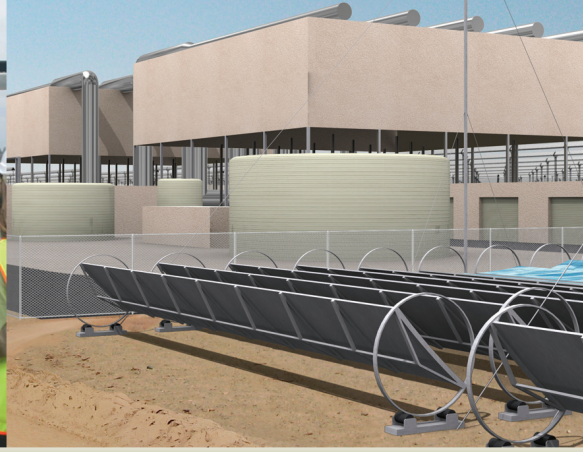

VOLUME 1
Application for Certification
Carrizo Energy Solar Farm
Carrizo Energy, LLC

Submitted to:
California Energy Commission

Submitted by:
Carrizo Energy, LLC

With Support from:
URS

1615 Murray Canyon Road, Suite 1000
San Diego, CA 92108

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$\mu g/m^3$	micrograms per cubic meter
µPa	micropascals
ACCs	air cooled condensers
ACOE	Army Corps of Engineers
ACSR	aluminum conductor steel reinforced
ADT	average daily traffic
ADT	average daily trips
AERMOD	American Meteorological Society/Environmental Protection Agency Regulatory Model
AF	acre-feet
AFC	Application for Certification
AFY	acre-feet per year
AG	Agriculture District
AHMs	Acutely Hazardous Materials
ANSI	American National Standards Institute
APCO	Air Pollution Control Officer
APEs	Areas of Potential Effect
APN	assessor parcel number
AQCR	Air Quality Control Regions
AQMP	air quality management plan
AQRVs	air quality-related values
ARCO	Atlantic Richfield Company
ARCO Site	ARCO Carrisa Plain Solar Project
ASME	American Society of Mechanical Engineers
ATC	Authority to Construct
Ausra	Ausra, Inc.
AWWA	American Water Works Association
B.P.	before present
BACT	best available control technology
Bechtel	Bechtel Civil & Minerals, Inc.
BFE	base flood elevations
bgs	below ground surface
BLM	Bureau of Land Management
BMPs	Best Management Practices
BOP	Balance of Plant
CAAA	Clean Air Act Amendments
CAAQS	California Ambient Air Quality Standards
$CaCO_3$	calcium carbonate
CAD	computer-aided design
Cal/OSHA	California Occupational Safety and Health Administration
CalARP	California Accidental Release Prevention
CalISO	California Independent System Operator
Caltrans	California Department of Transportation
CARB	California Air Resources Board
CAS	Compressed Air System

CBC	California Building Code
CCA	Clean Air Act
CCIC	Central Coast Information Center
CCR	California Code of Regulations
CDF	California Department of Forestry and Fire Protection
CDFG	California Department of Fish and Game
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CESF	Carrizo Energy Solar Farm
CFR	Code of Federal Regulations
CGS	California Geological Survey
CHP	California Highway Patrol
CHRIS	California Historical Resource Information System
CHSC	California Health and Safety Code
CHSP	Construction Health & Safety Program
CIDH	Cast-In-Drilled-Hole
CLFR	Compact Linear Fresnel Reflector
cm	Centimeter
CNDDB	California Natural Diversity Database
CNEL	Community Noise Equivalent Level
CNPS	California Native Plant Society
CO	carbon monoxide
CO_2	carbon dioxide
CPM	compliance project manager
CPUC	California Public Utilities Commission
CRHR	California Register of Historic Resources
CSA	County Service Area
CSO	Construction Safety Orders
CUPA	Certified Unified Program Agency
CVC	California Vehicle Code
CVCSD	California Valley Community Services District
CWA	Clean Water Act
CWC	California Water Code
dB	Decibels
dBA	Weighted Sound Level
DCS	Distributed Control System
DEH	Department of Environmental Health
DEHS	Department of Environmental Health Services
DEM	Digital Elevation Model
DMV	Department of Motor Vehicles
DNI	direct normal insolation
DOC/ATC	Determination of Compliance/Authority to Construct
DOGGR	Division of Oil, Gas & Geothermal Resources
DOSH	Division of Occupational Safety and Health
DOT	Department of Transportation

DPR	Department of Parks and Recreation
DTSC	Department of Toxic Substances Control
DWR	California Department of Water Resources
EMF	electromagnetic field
EMS	Emergency Medical Services
EPA	Environmental Protection Agency
EPC	Engineering, Procurement and Construction
EPRI	Electric Power Research Institute
ERCs	emission reduction credits
ESA	Environmental Site Assessment
ESILs	Existing Scenic Integrity Levels
ESO	Electrical Safety Orders
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FIRM	Flood Insurance Rate Map
FLPMA	Federal Land Policy Management Act
FPT	Fluted Point Tradition
gal	gallon(s)
GHG	greenhouse gas
GIS	Geographical Information System
GISO	General Industry Safety Orders
gpm	gallons per minute
GPS	global positioning system
GSU	Generator Step-Up
H&SC	Health and Safety Code
HAPs	hazardous air pollutants
HCP	Habitat Conservation Plan
HMBP	Hazardous Materials Business Plan
HMI	Human Machine Interface
HP	high-pressure
Hp	Horsepower
HRA	health risk assessment
HVAC	heating, ventilation and air conditioning
Hz	Hertz
IAS	Instrument Air System
IEEE	Institute of Electrical and Electronics Engineers
IGCC	Integrated Gasification Combined Cycle
IIPP	Injury and Illness Prevention Program
ISO	Independent System Operator
JHAs	job hazard assessments
km	kilometer(s)
KOPs	Key Observation Points
KPRA	kingpin-to-rear-axle
kV	kilovolt

LACM	Los Angeles County Museum of Natural History
L_{dn} or DNL	Day-Night Average Sound Level
L_{eq}	equivalent sound level
L_{max}	Maximum L_{eq}
L_{min}	Minimum L_{eq}
LOA	Live Oak Associates
LORS	laws, ordinances, regulations, and standards
LOS	level of service
lp	low-pressure
lpm	liters per minute
LRTP	Long Range Transportation Plan
LUO	Land Use Ordinance
m	meter(s)
m^3	cubic meter(s)
MCCs	Motor Control Centers
mg/l	milligrams per liter
MGD	million gallons per day
mm	millimeter
MSDS	material safety data sheets
MSL	mean sea level
MUP	Minor Use Permit
MW	megawatt(s)
NAAQS	National Ambient Air Quality Standards
$NaCO_3$	sodium carbonate
NADB	National Archaeological Database
NAHC	Native American Heritage Commission
NEC	National Electrical Code
NEMA	National Electrical Manufacturers Association
NEPA	National Environmental Policy Act
NESHAPS	national emission standards for hazardous air pollutants
NFPA	National Fire Protection Association
NNSR	Nonattainment New Source Review
NO_2	nitrogen dioxide
NO_x	nitrogen oxide
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NSPS	new source performance standards
OEHHA	Office of Environmental Health Hazard Assessment
OES	Office of Emergency Services
OPGW	optical ground wire
OSHA	Occupational Safety and Health Administration
OWHM	ordinary high water mark
OWS	oil/water separator
OWUS	Other Waters of the U.S./State

PCE	passenger car equivalent
PG	Professional Geologist
PG&E	Pacific Gas & Electric
PHMSA	Pipeline and Hazardous Materials Safety Administration
PI	Plasticity Index
PLA	Project Labor Agreement
PLC	Programmable Logic Controller
PM	Post Mile
PMI	point of maximum impact
PPA	power purchase agreement
PPE	personal protective equipment
PRC	Public Resources Code
PRC	PaleoResource Consultants
PSD	Prevention of Significant Deterioration
PSHA	Probabilistic Seismic Hazards Assessment
PSM	Process Safety Management
PTO	Permit to Operate
PV	photovoltaic
PWL	power level
RACT	Reasonably Available Control Technology
RAWS	Remote Automated Weather Station
RCRA	Resource Conservation and Recovery Act
RECs	Recognized Environmental Conditions
REL	reference exposure level
RMP	Risk Management Plan
RO	Reverse Osmosis
ROG	reactive organic gases
ROW	right-of-way
ROWD	Report of Waste Discharge
RPS	renewable portfolio standards
RWQCB	Regional Water Quality Control Board
SAA	Streambed Alteration Agreement
SARA	Superfund Amendments and Reauthorization Act
SC	sediment control
SCAQMD	South Coast Air Quality Management District
SCEC	Southern California Earthquake Center
SCS	Soil Conservation Service
SIPs	state implementation plans
SIS	System Impact Study
SLF	Sacred Lands File
SLOCAPCD	San Luis Obispo County Air Pollution Control District
SLOCCOG	San Luis Obispo Council of Governments
SLOCFD	San Luis Obispo County Fire Department
SO_x	sulfur oxide
SRA	sensitive resource area

SS	soil stabilization
SSURGO	Soil Survey Geographic
STAA	Surface Transportation Assistance Act
STGs	steam turbine generators
SVP	Society of Vertebrate Paleontology
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resource Control Board
TAC	toxic air containment
T-BACT	Toxic Best Available Control Technology
TC	tracking control
THI	total hazard index
TSD	transfer, storage, and disposal
TSP	total suspended particulate
TWA	time-weighted average
U.S.	United States
UCMP	University of California Museum of Paleontology
UFC	Uniform Fire Code
UL	Underwriters' Laboratories
URS	URS Corporation Americas
USC	United States Code
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UST	underground storage tank
UTM	Universal Transverse Mercator
V	volt(s)
VAC	visual absorption capability
VOC	volatile organic compounds
VRM	Visual Resource Management
VRMM	visual resources mitigation measures
VSOI	visual sphere of influence
WE	wind erosion
WPLT	Western Pluvial Lakes Tradition
WUS	Waters of the United States

SECTION 1 EXECUTIVE SUMMARY

1.1 INTRODUCTION

Ausra CA II, LLC (dba Carrizo Energy, LLC) (also referred to as Applicant) hereby applies for certification for the proposed Carrizo Energy Solar Farm (CESF or Project), which will consist of approximately one hundred and ninety-five Compact Linear Fresnel Reflector (CLFR) solar concentrating lines, and associated steam drums, steam turbine generators (STGs), air-cooled condensers (ACCs), and infrastructure, producing up to a nominal 177 megawatts (MW) net. The proposed CESF will be owned and operated by Carrizo Energy, LLC. The electricity generated by this Project will meet the requirements of a contract with a major California utility. Section 2.0, Project Objectives, describes the contract in more detail.

The Applicant is seeking approval from the California Energy Commission (CEC) to construct and operate a solar thermal power generation facility within eastern San Luis Obispo County. Solar thermal power plants have been built in the past and have proven reliable, but often have not been price-competitive. Ausra, Inc.'s (Ausra) improved, proprietary technology significantly reduces the cost of a solar thermal power plant and is thus capable of significantly reducing global carbon emissions by generating low carbon electricity on a commercial scale at competitive prices.

The CESF is located in an unincorporated area of eastern San Luis Obispo County (see Figure 1.1-1), west of Simmler and northwest of California Valley, California. The Project is approximately five miles west of Kern County. The CESF includes the solar farm site, a minimal offsite transmission system connection, and construction laydown area. The CESF site will encompass approximately 640 acres of fenced area on Section 28, Township 29 South, Range 18 East, on the California Valley and La Panza NE United States Geological Survey (USGS) 7.5 minute quadrangle maps, adjacent to California State Route 58 (SR-58)/Carrisa Highway (see Figures 1.1-2, 1.1-3, and 1.1-4). The 380-acre construction laydown area would be located entirely on Section 33, Township 29 South, Range 18 East, on the California Valley USGS 7.5-minute series quadrangle map, directly south of the Project site across SR-58. The CESF transmission system will require construction of approximately 850 feet of 230 kV transmission line. The transmission line is within the Project site boundary except for a 90-foot segment that connects to a tower within the existing Pacific Gas & Electric (PG&E) Morro Bay–Midway 230 kV transmission line right-of-way (ROW).

The CESF is located in an area zoned for agricultural uses as specified in the San Luis Obispo County General Land Use Plan; however, electrical generation is listed in the San Luis Obispo County Land Use Ordinance as an allowed use within the agricultural zone. Existing and past land uses include transmission lines, the PG&E Carrizo Plain Substation, agricultural, rural residences, and the prior Atlantic Richfield Company (ARCO) Carrisa Plain Solar Project (adjacent to the Project site).

The Project design will incorporate Ausra's proprietary CLFR technology to concentrate solar energy on pipes in an elevated receiver (see Figure 1.1-4). The concentrated solar energy boils water within a row of specially coated stainless steel pipes in an insulated cavity to produce saturated steam. The steam produced in the receivers is collected in a series of pipes, routed to steam drums, and then to the two STGs. Steam used by the steam turbines is condensed in two ACCs and returned to the solar field.

The solar field will operate daily from sunrise to sunset. Typical operating hours for the CESF will be approximately 13 hours per day, or an average of 4,765 hours per year.

This Application for Certification (AFC) has been prepared in accordance with the CEC's Rules of Practice and Procedure, and Power Plant Site Certification Regulations (April, 2007), and is intended to provide:

- A detailed description of the proposed CESF,
- An assessment of the anticipated Project impacts on the existing environment, and
- A discussion of compliance with applicable laws, ordinances, regulations, and standards (LORS).

The remainder of this Executive Summary summarizes the more detailed information presented in the balance of the AFC.

1.2 FACILITY LOCATION AND DESCRIPTION

The CESF site footprint will encompass a 640-acre section of land described as Section 28. The Project site is north and immediately adjacent to SR-58. Figures 1.1-2, and 1.1-3 depict the Project and surrounding area. The construction laydown area will be approximately 380 acres, located on the northern portion of Section 33, and immediately south of the CESF site across SR-58. The assessor parcel number (APN) for Section 28 is 072-091-001 and the APN for Section 33 is 072-091-010. Appendix A, Property Owners within 1,000 Feet, contains a list of current APNs and owners' names and addresses for all parcels within 1,000 feet of the proposed Project and related facilities.

Roadway access to the site will be from SR-58. In addition, Tracy Lane, an existing gravel road bordering the eastern side of the Project site, will be used to access the power block.

The Project site consists primarily of disturbed ranchland. Abandoned farm structures currently on Section 28 and an abandoned residence on Section 33 will be demolished prior to change of ownership. The site is generally flat and slopes gently to the southwest with elevations ranging from approximately 2,064 feet to 2,014 feet above mean sea level (MSL). The surrounding area is devoted almost exclusively to the agricultural uses of dry-farming and rangeland activities with a number of nearby rural residences, as well as the PG&E ROW and Carrizo Plain Substation.

1.2.1 Facility Description

The site plan for the Project is provided in Section 3.0, Facility Description and Location (Figures 3.1-1, 3.2-1, and 3.4-4). Onsite Project components include one hundred and ninety-five CLFR solar concentrating lines, and associated steam drums, STGs, ACCs, and other infrastructure, producing up to a nominal 177 MW net. Untreated groundwater will be supplied from an existing well onsite and conveyed to a 1,700 cubic meters (m^3) (450,000 gallon) raw water storage tank located in the power block via a 0.5-mile long 6-inch underground line. The underground water line will be located onsite within the Project property boundary. No natural gas is required for CESF operational activities; therefore, no offsite gas lines are proposed. The facility will require approximately 7 miles of internal roadways (asphalt paved or gravel) and the entire Project will be enclosed with a 10-foot chain-link fence. Offsite improvements

associated with the Project include approximately 90 feet of electric transmission line that will tie into the existing PG&E 230 kV transmission system at the northern Project boundary.

1.2.2 Water Supply and Discharge

Water supply for the CESF will be provided by groundwater from the local aquifer (i.e., Carrizo Plain Groundwater Basin) via an existing well near the center of Section 28. As discussed in Section 3.0, Facility Description and Location (see also Section 3.4.5, Water Supply and Use), groundwater will be conveyed to the 1,700 m^3 raw water storage tank via a 0.5-mile long 6-inch underground line entering the western side of the power block. The raw water supply line will be buried with a minimum of 3 feet of cover.

Untreated water needs include make up to the solar thermal and steam turbine system, washing of solar reflectors and collectors, general site uses, and fire protection. Potable water (treated water) will be supplied from a potable water skid for use by facility personnel.

The amount of process water used by the CESF is expected to be reasonably uniform. The expected average daily water consumption for the facility is approximately 18,500 gallons, or 21.8 acre-feet per year (AFY), based on the assumption of two units operating at full load for 13 hours per day. Estimated total peak daily use is approximately 0.7 million gallons per day (MGD), based on a 13 hour operating day. Average annual raw water consumption is estimated to be 17.2 AFY for full facility operation for 4,765 hours per year. CESF water use is shown in Section 3.0, Facility Description and Location, Figure 3.4-17.

Sources of process wastewater include solar thermal blow down, solar thermal system washdown, ACC washdown, and oil/water separator (OWS) clear well discharge. The design of the Project minimizes use and maximizes the recovery of process water. Blowdown and OWS clear discharge are routed to the onsite raw water storage tank and water treatment system for reuse. The wastewater streams are summarized in Section 3.0, Facility Description and Location, Table 3.4-3. The sanitary system will consist of a buried 1,000 gallon septic tank and leach field for all sanitary wastes including toilets, sinks, and showers.

Stormwater will be collected onsite and directed to swales and detention areas for percolation into the ground.

1.2.3 Transmission Facilities

The CESF transmission system will require construction of approximately 850 feet of 230 kV transmission line. As shown in Section 3.0, Facility Description and Location (see Figure 3.4-4), the CESF transmission line extends from the Project site switchyard to a point along PG&E's Morro Bay–Midway ROW. The overhead line begins at the dead-end structure in the switchyard and extends east along the northern edge of Section 28 for approximately 700 feet, then north for 150 feet to interconnect with the existing PG&E Morro Bay–Midway 230 kV transmission line (Line 1). The transmission line is within the Project site boundary except for a 90-foot long segment that connects to the PG&E tower. Construction of the line will include a dead-end structure in the switchyard and two tubular steel poles with concrete foundations and new 500 MCM ACSR conductors. Interconnection at this location

minimizes impacts that lengthy transmission lines create. This connection will allow the CESF to interconnect to the existing PG&E Carrizo Plain Substation. Refer to Appendices D through H for the engineering design criteria for the Project. See Section 3.0, Facility Description and Location (Figures 3.4-1, 3.4-2, and 3.4-3), for simulations created to present an illustration of the visual appearance of the CESF as well as the proposed transmission interconnection. See also simulations provided in Section 5.13, Visual Resources.

Output from the STGs will be converted from 13.8 kV at the generator terminals to 230 kV for interconnection to PG&E's existing Morro Bay–Midway transmission line via step-up transformers. Anticipated modification and upgrades to the PG&E substation and transmission systems are discussed in Section 3.0, Facility Description and Location (see Section 3.6, Transmission Line Safety and Nuisance). The Project will have two generators and two generator step-up (GSU) transformers, one for each STG. The electrical single-line diagram for the Project showing the transmission and auxiliary power schemes is provided in Section 3.0, Facility Description and Location (Figures 3.4-14 and 3.4-15).

PG&E has been contracted to perform a System Impact Study (SIS) to determine the method of interconnection and general equipment requirements. The executed SIS agreement and proof of payment to the interconnecting utility are provided in Appendix B, Executed System Impact Study Agreement and Proof of Payment to the Interconnecting Utility.

1.2.4 Construction Laydown Area

The construction laydown area will be 380 acres and is located on the northern portion of Section 33. The construction laydown area includes areas for staging, equipment and material storage, assembly; construction offices and buildings; and a temporary fueling station. Construction of two permanent crossings for vehicle access will be required along the access road as shown in Figure 1.1-4. This access road will also act as a turn-around onto SR-58 for large construction vehicles during construction and operation of the CESF. Abandoned farm structures currently on Section 28 and the abandoned residence on Section 33 will be demolished prior to change of ownership.

1.3 PROJECT SCHEDULE

The Project anticipates receipt of the CEC license to construct by November 2008. Construction of the CESF, from site preparation and grading to full commercial operation, is expected to take approximately 35 months. Site construction activities will commence in the first quarter of 2009 and continue through the 35-month construction schedule. The Project is scheduled to be online and available for dispatch into the grid on or before May 31, 2010. It is currently anticipated that the entire CESF will be online and in commercial service by the first quarter of 2012.

1.4 PROJECT OWNERSHIP

- Owner: Ausra CA II, LLC (dba Carrizo Energy, LLC).
- Operator: Ausra CA II, LLC (dba Carrizo Energy, LLC).

1.5 SUMMARY OF ENVIRONMENTAL IMPACTS

The proposed Project has the potential to adversely impact the existing environment. In order to limit potential Project impacts to a level of insignificance under normal operating conditions, the Applicant has carefully chosen the CESF location and incorporated design elements that serve to decrease impacts. Section 5.0, Environmental Information, of this AFC assesses environmental impacts according to the following environmental resources:

- 5.2 Air Quality
- 5.3 Geologic Hazards and Resources
- 5.4 Soil Resources
- 5.5 Water Resources
- 5.6 Biological Resources
- 5.7 Cultural Resources
- 5.8 Paleontological Resources
- 5.9 Land Use
- 5.10 Socioeconomics
- 5.11 Traffic and Transportation
- 5.12 Noise
- 5.13 Visual Resources
- 5.14 Waste Management
- 5.15 Hazardous Materials Handling
- 5.16 Public Health and Safety
- 5.17 Worker Safety
- 5.18 Cumulative Impacts

Section 5.0, Environmental Information, presents a detailed assessment of the environmental impacts of the Project on the existing environment.

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SECTION 2 PROJECT OBJECTIVES

The Carrizo Energy Solar Farm (CESF or Project) is a proposed solar thermal electric generation project that has been designed and developed to conform to the requirements of the 20-year power purchase agreement (PPA) between a major California utility and Ausra CA II, LLC (dba Carrizo Energy, LLC) (also referred to as Applicant). The goal and objective of this Project is to generate and sell clean, renewable, solar-powered electricity in accordance with the contractual requirements of the PPA and the legal and regulatory requirements of the State of California. The following discussion gives the background pertinent to the PPA for the sale of power from the CESF.

2.1 UTILITIES' REQUIREMENT TO PROCURE RENEWABLE POWER

To remain in compliance with renewable portfolio standards (RPS) set forth under California law (SB 1078, Sher, Chapter 516, Statutes of 2002), California utilities must procure 20 percent of the energy they provide customers in 2010 from qualifying renewable energy sources. The State of California is considering raising this target to 33 percent by 2020. The RPS program requires the California Public Utilities Commission (CPUC) to work collaboratively with the California Energy Commission (CEC) to implement the RPS and assign specific roles to each commission.

To achieve this challenging target, California utilities have undertaken several parallel renewable power procurement processes (e.g., competitive bidding, bilateral negotiations, joint venture development, expansion of existing facilities, etc.) to obtain renewable power at the most advantageous price and terms available. These utilities have signed several PPAs as a result of this procurement process and the Applicant is currently negotiating a PPA with a major California utility for the electricity and Renewable Energy Credits from the Project.

To date, the CPUC has addressed its responsibilities in implementing the RPS in R.01-10-024, Order Instituting Rulemaking to Establish Policies and Cost Recovery Mechanisms for Generation Procurement and Renewable Resource Development and R.04-04-026, Order Instituting Rulemaking that is specific to Renewables, which will be coordinated under a new broader procurement rulemaking, Order Instituting Rulemaking to Promote Policy and Program Coordination and Integration in Electric Utility Resource Planning, R.04-04-003.

In response to the RPS procurement process, the Applicant investigated potential sites throughout California near transmission substations and in areas of good solar direct normal insolation (DNI). The Applicant focused on sites at or near the Midway substation, located in Kern County, due to its potential to avoid major transmission congestion. Investigation included exploration of existing transmission path loads, flows, constraints, and growth potential. The electrical transmission line adjacent to the proposed Project site minimizes the need for, and potential impacts from, the linear facilities required for the plant. Project development on any other site in the vicinity of the existing PG&E substation would require the destruction of existing agricultural and/or potential biological resources habitat. Thus, use of the proposed Project site allows for fewer impacts to biological and agricultural resources and keeps transmission connection to a minimum.

2.2 POWER PURCHASE AGREEMENT

As stated previously, a major California utility and Carrizo Energy, LLC are in contract negotiations for generation services.

Contract provisions include:

- Contract term of 20 years.
- Carrizo Energy, LLC would have two (2) GE or Siemens (or equivalent) steam turbine generation units and an associated Compact Linear Fresnel Reflector (CLFR) solar field that result in an annual capacity factor of approximately 25 percent as-available. Each of these steam turbine units is to provide approximately 93 MW of capacity in summer peak conditions with no emission levels.
- The Project is to be on-line, as defined in the PPA, and available for the utility to begin dispatching into the grid on or before May 31, 2010.

2.3 OBJECTIVES SUMMARY

Based on the factors discussed above, project objectives are summarized as follows:

1. To comply with provisions of the PPA, and develop a project with the potential to achieve an initial commercial on-line date in 2010;
2. To safely and economically provide an efficient, reliable, and environmentally sound solar power generating facility in San Luis Obispo County capable of selling competitively priced renewable energy consistent with the needs of the surrounding areas, as well as provide additional generating capacity for the State and region as a whole;
3. To minimize infrastructure needs and reduce environmental impacts by locating the plant near existing infrastructure, including: PG&E transmission lines and substation, and an adequate water supply without requiring significant modifications to the regional system;
4. To avoid siting the plant in areas that are highly pristine or biologically sensitive;
5. To site the facility in areas with high solar energy potential and consistent with existing land use plans which call for renewable energy development; and
6. To assist California in repositioning its generation asset portfolio to use more renewable energy in conformance with State Policy, including the policy objectives set forth in Senate Bill (SB) 1078 (California Renewable Portfolio Standard Program) and Assembly Bill (AB) 32 (California Global Warming Solutions Act of 2006).

SECTION 3 FACILITY DESCRIPTION AND LOCATION

3.1 INTRODUCTION

The following section describes the proposed Carrizo Energy Solar Farm (CESF or Project) and its ancillary systems. The CESF will be owned and operated by Ausra CA II, LLC (dba Carrizo Energy, LLC). The CESF will consist of approximately one hundred and ninety-five Compact Linear Fresnel Reflector (CLFR) solar concentrating lines, and associated steam drums, steam turbine generators (STGs), air cooled condensers (ACCs), and infrastructure, producing up to a nominal 177 megawatts (MW) net. The 640-acre Project site is located on one section of land adjacent to California State Route 58 (SR-58)/Carrisa Highway, in an un-incorporated area of San Luis Obispo County near the towns of Simmler and California Valley, California. The 380-acre construction laydown is located south and adjacent to the proposed Project site on Section 33. Figure 3.1-1 depicts the Project and construction laydown area.

The CESF is located in an area zoned for agricultural uses as specified in the San Luis Obispo County General Land Use Plan; however, electrical generation is listed in the San Luis Obispo County Land Use Ordinance as an allowed use within the agricultural zone. The area adjoining the Project is primarily open, undeveloped land. Land uses within 1.6 kilometers (km) (1.0 mile) of the Project are comprised of the following:

- Carrisa Plains School located in the southwest corner of Section 34;
- Several existing residences located within 1.6 km (1.0 mile) of the Project;
- Local Pacific Gas & Electric (PG&E) Carrizo Plain Substation approximately 30 meters (m) (98 feet) east of the Project's northeast property corner;
- Agricultural (grazing and dry farming); and
- PG&E's Morro Bay–Midway 230 kilovolts (kV) and 115 kV transmission lines, approximately 30.5 m (100 feet) north of the Project.

The Project design will incorporate Ausra, Inc.'s (Ausra) proprietary CLFR technology to concentrate solar energy on pipes in an elevated receiver. The concentrated solar energy boils water within a row of specially coated stainless steel pipes in an insulated cavity to produce saturated steam. The steam produced in the receivers is collected in a series of pipes, routed to twenty steam drums located in the solar field, and then to two steam drums and two STGs in the power block. Steam used by the steam turbines is condensed in two ACCs and returned to the solar field.

The Project will include the construction of a new 230 kV switchyard located between the two STGs. Untreated raw water for the Project will be obtained from ground water via an existing onsite well. The design of the Project minimizes use and maximizes the recovery of process water. Blowdown and oil/water separator (OWS) clear discharge are routed to the onsite raw water storage tank for reuse. Stormwater will be collected onsite and directed to swales and detention areas for percolation into the ground. The sanitary system will consist of a buried septic tank and sanitary leach field.

The STGs will generate electricity at 13.8 kV. To provide transmission level capability, the electricity generated will be stepped up using two (2) 13.8/230 kV Generator Step-Up (GSU) transformers. A new

single-circuit 230 kV overhead transmission line will interconnect the facility with PG&E's existing Midway Substation by looping into the existing Morro Bay–Midway 230 kV line located north and adjacent to the CESF site.

Main access to the Project and the general vicinity will be provided via SR-58, immediately south and adjacent to the site.

3.2 LOCATION OF FACILITIES

As shown on Figure 3.1-1, the CESF site is located on Section 28, Township 29 South, Range 18 East, west of Simmler and northwest of California Valley, in San Luis Obispo County, California, and immediately adjacent to SR-58. This figure also shows the adjacent construction laydown area located in Section 33. Figure 3.2-1 illustrates the location of the CESF Project as well as the onsite well location and raw water line. The assessor parcel number (APN) for Section 28 is 072-091-001 and the APN for Section 33 is 072-091-010.

Roadway access to the site will be from SR-58, which borders the southern edge of the Project site. Tracy Lane, an existing gravel road bordering the eastern side of the Project, will be used to access the power block, located in the northeastern corner of Section 28.

3.3 SITE DESCRIPTION

3.3.1 Existing Site Conditions

The Project site currently consists primarily of disturbed ranchland. Abandoned farm structures currently on Section 28 will be demolished prior to change of ownership. The site is generally flat and slopes gently to the southwest with elevations ranging from approximately 629 m (2064 feet) to 614 m (2014 feet) above mean sea level (MSL). The portion of stormwater runoff that is not absorbed into the ground will run offsite as sheet flow and will follow the terrain to the south and west.

3.3.2 Site Surveys

A detailed land survey was performed to establish local benchmarks and site boundaries. A topographic survey was performed to establish the site's grading and drainage plans (see Figure 3.3-1). A preliminary geotechnical report was performed to evaluate general subsurface conditions, seismicity, and other geological information necessary in order to develop recommendations for the design and construction of foundations, above ground structures, and equipment (see Section 5.3, Geologic Hazards and Resources and Appendix J, Preliminary Geotechnical Investigation).

3.4 GENERATING FACILITY DESCRIPTION

This section describes the site arrangement, conceptual design, processes, and proposed operation of the CESF Project. All Project facilities will be designed, constructed and operated in accordance with applicable laws, ordinances, regulations, and standards (LORS). Computer-generated photo simulations of the proposed Project can be seen in Figures 3.4-1, 3.4-2, and 3.4-3.

3.4.1 Site Arrangement

The site plan for the Project (Figure 3.2-1) coincides with the general arrangement for the power block, as shown in Figure 3.4-4. Proposed transmission line connections are also clearly shown on this figure. Typical elevation views are provided in Figures 3.4-5 and 3.4-6. These figures illustrate the location, equipment arrangement, and size of the largest features of the Project. The Project site will encompass approximately 640 acres of fenced area within Section 28. The Project's construction laydown area will be approximately 380 acres adjacent to the Project, located on the northern portion of Section 33.

Access to the Project site will be provided from Tracy Lane. Access into the Project site will be provided via one new gate located at the northeastern corner of Section 28. Selected roadways internal to the Project site will be asphalt paved. The entire Project site will be fenced. All access to the Project site will be made through controlled gates.

3.4.2 Process Description

The Project will consist of CLFR solar concentrators, steam drums, two STGs, and associated air cooling systems. When completed, the CESF will produce 1.14 million kg/h (2.52 million lbm/h) of 49.6 bar (720 psia) dry saturated steam, sufficient to power the two 93 MW (gross) steam turbines. The process flow diagram is shown on Figure 3.4-7.

During daylight hours, the solar concentrators will focus heat directly on the receivers to produce steam, which will be collected in a piping system and delivered to twenty steam drums located in the solar field and then to two steam drums in the power block. Steam flows from the steam drums to the STGs. At full load, each STG generates approximately 93 MW (gross) at average ambient conditions.

The solar field will operate daily from sunrise to sunset and will come out of the stow position over 20-30 minutes at sunrise. The solar field consists of approximately 195 lines, each of which contains 10 rows of reflectors divided into 4 segments. See Figure 3.4-8 for the schematic depiction, including nomenclature explanation, of a line and its components. Each row-segment is supported on large hoops that rotate independently on metal castors. Rotation of the reflectors is driven by a small electrical pulse motor. Reflectors are stowed with the mirror aimed down at the ground during the night, and rotate out of the stow position at the beginning of operating hours to direct the incident sunlight onto the receiver. The rotation out of the stow position takes approximately 4 minutes for any one reflector, and groups of reflectors are sequenced across the field to manage auxiliary load. For example, row 1 of each line may rotate first, then row 2, etc. until each reflector in every line is focused on its receiver.

During operating hours, each drive motor will receive an electrical pulse every 5-15 minutes (depending on time of day and time of year) to keep the reflectors on focus. Due to the orientation of the solar field, the amount of rotation during operation each day is minimal, ranging through the course of the year from 3°-10° from starting position to noon and then back to starting position (as shown in Figure 3.4-9). The reflectors do not track the sun in the east west direction, but track based on sun angle above the horizon that varies with the season (i.e., higher in summer, lower in winter). For steam line operation, feedwater pumps will circulate the water steam mixture through the field. At the end of each line, there will be a small moisture-separator pump to re-circulate water in the receiver and minimize the amount of water

sent to the main steam line. These moisture separator pumps will operate continuously during daylight hours. Each pump is rated at 4.5 horsepower (Hp).

As the sun sets, each row will rotate back into stow position and the moisture separator pumps will cease operation at night. The feedwater pumps will shut down or reduce operation to keep a minimal defrosting flow in the solar field. Inside the main power block building, the steam turbine will stay in warm rotation using the steam drum and a pressure-control valve to manage the accumulated steam/hot water flows.

During adverse weather events (defined as storms, periods of sustained clouds, or sustained wind conditions greater than 30 miles per hour [mph]) the solar field will go into stow position similar to the overnight stow routine. An automated wind and weather monitoring system will trigger the stow routine, and plant operators will monitor weather information to determine if a stow routine is warranted.

3.4.3 Energy Conversion Facilities Description

This section describes the major energy conversion components of the proposed CESF, including the solar field, STGs, and auxiliary equipment.

3.4.3.1 Solar Thermal Field System Description

The following section presents a description of the solar thermal component of the CESF, followed by a description of the major components of the solar field.

3.4.3.2 History and Background of Technology

The CESF will use Ausra's CLFR technology. Ausra's technology makes it one of very few companies capable of significantly reducing global carbon emissions by generating low carbon electricity on a commercial scale and at competitive prices.

Solar-thermal power plants have been built in the past and have proven reliable but have not been price-competitive. Ausra's improved technology significantly reduces the cost of a solar thermal power plant. While similar in overall concept to parabolic trough, a number of important aspects of Ausra's CLFR technology allow it to be deployed at considerably lower costs:

- Less stringent mirror curvature requirements due to longer focal length, allowing for relatively flat and inexpensive mirrors;
- Low wind profile, resulting in reduced wind loads and structural requirements;
- Lower temperature process, precluding the need for expensive materials designed for high temperature use;
- Water is converted to steam directly within the receiver, greatly increasing the energy transport per unit of mass and thereby providing lower overall parasitic power losses; and
- An overbuilt solar field, which provides higher capacity factors.

The Ausra technology has been in development for over ten years. During that time significant testing has been performed, resulting in subsequent design modifications. Ausra's first generation CLFR plant was built specifically to demonstrate the technology in a thermal steam generation application. This

system, the Liddell 1 facility located at the Macquarie Liddell Power Station near Singleton, New South Wales, Australia, was constructed in 2004. The Phase I Liddell project accomplished its stated goals in terms of overall installed cost and performance. During its operational test period, the performance of the system was within 5 percent of the predicted performance, producing saturated steam at 82 bar (1,190 psi), suitable for generating electricity in a steam turbine.

In 2005, because of the success of the demonstration facility, Macquarie awarded Solar Heat and Power (the predecessor to Ausra) a Phase II expansion of the contract to 13.5 MW_t. The Phase II plant was designed to provide steam to Macquarie's 2000 MW coal fired power plant. This facility is currently under construction and is scheduled to become operational in December 2007. A Phase III expansion is under negotiation and is expected to be awarded later in 2007 for 90 MWt.

CLFR technology in general is simple relative to other solar technologies, and therefore poses lower risk. The optical requirements on the glass are far less stringent and less costly than what is required for parabolic trough or the Stirling dish. This is due to the minor curvature required because of the large focal length. Similarly, because the CLFR process operates at lower temperatures and converts water directly to steam within the receiver itself, technology risk is minimized in that neither special high temperature materials, expensive and complex vacuum tubes, nor special heat exchangers are required.

3.4.3.2.1 Description of Technology

Ausra's CLFR technology consists of a series of slightly curved linear solar reflectors that concentrate solar energy on pipes in an elevated receiver structure approximately 17 m (56 feet) tall. The reflectors and receivers are similar to the design in use at Liddell Power Station, near Singleton, New South Wales, Australia. The receiver will carry a row of specially coated steel pipes in an insulated cavity. When the reflectors focus on the receiver, saturated steam at approximately 270°C (518°F) will be produced as cooler water that is pumped through the receiver pipes and is heated up. The steam will then be used to drive the Project's turbines.

Figures 3.4-8 and 3.4-10 explain the terminology associated with the solar Array's components, and how they are defined relative to one another. A reflector measures 16 by 2.25 meters, or 52.5 by 7.5 feet. A row is defined as 24 reflectors lying end-to-end. A quarter of a row (6 end-to-end reflectors) is called a row-segment. A line is made up of a group of 10 adjacent rows and operates as a unit, focusing on its own receiver. A line's cross-section of ten single reflectors is a bay. Put in terms of single reflectors, a line measures a row by a bay, or 386.4 meters long by 27.5

Each receiver concentrates the sunlight using ten rows of reflectors. This ten-row group of reflectors operates as one unit called a line. A line will be 386.4 m long by 27.5 m wide (1,268 feet by 90 feet). The facility will contain approximately 195 lines arranged as shown in Figures 3.4-8 and 3.4-10. The solar field will occupy approximately 2.5 km^2 (0.975 mi^2) of land. Detailed descriptions of the major Project components are provided below.

3.4.3.2.2 Major Solar Equipment

Table 3.4-1 shows dimensions of all equipment and structures associated with the CESF project. Each row of reflectors is composed of four segments of six 16 m by 2.25-m (52.5 feet by 7.5 feet) reflectors

that assembled together and controlled as a single unit. The reflector mirrors are made from commercially available low iron glass with high performance silver backing (also commercially available) generating 92 percent reflectivity of the solar spectrum. The reflector rows are oriented so as to minimize tracking requirements during the course of the day. Of the ten reflector rows associated with each receiver, six lie to the north of the receiver and four lie to the south. The focal length of the reflectors matches their distance from the receiver.

Table 3.4-1
Dimensions of CESF Equipment and Structures

Description	Diameter (Feet)	Width (Feet)	Length (Feet)	Height (Feet)
POWER BLOCK				
Control and Administration Building	~	40	75	40
Steam Turbine Generator Building	~	50	200	60
Air Cooled Condensers	~	220	250	115
Demineralized Water Treatment Facility	~	40	75	20
Warehouse and Shop Building	~	75	150	20
Steam Drum and Support Structure	~	20	40	30
Blowdown Tank	12	~	~	25
Vacuum Ejector Skid	~	25	50	20
Condensate Tank (Horizontal, Elevated, 20,000 Gallons)	10	~	26	20
Generator Step Up Transformers	~	30	23	30
Auxiliary Transformers	~	12	15	15
Standby Transformer	~	20	15	15
Take-Off, Dead End and Buss Structures	~	30	35	40
Transmission Line Steel Pole, In Line	8	~	~	100
Transmission Line Steel Pole, at 230kV Connection	8	~	~	150
Raw Water-Fire Water Tank (450,000 Gallons)	56	~	~	28
Service Water Tank (150,000 Gallons)	36	~	~	19
Demineralized Water Tank (40,000 Gallons)	17	~	~	28
Fire Water Pump Building	~	20	50	15
Filter Station	~	15	25	10
Pipe Rack	~	18	~	20
SOLAR FIELD				
Reflector Line	~	90	1,268	5
Reflector Hoop	8	~	~	~
Receiver	~	3	1,268	56

Table 3.4-1
Dimensions of CESF Equipment and Structures
(Continued)

Description	Diameter (Feet)	Width (Feet)	Length (Feet)	Height (Feet)
Pipe Rack & Electrical Raceway	~	18	~	6
Recirculation Pumps	~	5	10	4
Steam Separator Tanks	4	~	~	6
Steam Drum and Support Structure	~	15	40	58

The height of the receiver from the reflector rows enables a much easier manufacturing process than traditional solar thermal reflectors. Rather than using slumped glass to achieve the desired curvature, flat glass is attached tightly to corrugated steel decking that is supported by and attached to a weldment structure with the desired curvature. The use of flat glass is made possible since only a minor curvature of the reflectors is required. This dramatically reduces the cost of solar reflectors in comparison with other solar thermal technologies that require much higher curvature.

The hoop shaped support structure allows the reflectors to rotate through a complete circle, as shown in Figure 3.4-10. Since the reflector's center of gravity is located at the center of the hoops, each row of reflectors can be controlled by four electric motors, each requiring approximately 0.5 kW. A total of 40 motors are used to control the ten rows of reflectors in a line.

The method of reflector construction and the control system used allows the reflectors to be stowed upside down at night and during potentially damaging weather events, leaving only the steel backing sheet exposed. Full rotation also aids maintenance operations by allowing easy access to the mirror for washing when rolled on its side. Regular washing ensures continuously high mirror reflectivity, and has little negative impact on electricity output as only the line actually being washed must be taken out of focus while the remaining portions of the Project continue to produce power. The flexibility provided by rotating reflectors also means that just 0.12 m (0.4 feet) of space is needed between the hoops of two parallel reflectors, allowing each line to provide approximately 82 percent ground coverage. Accounting for the power block and access roads, the solar farm achieves approximately 70 percent overall ground coverage, providing more compact land use and higher annual energy output per acre than is achieved with other solar technologies.

The reflectors are able to operate in winds up to 30 mph, and are designed to meet or exceed California Building Code (CBC) wind loads while in the stowed position.

Every 17 m (56 feet) tall, 386.4 m (1,268 feet) long receiver structure carries a series of ten pipes in an insulated cavity (see Figure 3.4-10). A proprietary absorptive coating on the pipes produces excellent absorption of the solar energy with low radiative emittance. The pipes are arranged in a two-pass system. Five pipes are used to carry 180°C (356°F) feedwater along the outside of the internal receiver cavity. The heated liquid-steam mixture from these five pipes is then mixed and combined in a manifold at the opposite end of the receiver. Additional energy is added to this first pass steam-water mixture by

providing a second pass using the five interior pipes. At the completion of this second pass, saturated steam is produced at approximately 270°C (518°F). Each line will have a mass flow rate of approximately 4.6 kg/s (36.5 kpph).

Piping arrangements in the Project will carry the saturated steam-liquid mixture to twenty steam drums located in the solar field and then to two steam drums located adjacent to the STGs in the power block. Piping arrangements are depicted on Figures 3.4-11. 3.4-12, and 3.4-13. The steam drums will collect the steam-liquid mixture and produce the steam quality required to drive the two 93 MW (gross) steam turbines.

Receiver structures, supports, foundations and piping will be designed consistent with CBC requirements. A trickle flow system will be used to protect the pipes against freezing. A galvanized steel roof will guard the elevated receiver piping against rain and hail. Project piping will be designed to meet American Society of Mechanical Engineers (ASME) B31.1 standards.

3.4.3.3 Steam Turbine Generator (STG)

Steam from the solar fields will be routed to twenty steam drums located in the solar field and then to two steam drums and two STGs in the power block. The steam turbines are two-casing, strait condensing double-flow down exhaust turbines with 50.8 centimeter (cm) (20 inch) last stage buckets. The steam is admitted at the inlet to the high-pressure (HP) turbine section, expanded through eight stages of turbine blades in the HP section, and exhausted to the cross-over. The cross-over piping carries the steam to the low-pressure (LP) turbine where the flow is divided. Steam expands through four stages (per flow) to exhaust to the ACC. This expansion converts the incoming energy of the steam into mechanical energy in the turbine.

The steam turbine provides the driving force to spin the generator, which converts the mechanical energy into electrical output. The STGs are equipped with all accessories necessary to provide safe, reliable, and efficient operation. The STGs include:

- Governor systems
- Steam admission system
- Gland seal system
- Lubricating oil system and associated coolers
- Generator coolers
- Acoustical enclosure

3.4.4 Electrical System Description

This section describes the major electrical systems and equipment proposed for the CESF. While a small (8 percent) amount of the Project output will be used onsite for plant auxiliaries such as pumps, lighting, heating, ventilation and air conditioning (HVAC), etc., most will be delivered to the regional grid through the interconnection with the PG&E transmission system. An overall single-line diagram is provided in Figure 3.4-14.

3.4.4.1 Major Electrical Equipment and Systems

The Project includes constructing a switchyard, which will include transformers, circuit breakers, metering and other protection required to connect the Project to the Morro Bay–Midway 230 kV transmission system. The CESF transmission system will require construction of approximately 260 m (850 feet) of 230 kV transmission line. As depicted in Figure 3.4-4, the CESF transmission line extends from the Project site switchyard to a point along PG&E's Morro Bay–Midway ROW. The overhead line begins at the dead-end structure in the switchyard and continues east along the northern edge of Section 28 for approximately 213 m (700 feet), then north for 46 m (150 feet) to interconnect with the existing PG&E Morro Bay–Midway 230 kV transmission line (Line 1). The transmission line is within the Project site boundary except for a 27 m (90 feet) long segment that connects to the PG&E tower.

Auxiliary power required to support the Project will be provided at 4,160 V via auxiliary transformers during normal operation, and will be back fed from the 230-kV transmission line via the GSUs during non-daylight hours, as described in Section 3.4.4.3.

Motor control centers, lighting and electrical panels will be used to provide power to support the electrical demands required to operate the Project. A battery system will also be provided to support those portions of the Project that require direct current to operate.

Output from the STGs will be converted from 13.8 kV at the generator terminals to 230 kV for transmission to PG&E's existing Morro Bay–Midway 230 kV transmission line. Anticipated modification and upgrades to the PG&E substation and transmission systems are discussed in Section 3.6. The Project will have two generators and two GSU transformers, one for each STG. Electrical single-line diagrams for the Project showing the transmission and auxiliary power schemes are provided in Figures 3.4-14 and 3.4-15.

3.4.4.2 Electrical Generation

Power is generated at 13.8 kV by the two STGs and then stepped up to 230 kV for delivery to the interconnecting transmission system. Each generator is connected by 13.8 kV bus to its own 13.8 kV/230 kV oil-filled GSU transformer. Each GSU will be supported on a concrete foundation. A containment area will be provided around the GSU in the unlikely event there is a leak or spill. The 230 kV high voltage side of each GSU will be connected by overhead conductors to a dead-end structure in the Project's switchyard. Overhead conductors will be used from the dead-end structure to the physical connection with the existing Morro Bay–Midway 230-kV transmission line.

3.4.4.3 Electrical System for Plant Auxiliaries

Auxiliary power to the power block and auxiliaries will be provided at 4,160 volts (V) AC. Two 13.8 kV/4.160 kV outdoor auxiliary transformers will provide primary power to the 4,160 V switchgear. The 13.8 kV bus of each STG is provided with a tap connection to a 13.9-kV/4160-dry type, step down auxiliary transformer and the 4160 V side of each transformer is connected to 4160-switchgear. Each STG is provided with a 13.8 kV generator breaker located between the generator and the tap connection. This configuration allows power for plant auxiliaries to be supplied from the plant switchyard regardless of whether or not the STGs are online or offline. The auxiliary transformers are set on concrete.

The 4160 V switchgear distributes power to the plant's 4000 V motors and to the 4160/480 V dry type transformers. The low voltage side of the 4160/480 V transformers is connected to 480 V switchgear.

Balance of plant equipment will be supplied at 480 V. Switchgear and Motor Control Centers (MCCs) will be provided to supply various 4000 V and 460 V motors. The 4160 V starters will be indoor, National Electrical Manufacturers Association (NEMA) 1 type with fused contactor and overload relay controls. The 480 V MCCs will be indoor enclosures, NEMA 1, Type B wiring, combination starters using circuit breaker and starters. Indoor floor mounted distribution transformers with a voltage rating of 480/120/208 V will be used to supply lighting, receptacles, control, and low voltage power.

Protection and control systems will be provided and include synchronization, protective relays, redundant relays for step-up transformer differential protection, transmission line protection, station bus differential protection, and generator protection, as required to meet PG&E Generator Interconnection criteria, as shown in Figure 3.4-16.

3.4.4.4 DC Power Supply System

A 125 V DC battery system with charger, metering, ground detectors, and distribution panels is provided. Under normal operating conditions, the battery charger supplies DC power to the DC loads. The battery charger receives 480 V, three-phase AC power from the 480V bus and continuously charges the battery bank while supplying DC power to the DC loads. Under abnormal or emergency conditions when AC power is not available, the battery bank supplies DC power to the DC loads. The battery bank is sized to power the DC loads for a sufficient amount of time to provide for safe and damage-free shut down of the power plant.

3.4.4.5 Essential Service AC System

An essential service AC system (120 V, single-phase) provides power to essential instrumentation, critical equipment loads, safety systems, and equipment protections systems that require uninterruptible AC power. The essential service AC system and the DC power supply system are both designed to ensure that critical safety and equipment protection control circuits are always energized and able to function in the event of unit trip or loss of AC power.

The essential service AC system consists of an inverter, a solid-state transfer switch, a manual bypass switch, an alternate AC source transformer and voltage regulator, and AC panel boards. The DC power supply system is the normal source of power to the essential service AC system. Power flows from the DC power supply system through the inverter to the AC panel boards. The solid-state transfer switch continuously monitors both the inverter outputs and the alternate AC source. Upon loss of the inverter output and without interruption of powers, the transfer switch automatically transfers essential service AC loads from the inverter output to the alternate AC source. The manual bypass switch enables isolation of the inverter and transfer switch for testing and maintenance without interruption of power to the essential service AC loads.

3.4.4.6 Standby Power

A standby power source fed from the utility grid will supply electrical power to the power plant critical services in the event of a total power outage of plant auxiliary buses. The plant critical services will include battery chargers, turning gear, lubricating oil systems, Distributed Control System (DCS)/ Programmable Logic Controller (PLC) controls, circulating pumps for the steam field, reflector drive motors, condenser fan motors, emergency/ critical lighting, and a plant communication system.

The standby transformer will be designed, tested, rated, assembled, and installed in accordance with all the applicable standards on American National Standards Institute (ANSI), National Electrical Code (NEC), Independent System Operator (ISO), Underwriters' Laboratories (UL), Institute of Electrical and Electronics Engineers (IEEE) and National Electrical Manufacturers Association (NEMA). The equipment will meet the requirements of NEC and all applicable codes and standards.

The standby transformer will be a two winding transformer rated at 20,000 kV, 230 kV/4.16 kV. The 4.16 kV winding transformer will be connected in delta to allow the 4.16 kV buses to stay connected on a single line to ground fault. This improves the reliability of the system. There will be a ground fault detection for the delta connection and it will be alarmed on a single line to ground fault. The 4.16 kV winding will supply power to each of the plant's 4.16 kV buses through a normally open breaker. Upon loss of normal power to the plant's 4.16 kV bus(s), the 4.16 kV bus(s) will be automatically transferred to the standby power. The standby transformer is sized to carry the total emergency load of both units (see Figure 3.4-14).

3.4.5 Water Supply and Use

Water will be required for the following:

- Make up to the solar thermal and steam turbine system.
- Washing of solar reflectors and collectors.
- Potable water. Potable water will be supplied from a potable water skid for use by plant personnel.
- Service water. Untreated water will be required for general site uses.
- Fire protection.

Untreated raw water will be supplied by ground water via an existing well near the center of Section 28. The well is approximately 180 m (591 feet) deep and is lined with a 35.6 cm (14 inch) diameter steel casing and screen. The existing well will be fitted with a 56 kW (75 hp) submersible electric pump capable of providing up to 113.6 m^3/hr (500 gallons per minute [gpm]) of water from the local aquifer (i.e., Carrizo Plain Groundwater Basin). Raw water will be forwarded to the raw water tank via a buried 15.2 cm (6 inch) line (see Section 3.4.11).

Two 100 percent forwarding pumps located in the power block will pump the water from storage in a 1,700 m^3 (450,000 gallon) combination raw water/firewater storage tank to the water treatment system. All water for the Project will be treated as required onsite. Blowdown from the steam drums will be returned to the raw water storage tank to reduce raw water requirements.

The water usage is summarized in Table 3.4-2.

Table 3.4-2
Carrizo Energy Solar Farm Water Usage Rates[1]

Water Use	Average Annual (lpm/gpm)[2]	Average Daily (lpm/gpm)[3]	Maximum Daily (lpm/gpm)[4]
EQUIPMENT MAKEUP WATER REQUIREMENTS			
Steam Cycle Makeup to DI Tank	103 / 27	103 / 27	190 / 50
Reflector Wash Water	19 / 5	28 / 7	51 / 13
ACC Wash Water	0.9 / 0.25	0.9 / 0.25	121 / 32
Media Filter Back Wash[5]	0.006 / 0.01	0.05 / 0.01	0.03 / 0.009
Misc. Drains, etc. to OWS	5.4 / 1.4	2 / 0.6	4 / 1
Potable Water	20 / 5.3	20 / 5.3	20 / 5.3
Total Equipment Makeup Requirements	149 / 39	154 / 41	387 / 101
Recovered Water[6]			
Steam Drum Flash Steam	12 / 3	12 / 3	23 / 6
Blowdown Flash Tank Condensate	91 / 24	91 / 24	168 / 44
Recovered from OWS (clear water)	5.4 / 1.4	2 / 0.6	4 / 1
NET RAW WATER REQUIREMENT	40 / 10.6	49 / 13	193 / 51

Notes:
[1]Based on two units at rated steam flow.
[2]"Average Annual" is based on 35 °C at 100 percent Load for 4,745 hours per year, reflector washing 250 days per year and ACC washing of all 50 cells, averaged over 8,760 hours.
[3]"Average Daily" is based on 13 hours per day operation, averaged over 24 hours.
[4]"Maximum Daily" is based on 13 hours per day, averaged over 13 hours, with ACC washing (10 cells over 10 hours).
[5]Based on one 20-second back flush every eight days at 64.35 liters per flush.
[6]Potable water includes water used for drinking, sanitation, and laboratory.

The entire Carrizo Plain area is served by septic tanks and other individual disposal systems. There are no wastewater treatment plants in the area and without wastewater treatment plants in the area; there is no source of tertiary treated water for use as raw water for the CESF.

3.4.5.1 Water Supply Requirements

The amount of process water used by the CESF is expected to be reasonably uniform. The expected average daily water consumption for the plant is approximately 70 m^3 (18,500 gallons), or 21.8 acre-feet per year (AFY), based on the assumption of two units operating at full load for 13 hours per day. The expected peak water consumption for the facility is approximately 195 liters per minute (lpm) (51 gpm) based on full plant output for 4,765 hours per year. Total peak daily use is about 282 m^3 or 0.7 million gallons per day (MGD), based on a 13 hour operating day. Average annual raw water consumption is estimated to be 17.2 AFY. Plant water used for the CESF is shown on Figure 3.4-17.

During the construction phase, an estimated 5 AF of water will be used for concrete. Due to the remote location of the site, it is anticipated concrete will be transported dry to the site in mixer trucks, where water will be added from the raw water well.

The water quality analysis from the ground water well is summarized in Table 3.4-3.

Table 3.4-3
CESF Supply Water Quality Analysis

Component	Unit	Ave
Bicarbonate	mg/L	150
Boron	mg/L	0.77
Calcium	mg/L	90
Carbonate	mg/L	ND
Chloride	mg/L	69
Hardness (total)	mg/L	290
Hydroxide Alkalinity	mg/L	ND
Magnesium	mg/L	17
Nitrate as N	mg/L	15
Nitrite as NO_2	mg/L	65
pH, Field	pH	8.0
pH, Lab	pH	7.4
Potassium	mg/L	ND
Sodium	mg/L	150
Specific conductance	µmhos/cm	1100
Sulfate	mg/L	330
Total Dissolved Solids	mg/L	790
Total Cations	mg/L	12
Total Anions	mg/L	12

Notes:
BC Laboratories Water Analysis of sample collected 12 December 2005.
mg/L = milligrams per liter.

3.4.5.2 Water Treatment Requirements

The CLFR wash water, solar thermal system makeup, and potable water require onsite treatment. A combination water treatment system with softeners, demineralization, and sanitizing equipment will be provided by a contract service. The water plant produces approximately 103 lpm (27 gpm) of treated water. Water quality is controlled by continuous analysis of the conductivity and periodic analysis of silica content.

Incoming water from the raw water storage tank is softened by a self contained water softener where most of the calcium carbonate ($CaCO_3$) and sodium carbonate ($NaCO_3$) will be removed prior to storage in a 568 m^3 (150,000 gallon) service water tank. Softened water is used for dust and contaminant removal from the reflectors. The wash water is trucked to the line of reflectors to be used by a wash crew. The reflector washing operation is similar to commercial window washing using wet applicators and squeegees.

Makeup water for the steam drums must meet stringent specifications for suspended and dissolved solids. Softened water is further treated by ion exchange in a cartridge type (bottle) mixed bed ion exchange system. The ion exchange system will be provided by a contract service; once spent, the ion exchange resin cartridges are exchanged with fresh resin cartridges and the spent cartridges are taken offsite for regeneration by others. Typically, two or three exchanges per week are anticipated. Demineralized water is stored in a 151 m^3 (40,000 gallon) de-ionized water tank.

Additional conditioning of the condensate and feedwater circulating in the steam field is provided by means of a single DEHA type compound (Corrotrol) corrosion inhibitor /oxygen scavenger. The system will consist of a 1 m^3 (280 gallon) chemical tote and a small positive displacement-metering pump. This system will require two additional totes to be stored onsite during normal operation. Initial charge of the system will require (6.8 m^3) to be brought to the site during the startup and commissioning phase. The Corrotrol will be injected at the deaerator or the boiler feedpump suction and will be controlled by an automated online pH monitor.

Potable water for plant personnel use is supplied from the DI water tank to a potable water skid, which includes sanitizing equipment and pumps for distribution and pressurization.

3.4.5.3 Wastewater Discharge

Sources of process wastewater include:

- Solar thermal blow down
- Solar thermal system washdown
- Air cooled condenser washdown
- OWS clear well discharge

Process wastewater is recovered from solar thermal blow down and the OWS clearwell and recycled back to the water treatment system. The wastewater streams are summarized in Table 3.4-4.

Table 3.4-4
Summary of Wastewater Streams and Estimated Quality

Stream Description	TDS, mg/L[1]	pH	Disposition
Solar Thermal System Blow Down	75	9.2	Water Treatment System
OWS Water Discharge (plant drains)	800	8.0	Wastewater Holding Tank/Water Treatment System

Table 3.4-4
Summary of Wastewater Streams and Estimated Quality
(Continued)

Stream Description	TDS, mg/L[1]	pH	Disposition
Solar Thermal Washdown	800	8.0	Evaporated
ACC Washdown	800	8.0	Evaporated
Multi-Media Filter Backwash	790 (35,000 TSS)	8.0	Local Dust Control
Sanitary Wastewater	800	8.0	Leach Field

Notes:
[1]Assumes raw water makeup TDS = 790 ppm; assumes one 20-second backwash every 8 days at 64.35 liters per backwash.
TDS = total dissolved solids.
TSS = total suspended solids.

The sanitary system will consist of a buried 1,000 gallon septic tank and leach field for all sanitary wastes including toilets, sinks, and showers.

3.4.6 Plant Cooling Systems

The CESF cooling system for heat rejection from the steam cycle will utilize ACCs in order to minimize water use at the CESF. The STGs will exhaust to an exhaust trunk, which carries the steam to the ACCs. Condensed steam is collected in a condensate tank.

All auxiliary cooling systems are closed-loop with fin-fan air coolers. There is no intermediate cooling loop. These closed loop cooling systems are filled with a water-glycol mixture. The coolant is pumped in a closed loop for the purpose of cooling equipment including the STG lubricating oil, generator coolers, air compressor after coolers, steam cycle sample coolers, etc.

3.4.7 Management and Disposal of Waste Materials

The CESF will generate wastes typical of industrial facilities, during both construction and operation of the plant. Types of waste will include non-hazardous solid waste, groundwater produced during dewatering, non-hazardous wastewater, and liquid and solid hazardous waste. Typical wastes and volumes generated during construction and operation are summarized in Tables 3.4-5 and 3.4-6, respectively.

Table 3.4-5
Summary of Construction Waste Streams and Management Methods

Waste Stream and Classification	Origin and Composition	Estimated Amount	Estimated Frequency of Generation	Onsite Treatment	Waste Management Method
Construction Waste – Non-hazardous	Scrap wood, steel, glass, plastic, paper	30 m^3 per week (39 yd^3)	Intermittent	None	Dispose to Landfill
Construction Waste – Hazardous	Empty hazardous material containers	1 m^3 per week (1.3 yd^3 per week)	Intermittent	Store for <90 days	Return to vendor or dispose to hazardous waste disposal facility
Construction Waste – Hazardous	Solvents, used oils, paint, oily rags, adhesives	665 liters (176 gallons)	Every 90 days	Store for <90 days	Dispose to hazardous waste disposal facility or recycle
Spent Batteries – Hazardous	Lead acid, alkaline type	40 in 4 years	Intermittent	Store for <90 days	Dispose to recycling facility
Stormwater from construction area – Non-hazardous	Surface runoff (e.g., water, inert material, dirt and concrete particles)	50 liters per day (13.2 gallons per day)	Intermittent	None	Water will percolate into onsite soils
Sanitary Waste – Non-hazardous	Portable chemical toilets; sanitary waste	760 liters per day (20 gallons per day)	Periodically pumped to tanker truck by licensed contractors	None	Ship to sanitary water treatment plant
Pipeline Pressure Testing – Non-hazardous	Raw water from raw water storage	≤900,000 liters (≤237,755 gallons)	Four times at end of field construction	None	Return to raw water tank

Table 3.4-6
Summary of Operation Waste Streams and Management Methods

Waste Stream and Classification	Origin and Composition	Estimated Amount	Estimated Frequency of Generation	Onsite Treatment	Waste Management Method
Used Hydraulic Fluid, Oils and Grease, Oily Filters – Hazardous, recyclable	STG and other users of hydraulic actuators and lubricants	<20 liters per day (5.3 gallons per day)	Intermittent	Store for <90 days	Dispose to authorized waste recycle facility
Spent batteries – Hazardous, recyclable	Lead Acid, Alkaline	5/year, 400/year	Intermittent	Store <90 days	Dispose to authorized waste recycle facility

Table 3.4-6
Summary of Operation Waste Streams and Management Methods
(Continued)

Waste Stream and Classification	Origin and Composition	Estimated Amount	Estimated Frequency of Generation	Onsite Treatment	Waste Management Method
Oily Rags – Non-hazardous	STG and other users of hydraulic actuators and lubricants	210 liters/ month (55 gallons per month)	Intermittent	Store <90 days	Launder at authorized facility
Oily Absorbent – Hazardous	STG and other users of hydraulic actuators and lubricants	210 liters/ month (55 gallons per month)	Intermittent	Store <90 days	Dispose to authorized waste disposal facility
Waste Oil/Sludge – Hazardous, recyclable	OWS	1.9 m^3 (500 gallons)	Intermittent	Store <90 days	Dispose to authorized waste recycle facility

3.4.7.1 Solid Waste

The Engineering, Procurement, and Construction (EPC) contractor will engineer and construct the CESF and related facilities. Typical wastes generated during construction will include paper, wood, glass, plastics, and excess concrete and metal scraps. During construction, the EPC contractor will retain a private waste hauler to pick up non-hazardous materials for disposal offsite.

Minimal solid waste is expected to be generated during operations. Typical wastes generated include metal scrap, machine parts, defective or broken electrical materials, and other miscellaneous solid waste.

3.4.7.2 Hazardous Waste

Hazardous wastes will be generated during construction and operation of the CESF. Most of the hazardous wastes generated during the construction phase (e.g., paint and primer, thinners, solvents) will be recycled (see Table 3.4-5). Hazardous solid and liquid waste streams generated during CESF operations include used hydraulic fluids, oils, greases, filters, etc.; spent cleaning solutions; and spent batteries. The CESF operation phase hazardous wastes will be recycled (see Table 3.4-6).

The CESF is designed with one OWS. All drains from transformers, turbines, skids, and other mechanical equipment and potential oily "contact" areas are routed to the OWS. Discharge oil is stored in a 1.9 m^3 (500 gallon) tank with transfer pump for truck loading for disposal offsite. Clear water from the OWS still well is recovered in the water treatment system.

3.4.7.3 Stormwater Management

Stormwater is considered a wastewater stream. A stormwater drainage system designed to match existing drainage patterns and meet all local regulations, will collect and direct all rainwater from the 640-acre Project site, managed through the use of swales, ditches, culverts, and site grading, to locations away

from the facility. In the power block area, a series of stormwater catch basins and graded swales are interconnected to a catch basin lift station. The water is then pumped from the sump basin to an existing stormwater basin. Final elevation and location of this sump basin will be determined during detailed engineering.

Stormwater run off for the CESF is directed from the paved (i.e., roads and parking lots) and non-paved areas to local collection ponds/swales and allowed to percolate and evaporate. Area grading and the use of swales guides the rain water into the stormwater collection swales.

The 50-year, 24-hour storm event produces a rainfall of 0.43 cm (0.17 inches) per hour for a total rainfall of 10.16 cm (4 inches). Calculations for this storm event frequency would produce 213 acre-feet of rain water across the entire one square mile solar field. Given its desert nature and the very limited rainfall that occurs on the Carrizo Plain, the majority of the water from this low intensity rainfall will be absorbed into the ground. A small series of detention basis, integrated with local swales, will be strategically located around the solar field to collect any excess rainwater that is not absorbed into the ground. Release of water from the detention basins will be to the established water courses in the area.

The oil-water separator (OWS) is rated at 5.4 lpm (1.4 gpm). Rain water collected from active areas (i.e., potentially contaminated by oil) is routed to an OWS. Water from the OWS is sent to the wastewater tank and then, following inspection, to the water treatment system for recovery.

3.4.8 Management and Disposal of Hazardous Materials

A variety of chemicals will be stored and used by the Project during both construction and operation. Storage, handling, and use of all chemicals will be in accordance with applicable LORS. Chemical storage and handling areas are designed with appropriate containment to collect any potentially contaminated wastes and to avoid any cross contamination of other systems or areas. Berm and drain piping design will allow a full-tank capacity spill with appropriate margin, without overflowing the containment berms.

Spill containment structures are provided for all chemical injection, unloading, and storage areas. Containment is provided around transformers and other equipment, which contain oil in case of rupture, spill, or leak and are designed per National Fire Protection Association (NFPA) 850.

Portable safety showers and eyewashes will be provided adjacent to the chemical storage area. Personal protective equipment (PPE) will be provided for use by operations and maintenance personnel in the event of an accidental release. Personnel will be trained to handle the chemicals stored and used onsite, and instructed in proper protocol to be followed in the event of a spill or accidental release. Absorbent materials will be stored onsite in quantities adequate for spill containment and cleanup.

The quantities of hazardous materials that will be onsite during construction are small. As shown in Table 3.4-7, they will be limited to gasoline, diesel fuel, motor oil, hydraulic fluid, solvents, cleaners, sealants, welding flux, various lubricants, paint, and paint thinner. There are no feasible alternatives to vehicle fuels and oils for operating construction equipment. The types of paint required are dictated by the types of equipment and structures that must be coated and by the manufacturers' requirements for coating.

A list of the chemicals anticipated to be used during operation of the CESF is provided in Table 3.4-8, Hazardous Material Used and Stored during Operations. Table 3.4-8 identifies each chemical by type and intended use and the estimated quantities to be stored onsite.

Table 3.4-7
Hazardous Materials Used and Stored During Construction

Chemical	Use	Storage Location	State	Storage Quantity
Diesel Fuel	Refueling construction vehicles and equipment	Laydown Area	Liquid	4 m^3 (1,000 gallon)
Diesel Fuel	Refueling Truck	Laydown Area/Mobile	Liquid	5000 liter (1,320 gallon)
Gasoline	Refueling construction vehicles and equipment	Laydown Area	Liquid	4 m^3 (1,000 gallon)
Cleaning Chemicals/Detergents	Periodic cleaning	Warehouse/shop area	Liquid	500 liter (132 gallon)
Lubricating Oil	Lubricate rotating equipment (e.g., STG lube oil systems)	Contained in storage tanks on equipment skids	Liquid	6 m^3 ea. 12 m^3 total (1,500 gallons ea. or 3,000 gallons total)

Table 3.4-8
Hazardous Materials Used and Stored During Operations

Chemical	Use	Storage Location	State	Storage Quantity
Diesel Fuel	Firewater pump driver	Firewater skid	Liquid	1.135 m^3 (300 gallon) for initial fill. Maintain full diesel tank
Diesel Fuel	Refueling station service vehicles	Power block refueling station	Liquid	4 m^3 (1,000 gallon). Maintain full diesel tank
Gasoline	Refueling station service vehicles	Power block refueling station	Liquid	4 m^3 (1,000 gallon). Maintain full gasoline tank
Cleaning Chemicals/Detergents	Periodic cleaning	Warehouse/shop area	Liquid	500 liter (132 gallon)
CORTROL OS5300	Oxygen scavenger	Water treatment building	Liquid	3.5 m^3 (925 gallon)
Lubricating Oil	Lubricate rotating equipment (e.g., STG lube oil systems)	Contained in storage tanks on equipment skids	Liquid	6 m^3 ea. 12 m^3 total (1,585 gallons ea. or 3,170 gallons total)

Table 3.4-8
Hazardous Materials Used and Stored During Operations
(Continued)

Chemical	Use	Storage Location	State	Storage Quantity
Laboratory Reagents	Water laboratory analysis	Water treatment building	Liquid and granular solid	<4 liters (<1 gallons)
Mineral Transformer insulating oil	Generator step-up (GSU) transformers	Contained within transformers and electrical switches	Liquid	41.6 m^3 per GSU (11,000 gallons per GSU)
Mineral Transformer insulating oil	Standby transformer	Contained within transformers and electrical switches	Liquid	15.1 m^3 (4,000 gallon)
Mineral Transformer insulating oil	Auxiliary transformers	Contained within transformers and electrical switches	Liquid	11.4 m^3 per auxiliary transformer (3,000 gallons per auxiliary transformer)
Propylene Glycol	Coolant antifreeze	Power block	Liquid	210 liters (55 gallons)

3.4.8.1 Spill Response

Construction Phase: As noted above, the quantities of hazardous materials handled during the Construction Phase are relatively small, and best management practices (BPMs) will be implemented by construction personnel. The most probable spill scenario is during refueling operations.

A temporary fueling station will be constructed in the laydown area. Fuel will be transported to the Project from surrounding areas. Refueling operations will be conducted in the designated location as shown in Section 1.0, Executive Summary (see Figure 1.1-4). A 3.8 m^3 (1,000 gallon) diesel fuel storage tank and a 3.8 m^3 (1,000 gallon) gasoline storage tank will be temporarily located on a paved surface with secondary containment. Vehicles to be refueled will park on a paved surface adjacent to the temporary storage tank. For those few vehicles unable to traverse to the designated refueling location, a refueling truck will be used. The refueling truck will be equipped with spill prevention and cleanup items.

Small spills will be contained and cleaned up immediately by trained, onsite personnel. Larger spills will be reported via emergency phone numbers to obtain help from offsite containment and cleanup crews. In the event of a spill to soil, the soil will be excavated and disposed of in containers for offsite disposal. Empty drums, shovels, and spill cleanup items (absorbent pads and oil absorbent) will be stored onsite and located adjacent to potential spill sources such as the refueling area and the hazardous materials storage areas.

In the event of a larger spill, containment will be with absorbent barriers, “kitty litter” absorbent, and absorbent pads. In the event of a spill to soil, contaminated soil will be placed into barrels or trucks by service personnel for offsite disposal a licensed disposal facility. Larger spills will be reported via emergency numbers so that offsite containment and cleanup crews can be employed.

All personnel working on the Project during the construction phase will be trained in handling hazardous materials and the dangers associated with hazardous materials. In addition, an onsite health and safety person will be designated to implement health and safety guidelines and to contact emergency response

personnel and the local hospital, if necessary. The coordinator will have basic first aid skills; however, in the event of an emergency, Emergency Medical Services (EMS) support will be provided by the Simmler Fire Station 42 located at 13080 Soda Lake Road, California Valley, 93453. Response time to an emergency is approximately 10 minutes. In the event of a life threatening injury, the responding fire station can request one of the two helicopters that serve San Luis Obispo County.

Operational Phase: Various hazardous materials will be stored onsite during facility operation. All hazardous materials will be handled and stored in accordance with applicable codes and regulations.

A fueling station will be constructed in the power block area of the solar farm. Fuel will be transported to the Project from surrounding areas. Refueling operations will be conducted in the designated location as shown in Figure 3.4-4. A 3.8 m^3 (1,000 gallon) diesel fuel storage tank and a 3.8 m^3 (1,000 gallon) gasoline storage tank will be located on a paved surface with secondary containment. Vehicles to be refueled will park on the paved surface adjacent to the storage tank.

A Hazardous Materials Business Plan (HMBP) will be developed and filed with the San Luis Obispo County Department of Environmental Health (DEH) and updated annually in compliance with California Code of Regulations (CCR) 19 and the Health and Safety Code Section 25504. Emergency response procedures will be specified in the HMBP.

Designated personnel will be trained as members of a plant hazardous material response team, and team members will receive first responder and hazardous material technical training in appropriate methods to mitigate and control accidental spills.

3.4.9 Fire Protection System

The fire protection system will be designed to protect personnel, limit property loss, and reduce plant downtime in the event of a fire. The fire protection system is summarized in Table 3.4-9. The complete fire protection system includes automatic detection and suppression systems installed in the combustion turbine enclosures, automatic suppression systems installed for the control room, gas compressor building, warehouse, etc. Transformer protection will be provided by separation and firewalls.

Table 3.4-9
Fire Protection Systems Design Conditions

Location	Type of System
Buildings	Automatic clean agent system per NFPA 2001 for Project control room and substation control room, wet/dry/pre-action sprinkler system for warehouse/office building, water treatment building, gas compressor building. Note: The fixed fire systems will be provided as required by local jurisdiction or UBC. Hose stations and portable extinguishers will be provided throughout buildings as required by Code.

Table 3.4-9
Fire Protection Systems Design Conditions
(Continued)

Location	Type of System
Buildings (Continued)	Detection system and fire alarm pull stations will be provided for the Control Room, combustion turbine inlet filter area, and the switchgear room. Pull stations shall be located in buildings as required by Code.
STGs	CO_2 system as defined NFPA will be provided for the STGs by General Electric.
Transformers	Separation and firewalls.
Outside Areas	Wet barrel type fire hydrants will be designed, installed, and located as per NFPA 24 and as required per local jurisdiction. The location of hydrants will never be more than 90 m (300 feet) apart in all outside areas as required by Code.
Water Treatment Area	An automatic wet pipe sprinkler system, portable "BC" rated fire extinguishers in all areas and hose reel stations with 30.5 m (100-foot) hose in the area.

The fire water system is a packaged design system, which includes pumps (diesel and electric), a jockey pump, plant distribution system, and monitors. The system includes 1100 m^3 (300,000 gallon) of storage from the 1700 m^3 (450,000 gallon) raw water/fire water tank. Raw water is supplied to the water-treating unit by an elevated nozzle on the tank to ensure that the tank is not emptied below the safe operating level. Fire detection is included throughout the facility and in the buildings and is interconnected to a fire detection panel located in the control room.

3.4.10 Plant Auxiliaries

3.4.10.1 Lighting

The lighting system provides personnel with illumination for plant operation under normal conditions, means of egress under emergency conditions, and emergency lighting to perform manual operations during a power outage of the normal power source. The lighting system will be designed and installed to meet Occupational Safety and Health Administration (OSHA) minimum standards while keeping light emissions to a minimum. Indoor lighting will be per current minimum average maintained foot-candle levels as published by the Illuminating Engineering Society.

Exterior area lighting will be limited to the power block and will consist of 9.1 m (30-foot) metal poles with 400-watt metal-halide lights. Exterior building lighting will be a wall-mounted type fixture, high-pressure sodium lamps with integral ballast. These fixtures will be placed to offer maximum illumination of operating work areas in compliance with OSHA standards while minimizing offsite illumination.

Control/office/warehouse and electric utility building interior lighting will be with fluorescent fixtures. Fluorescent lamps will be cool-white, rapid start. The water treatment building interior lighting will be 250-watt vapor proof incandescent or fluorescent. All fixtures will be energy efficient, installed per NEC, and will be UL listed and stamped.

Emergency lighting will be powered from battery packs.

3.4.10.2 Electrical Grounding

The electrical system will be susceptible to ground faults, lightning, and switching surges that can result in high voltage. The station grounding system will provide an adequate path to permit the dissipation of current created by these events, protecting personnel and equipment. The facility and substation grounding system is tied solidly into all facility equipment.

The ground mat is located underground and is sized in accordance with NEC, using a minimum #4/0 AWG bare copper wire size. Grounded neutral conductors are protected by non-metallic conduit where conductors run exposed above grade.

Ground rods are copper-clad steel, not less than 2 cm (¾ inch) in diameter and 3.05 m (10 feet) long. Rods will be driven into the ground and interconnected 76.2 cm (30 inches) below grade. Rods will be added or lengthened and interconnected as required to meet the specified ground resistance. Above grade grounding connections are made using exothermic welds or compression connectors bolted to skidded equipment or structural steel.

3.4.10.3 Cathodic and Lightning Protection

The cathodic protection system will be designed and installed to control electrochemical corrosion of exterior surfaces of underground carbon steel and stainless steel. Bottoms of soil or sand pad mounted steel tanks, exterior surfaces of underground ductile or cast iron pipe will be protected against corrosion. The type of cathodic protection system (galvanic or impressed current) will be based on soil characteristics, the amount of material to be protected, and the interference effects of any nearby cathodic protection systems.

Lightning protection will be as per NFPA 780 guidelines, and will be provided where required for plant structures and pumps. Specific equipment protected will be determined by a lightning protection study.

3.4.10.4 Distributed Control System

The DCS provides monitoring and control of the two STG packages and related Balance of Plant (BOP) systems. The DCS is designed for facility operation from the main control room by a single operator. The DCS workstations will enable the operator to view real-time instrumentation status of the STGs and related BOP. Interactive control of the STGs is provided through Human Machine Interface (HMI) screens located on the computer workstations. Redundant workstations are located at the STGs and in a remote control room with the BOP HMI workstations. Event and alarm data are continuously logged and stored in a redundant database for reports, printout, and historical analyses.

3.4.10.5 Compressed Air System

The Compressed Air System (CAS) will provide one screw-type compressor package for each STG. Each CAS package will consist of two 100 percent compressors (one spare), filters, a receiver tank, and dryer. Each CAS is capable of supplying the Instrument Air System (IAS) with 314.3 Nm^3 (185 scfm) of

air at 8.62 bar (125 psig). The air will be dried to -40 °F dew point. Pneumatic operators will be supplied with clean, dry, oil-free instrument air.

Utility air will be provided from the IAS. Utility air is automatically isolated in the event of low instrument air pressure.

3.4.10.6 HVAC

Controlled HVAC is provided for the warehouse and maintenance facilities, maintaining the interior temperature between a minimum of 15 ºC (59 ºF) and a maximum temperature of 5.5 ºC (10 ºF) above ambient summer temperature conditions.

HVAC controls are provided for sensitive areas (e.g., control rooms, electronics storage, etc.) as required for equipment protection and personnel comfort.

3.4.10.7 Facility Civil Structural Features

3.4.10.7.1 Power Island Block

The power block for the CESF will consist of two STGs with associated condensing and cooling systems. One two-winding generator step-up transformer will be provided for each STG. Corresponding BOP mechanical and electrical equipment will be located adjacent to each power block.

The types of foundations and piling, if required, will be as recommended by the Geotechnical Engineer in accordance with the final Geotechnical Report. Design of concrete foundations will be in accordance with ACI 318 and the CBC.

3.4.10.7.2 Buildings

Facility buildings will be pre-fabricated, pre-engineered metal buildings designed in accordance with the appropriate building codes. Buildings will be comprised of materials in shades of beige and brown. Complete gutters and downspouts will be provided. Project buildings include:

- Control/office building
- Warehouse and shops
- Turbine building with electric utilities
- Water treatment building

Foundation systems will be designed with an allowable soil bearing capacity as recommended by the Geotechnical Engineer in accordance with the final Geotechnical Report. All permanent buildings will be provided with proximity badge readers for permanent employees.

3.4.10.7.3 Yard Tanks

Yard storage tanks will include the following:

- One 1700 m^3 (450,000 gallon) raw water – firewater carbon steel tank
- One 151.4 m^3 (40,000 gallon) de-ionized stainless steel water tank
- One 75.7 m^3 (20,000 gallon) wastewater carbon steel tank
- One 600 m^3 (150,000 gallon) service water carbon steel tank
- One 1.9 m^3 (500 gallon) potable water storage tank
- One 1.9 m^3 (500 gallon) waste oil tank
- One 4 m^3 (1,000 gallon) diesel fuel storage tank
- One 4 m^3 (1,000 gallon) gasoline storage tank

The diesel and gasoline storage tanks will be shop fabricated above ground steel tanks including secondary containment, with a 15 cm (6 inch) thick concrete exterior. These tanks will be initially located temporarily in the construction laydown area, and then relocated to the power block for permanent installation.

The water storage tanks will be shop fabricated and/or field erected according to the requirements of American Water Works Association (AWWA) D103. Welded steel tanks will be used for oil storage. Welders will be qualified per ASME Section IX. Each tank will be equipped with roof and shell access man ways, 61 cm (24 inch) wide spiral stairs and roof platform with handrails, and other appurtenances as required for the service.

3.4.10.7.4 Roads

The facility will require approximately 11.3 km (7 miles) of roadways. The roads will be approximately 6 m (20 feet) wide with approximately 5.5 km (3.5 miles) being made up of asphalt concrete surface with a gravel base. The parking lot will be approximately 61 m by 30.5 m (200 feet by 100 feet) and made up of asphalt concrete surface with a gravel base.

3.4.10.7.5 Site Security

The facility will be fenced with a minimum 3 m (10-foot) chain link fence with three strands of barbwire on top and with privacy lattice around the perimeter. Entrance to the facility will be through one 7.3 m (24 feet) wide motorized gate equipped with a security monitoring system, including a camera and intercom system, remotely controlled from the control room.

Separate access will be provided to the switchyard and metering substation building. Access to individual buildings will be controlled with proximity badge readers.

3.4.10.7.6 Site Grading and Drainage

Grades will be established to minimize the amount of earthwork required to construct the facilities and to maintain control of stormwater runoff. All areas disturbed during construction will be graded to a smooth surface. Selected area will be covered with appropriate material, as conditions require (e.g., asphalt concrete for road base and gravel for other surfaces). Finish grading will be performed to conform to the finished design elevations for surface drainage and to prepare the areas for the specified surface finishes.

Rainfall from the one square mile solar field will continue to be drained by sheet flow. A series of interrupter swales will be used to both reduce the velocity of the runoff as well as allow the rainfall to be absorbed into the ground replenishing local ground water levels.

Rain falling in the power block area will be collected and directed to the surrounding solar field using a system of swales integrated with the site-grading plan. Rainfall from vehicle parking and paved areas in the power block will be collected and directed to an oil/water separator prior to discharge to the raw water tank for recovery.

3.4.11 Raw Water Supply Line

As discussed in Section 3.4.5, untreated ground water will be supplied from an existing well near the center of Section 28. Ground water will be conveyed to the 1700 m^3 raw water storage tank via a 0.8 km (0.5 miles) long 15 cm (6 inch) underground line located within the 5 m (16 feet) wide access way between steam fields 1 and 2, entering the southwest corner of the power block and continuing on to the raw water storage tank (see Figure 3.2-1 and Figure 3.4-4).

The raw water supply line will be buried with a minimum of 0.9 m (3 feet) of cover.

3.4.12 Interconnection to Electrical Grid

This subsection describes the transmission interconnection between the CESF and the existing electrical grid.

The CESF's up to a nominal 177 MW net output will be supplied to the PG&E high voltage system at PG&E's Midway Substation, which is located north of Bakersfield, by looping into the existing Morro Bay–Midway 230 kV transmission Line 1, north and adjacent to the Project site. The high voltage transmission line is a single circuit, with 500 MCM/phase, aluminum conductor steel reinforced (ACSR) conductor per line, thermally rated to carry full plant peak output. A fiber optic cable is provided for communication with PG&E and the California Independent System Operator (CalISO).

The overhead 230 kV transmission conductors to the physical connection with the existing Morro Bay–Midway 230-kV transmission line will be supported by a dead-end structure in the Project's switchyard and two 30 m (100-foot) 230 kV type A poles (3 stacks of insulators in vertical configuration with a spacing of about 5.5 m (18 feet) between the phases).

PG&E has been contracted to perform a System Impact Study (SIS) to determine the method of interconnection and general equipment requirements. The study is scheduled to be concluded by October 2007. The executed SIS agreement and proof of payment to the interconnecting utility are provided in Appendix B, Executed System Impact Study Agreement and Proof of Payment to the Interconnecting Utility.

3.4.12.1 Design, Construction and Operation of Transmission Facilities

The CESF will be connected to the power grid through the PG&E Midway Substation by a single circuit three-phase 230 kV transmission line. It is expected final design and construction of transmission facilities and reliability upgrades (should they be required) will be completed by PG&E.

The CESF transmission system will require construction of approximately 260 m (850 feet) of 230 kV transmission line. As depicted in Figure 3.4-4, the CESF transmission line extends from the Project site switchyard to a point along PG&E's Morro Bay–Midway right-of-way (ROW). The overhead line begins at the dead-end structure in the switchyard and continues east along the northern edge of Section 28 for approximately 213 m (700 feet), then north for 46 m (150 feet) to interconnect with the existing PG&E Morro Bay–Midway 230 kV transmission line (Line 1). The transmission line is within the Project site boundary except for a 27 m (90-foot) long segment that connects to the PG&E tower. Construction of the line will include a dead end structure in the switchyard and two tubular steel poles with concrete foundations and new 500 MCM ACSR conductors.

The power poles will be spaced at approximately 150 m to 170 m (500 feet to 550 feet) apart (a final calculation taking into account the grading and other factors will determine the final spacing). Only two poles are expected to be required.

Construction of the CESF transmission line includes the following elements:

- Marshalling Yards: Staging areas for trailers, office personnel, equipment, material staging, and employee parking will be provided in a disturbed area along the northern boundary of the site.
- Road Work: As needed, dirt roads will be cleared for access along the transmission line route coinciding with the northern perimeter road for the site to provide access to the tower locations.
- Foundations: Each pole will have a foundation installed that will require curing prior to the pole installation. These pole foundations will be installed in locations that avoid sensitive environmental resources identified in Project environmental surveys.
- Pole Erection: Each pole, made up of two sections, will be assembled onsite and welded together, and then insulators and conductor hardware will be installed.
- Conductors: From pulling sites, the conductors will be installed, sagged, and permanently connected to the insulators.
- Pulling Sites: There are only two pulling sites required to install the conductors along this segment of the transmission line. The sites will be on existing access roads or access roads that will be installed as part of the transmission line installation.
- Communication System: The overhead ground/fiber optic communications optical ground wire (OPGW) cable will be installed using the same pulling sites as were used for the conductor installation.
- Cleanup: Although cleanup will be ongoing as the work proceeds, once construction is completed, a final cleanup of the entire Segment 1 will be performed to clear the area of any remaining construction-related debris.

3.4.13 Project Construction

3.4.13.1 Power Plant Facility

Construction of the CESF, from site preparation and grading to full commercial operation, is expected to take approximately 35 months. Major milestones are listed in Table 3.4-10.

Heavy construction will be scheduled to occur between 7:00 am and 7:00 pm, Monday through Friday. Additional hours may be necessary to make up schedule deficiencies or to complete critical construction activities.

Some activities will continue 24 hours per day, 7 days per week. These activities include, but are not limited to, refueling equipment, staging material for the following day's construction activities, quality assurance/control, and commissioning.

Table 3.4-10
Project Schedule Major Milestones

Activity	Date
Begin Construction	1st Quarter 2009
Begin Start Up and Commissioning: Steam Field #1	2nd Quarter 2010
Start Up and Commissioning: Steam Field #1	1st Quarter 2011
Start Up and Commissioning: Power Block #1	3rd Quarter 2011
Start Up and Commissioning: Steam Field #2 & Power Block #2	1st Quarter 2012

3.4.13.1.1 Construction Site Security

The construction site and laydown areas will be fenced with a minimum 3 m (10-foot) high chain link fence, which will remain in place as the permanent site perimeter fence. Entrance to the site will be via a gated entrance from Tracy Lane at the northeastern corner of the facility. A second gated entrance at the southwest corner of the site will provide ingress and egress between the site and the construction laydown area south of SR-58.

The construction laydown area will be fenced with a temporary 3 m (10-foot) chain link fence with a gated entrance from SR-58.

3.4.13.1.2 Site Mobilization

Site facilities and amenities will be established during the first month of the solar field build out. The majority of these will be located in the construction laydown area, Section 33. These will consist of site offices, restroom facilities, meal rooms, parking areas, vehicle marshalling areas, and construction material/equipment storage areas. Construction power to the temporary site facilities will be provided by mobile diesel-driven generator sets. Employees will be moved to the site from surrounding areas in up to nine suitable buses.

3.4.13.1.3 Site Preparation

The planned location of the facility is generally flat, at an elevation of approximately 622 m (2,040 feet) above mean sea level (MSL). The power block will be graded to provide a level site area for the STGs, ACCs, buildings, tanks, switchyard, and all associated facilities at approximately 619 m (2,030 feet) above MSL. Movement of material will be limited to that required for a level site for the CESF power block equipment and facilities. No fill is anticipated, but in the event fill is required, material present onsite is expected to be adequate, subject to final geotechnical evaluation.

The topography of Section 28 is predominantly flat with a slight downward slope to the south and east. Construction of the solar field requires level ground, so the blocks will be prepared in a terraced configuration. This will best achieve the necessary leveled effects while minimizing the amount of cut and fill operations. Any material cut from the site in preparation for construction will be used to improve adjacent areas in Section 33.

Site clearing and grading will occur during the first six months of construction. Preliminary numbers based on the Grading and Drainage Plan are 1,200,000 cubic yards of cut and 1,200,000 cubic yards of fill. Field 1, blocks 1 and 2 will be prepared first, then blocks 3 and 4, followed by field 2, blocks 1 though 4 (see Figure 3.4-8). This will be undertaken on a continuous rolling basis across the site. There will be some overlap in these operations.

The earth works process will be undertaken using standard contractor equipment. This will consist of dozers, elevating scrapers, hydraulic excavators, tired loaders, compacting rollers, and dump trucks.

3.4.13.1.4 Foundations

Based on preliminary geotechnical investigations, it is expected that lightly loaded equipment and structures such as the solar reflectors and receivers will be supported on shallow footings. Shallow foundations will be continuous strip and isolated spread footings.

The solar field will be supported on a foundation of reinforced concrete strip footings. These footings run north/south and will be individually grouped for each line. Each line will consist of 25 strips, each 27 m long (90 feet). Each line requires excavation of 187 m^3 (245 yd^3) of earth for strip footings. Excavation will initially be undertaken using hydraulic excavators, but may potentially progress to the use of continuous trenching machinery. This machinery will be laser or Global Positioning System (GPS) guided. The excavated material will be spread evenly across the array lines between the strip footings.

In the excavated strip footing trenches, steel reinforcing will be placed. Concrete of the appropriate grade will be poured into each of the strip trenches. The top surface of these strips will be approximately 10 cm (4 inches) above the earth surface after the site preparation. The strip footings will be poured using a continuous casting self-propelled machine such as a Millar MC1050. These machines will be laser or GPS guided. Strip footings will be poured at the rate of one complete array line per day. This will require around 210 m^3 (275 yd^3) of concrete per day). This is 31 agitator truck loads per day (assuming one truck carries 9 cubic yards).

Foundation excavations will be prepared as required for the STG, transformers and other heavy equipment. Prior to excavation, underground structures will be located and taken protected or removed.

Deep foundations may be required in limited locations within the power block to support heavy equipment with large overturning moments (e.g., ACCs). Cast-In-Drilled-Hole (CIDH) or precast-prestressed concrete piles may be used, as determined by the final geotechnical investigation and foundation design.

3.4.13.1.5 Groundwater

Ground water levels are a minimum of 4.3 m (14 feet) below ground surface (bgs) and are approximately 9.1 m (30 feet) bgs in the vicinity of excavation. The deepest CESF excavations are anticipated to be approximately 2.4 m (8 feet) bgs in the power black and 0.9 m (3 feet) bgs in the solar field. Accordingly, CESF does not anticipate encountering ground water and does not expect to have to dewater. If ground water is encountered and dewatering is required, then approved BMPs (e.g., NS-2 from the State of California Department of Transportation Construction Site Best Management Practices Manual) will be employed.

3.4.13.1.6 Reflector/Receiver Line Construction

During the construction, temporary site services will be in place. Power will be provided by mobile diesel generators. Water will be available at points around the site, as well as on a series of mobile equipment. Hydration points for employees will be a priority. Employees will be transported around the site in up to 8 small buses.

A variety of ATVs will also be in use, both for general site mobility and for deploying specific work trailers throughout the site. There could potentially be around 20 of these vehicles operating onsite.

After the appropriate cure period for the concrete strip footings, steel mounting channels and tower pivot plates will be fixed down. These support the reflector hoops and receiver towers, as well as providing anchor points for the receiver cable stays. They will be fixed down using industry standard masonry drilling and fixing equipment. Alignment of these supports is critical, and will be achieved using high-end survey equipment.

Construction will generally progress from the northern boundary towards the south through each block. There may be up to four individual receiver crews operating onsite simultaneously and eight reflector installation crews operating onsite at peak. As a result of this simultaneous construction, construction within the solar field, construction of linears, and associated earth moving operations will occur throughout the majority of the 35 month construction period.

Because electrical services will be installed progressively with the connecting pipe work, the initial operations will be run using site power from mobile diesel generator sets.

As the lines are completed and the installation crews clear the areas, the connection pipe work and electrical services will be installed. This will be scheduled to allow each crew to move continuously through the lines without pause. Installation of these components will require suitable lifting equipment. As each block is completed, it will be tested and run, generating steam.

3.4.13.1.7 Stormwater

Stormwater discharges from construction activities are subject to Best Management Practices (BMPs) designed and implemented for construction activities. Approved BMPs appropriate to the site and specific conditions will be selected from the State of California Department of Transportation Construction Site Best Management Practices Manual. Selected BMPs may include, but are not limited to, the following, as appropriate:

- Temporary Soil Stabilization (SS) techniques such as scheduling construction sequences to minimize land disturbance during the rainy and non-rainy seasons and employing BMPs appropriate for the season; preservation of existing vegetation by marking areas of preservation with temporary orange propylene fencing; use of geotextiles, mats, plastic covers or erosion control blankets to stabilize disturbed areas and protect soils from erosion by wind or water; use of earth dikes, drainage swales and lined ditches to intercept, divert and convey surface runoff to prevent erosion; use of outlet protection devices and velocity dissipation devices at pipe outlets to prevent scour and erosion from stormwater flows, and/or use of slope drains to intercept and direct surface runoff or groundwater to a stabilized water course or retention area.
- Sediment Control (SC) techniques including use of silt fences, straw bales, and/or fiber rolls to intercept and slow the flow of sediment laden runoff such that sediment settles before runoff leaves the site.
- Wind Erosion (WE) control by applying water or dust palliatives as required to prevent or alleviate wind blown dust.
- Tracking Control (TC) techniques to limit track-out include stabilized points of entering and exiting the site and stabilized construction roadways on the site.

3.4.13.1.8 Heavy Equipment Delivery

Heavy construction equipment will be moved to the site by road, using road transport suitable for the size and weight of that equipment.

Primary equipment such as the STG and transformers and other equipment will be delivered to the site by special conveyance due to their weight and/or size. Typically, deliveries of material and equipment to the site will be made by truck.

3.4.13.1.9 Construction Workforce

The projected monthly construction labor is presented in Table 3.4-11 for the 35-month construction period. The size of the workforce onsite will range from 85 during month 1 to a peak of 396 during months 16 and 17. Carrizo Energy, LLC and the local union will enter into a Project Labor Agreement (PLA) to ensure that a sufficient supply of skilled craft workers is available at the Project to perform

construction related activities. Carrizo Energy, LLC will provide approximately $170 million (in 2007 dollars) in construction payroll. During construction, the average salary per employee is expected to be $30-40 per hour, including benefits.

Table 3.4-11
Construction Labor
Projected Monthly Manpower (by Craft)

Craft Type	Months After Notice to Proceed																																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
Laborers / Cement Masons	15	16	25	30	40	40	45	50	55	55	50	45	45	45	45	45	45	45	40	40	40	40	40	40	40	35	35	35	35	30	30	30	30	30	25
Carpenters	7	11	30	35	45	45	45	45	45	40	40	30	30	30	30	30	30	25	25	22	22	18	18	18	18	13	13	13	13	13	11	8	7	7	7
Ironworkers	8	17	24	35	48	48	53	58	58	58	58	68	63	63	63	63	58	48	49	48	48	46	41	41	41	38	38	38	28	28	23	23	16	15	17
Pipefitters / Welders	8	9	16	32	37	37	42	47	47	52	57	65	75	75	75	65	65	65	60	60	60	55	50	38	43	41	36	36	31	27	25	20	16	12	12
Electricians & Instrumentation	7	7	8	9	10	11	11	11	18	18	26	35	40	50	55	55	55	55	45	35	35	35	35	35	35	35	40	40	38	31	26	20	23	21	21
Operators / Mechanics	10	13	17	17	17	10	10	10	10	15	15	15	15	15	15	15	15	15	15	15	7	7	7	7	7	7	7	7	5	5	5	5	5	4	3
Millwrights	1	3	6	10	10	10	10	15	15	15	15	15	15	20	20	25	25	30	30	30	30	30	30	30	30	20	20	16	11	11	10	10	10	10	10
Teamsters	9	13	17	20	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	14	14	14	14	13	13	13	13	13	8	8	8
Insulators																10	15	15	20	25	30	30	30	30	30	30	25	25	25	20	20	25	15	10	5
Boilermakers		2	3	4	4	6	8	8		8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	6	6	6	6	6	6	3	3	3	3	
Painters																					2	2	2	2	5	5	5	5	5	5	5	5	5	2	2
Indirects	10	10	10	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	10	10	10	15	15	15	10
Total Craft Labor per Month	75	101	156	207	241	237	254	274	278	291	299	311	321	336	341	346	346	336	322	313	312	301	291	278	284	259	254	249	220	199	181	177	153	137	120
Field Non-Manual	10	15	25	25	40	40	45	50	50	50	50	50	50	50	50	50	50	50	50	50	45	45	45	45	40	35	35	35	30	25	25	20	20	20	20
Total Manpower Per Month	85	116	181	232	281	277	299	324	328	341	349	361	371	386	391	396	396	386	372	363	357	346	336	323	324	294	289	284	250	224	206	197	173	157	140

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3.4.13.1.10 Construction Traffic

Construction traffic should commence in the first quarter of 2009 and continue through the 35-month construction schedule. Traffic should peak during the first quarter of 2010. Due to the remote location of the site, the majority of craft labor will be bused between the surrounding areas (e.g., Paso Robles, San Luis Obispo, and Bakersfield) and the site each day. The estimated construction traffic is summarized in Table 3.4-12.

Table 3.4-12
Estimated Daily Construction Traffic

Vehicle Type	Average Daily Round Trips	Peak Daily Round Trips
Construction Personnel (Buses)	13	21
Delivery Trucks	3	7
Heavy Vehicles & Trucks	27	75
TOTAL	43	103

3.4.13.1.11 Land Disturbance

The estimated land disturbance for the Project is provided in Table 3.4-13.

Table 3.4-13
Estimated Disturbed Area

Project Component Item	Unit Area		Proposed Length	Construction Right-of-Way (ROW)
	Construction	Operations		
Plant Site				
Within Project Site Boundary	640 acres	640 acres	N/A	N/A
Within Construction Laydown	380 acres	0	N/A	N/A
New Single Circuit Above Ground 230 kV Transmission Line to Morro Bay–Midway Line 1				
Within Site Boundary	5800 m^2 (62,320 square feet)	1,160 m^2 (3,800 square feet)	232 m (760 feet)	25 m (82 feet)
Offsite	675 m^2 (7,380 square feet)	135 m^2 (450 square feet)	27 m (90 feet)	25 m (82 feet)

3.4.13.1.12 Materials and Equipment Staging Area

The 380-acre (5,280-foot by 3,000-foot) primary construction laydown and parking areas will be adjacent to the Project site south of SR-58 on Section 33. Existing abandoned farm structures currently located on Section 33 will be demolished. Additional areas will be used for the installation of the transmission line, as discussed in Section 3.4.12.1.

The southeastern portion of the construction laydown area will consist of several temporary construction facilities, including site offices, restrooms, meal rooms, and conference rooms, and the employee parking and vehicle marshalling area, as shown in Section 1.0, Executive Summary (see Figure 1.4-4). These facilities are located in proximity to the southeastern entrance to the laydown area from SR-58 to provide ease of access to employees and site visitors from the highway.

A temporary fueling station will be constructed in the southwestern portion of the laydown area. Refueling operations will be conducted in a designated location as shown in Section 1.0, Executive Summary (see Figure 1.4-4). A 3.8 m^3 (1,000 gallon) diesel fuel storage tank and a 3.8 m^3 (1,000 gallon) gasoline storage tank will be temporarily located on a paved surface with secondary containment. Vehicles to be refueled will park on a paved surface adjacent to the temporary storage tank. For those few vehicles unable to traverse to the designated refueling location, a refueling truck will be used. The refueling truck will be equipped with spill prevention and cleanup items.

The northwestern portion of the construction laydown area will contain a staging area, located adjacent to the northwestern entrance to the laydown area from SR-58 and in proximity to the solar farm to the north. Material storage areas, including storage for mirrors, steel, and footings will be constructed around the staging area. Equipment storage areas will be constructed south of the material storage areas. A restroom facility will also be located in the staging area.

The northeastern portion of the construction laydown area will contain a large assembly area to accommodate assemblage of the components of the CESF. Each row of reflectors is composed of four segments of six 16 m by 2.25 m (52.5 feet by 7.5 feet) reflectors that are assembled together. The assembly area is located near the staging area to facilitate transportation of the rows to the solar farm as they are completed.

A 9-m (30-foot) access road will extend along the western and southern sides of the construction laydown area to provide access to the various areas within the construction laydown area. This access road will also act as a turn-around onto SR-58 for large construction vehicles during construction and operation of the CESF. Two permanent crossing will be required along the access road as shown in Section 1.0, Executive Summary (see Figure 1.4-4). The permanent crossings will consist of culverts able to support the large construction machinery associated with the Project.

The primary construction laydown area is nearly level and thus requires little grading. Pads will be prepared for setting the trailers housing the temporary construction facilities (offices, restrooms, meal rooms, meeting and conference rooms, etc.). The soil in the laydown area will be covered with protective gravel along the access roadways, parking, and vehicle marshalling areas or with construction material on dunnage in the material storage areas so that soil losses will be negligible. In the areas to be restored after their use as temporary construction access and laydown areas, geotech fabric and gravel will be removed and shallow swales and/or depressions will be created for revegetation.

3.4.13.1.13 Construction Equipment Requirements

During construction, a variety of equipment will be required. Estimates of the types of and timing of use of construction equipment are provided in Table 3.4-14.

Table 3.4-14
Projected Monthly Construction Equipment Use

Construction Equipment Description	HP	Month																																		
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
Pick Up Truck (1/2T)	150	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Flatbed – Stake Body Truck (1T)	250	3	5	5	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Dump Truck (15cy)	250	7	9	9	9	9	9	9	9	9	9	8	6	6	5	5	5	3	2	2	2	1	1													
Truck Tractor	250			1	1	1	1	1	1	1	1	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1							
Compactor	50	1	3	4	4	4	4	4	2	1	1																							1	1	
Excavator	120	1	3	3	3	3	3	3	3	3	3	2	1	1	1	1	1	1	1	1	1	1	1													
Dozer	250	4	4	4	4	3	2	2																												
Scraper	120	4	4	4	4	2	2	1																												
Grader	120	2	4	4	4	3	2	2	2	2	2	2	2	1	1	1	1																1	1	1	1
Wheel Loader	120	2	3	3	3	3	2	2	1	1	1	1	1	1	1	1	1																			
Backhoe	50	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Water Truck	250	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1				
Fuel Truck	250		2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1
Bus (50 Seat)	275	2	2	4	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	5	4	4	3	3
Bus (20 Seat)	225	2	5	6	6	6	6	6	6	6	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	6	4
ATV	10	5	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Pile Driving Hammer	120			1	1	1																														
Hydraulic Mobile Crane	120		1	2	3	3	3	3	4	5	6	6	6	6	6	6	6	6	6	6	6	6	6	5	5	5	4	4	3	3	3	3	2	2	1	1
Crane	250							1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1									
Forklift	50											2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1		
Concrete Pump Truck	250					1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1												
Telescopic Handler	50		3	4	4	4	4	5	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Portable Welding Machine	50	1	1	1	1	1	1	1	1	1	1	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Engine Generator Set	50	1	2	2	3	3	3	4	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	5	5	5	5	5	5	5	5	5	5	3	3
Plate Compactor	15		2	4	4	4	4	5	6	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	6	4	2			
Manlift	50	1	2	2	2	2	3	4	4	4	4	5	5	5	5	5	6	6	7	7	8	8	8	8	8	8	7	7	3	3	3	1	1	1	1	
Light Plant	15		1	1	1	1	1	2	3	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	3	3	3	3	3	3	2	2	2	1	1
Air Compressor - Electric	N/A	1	2	3	3	4	4	5	5	6	6	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	6	5	4	4	4	4	4	4
	Total:	46	73	84	89	87	84	90	90	92	96	99	97	96	95	94	95	90	90	90	91	90	90	86	85	84	81	79	74	70	67	61	57	56	48	44

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3.4.14 Facility Operation

CESF will be an as available resource. The Project is intended to be operated anywhere between the minimum turndown of approximately 8 MW net, up to the maximum output of 177 MW net. The two independent STGs' output can be controlled individually, allowing the Project to provide a high degree of flexibility in operations. The CESF is expected to have an annual plant availability of 95 percent. It is possible for the solar farm to exceed 95 percent for any given 12-month period.

The Project will be priority dispatched by PG&E through day ahead, hour ahead, and real-time scheduling, as required to meet the demands of the California market. The market will dictate unit operations. Carrizo Energy, LLC expects the CESF will be cycled on a daily basis, harvesting solar energy during daylight hours and shutdown during overnight, resulting in 365 starts, 3,000 hours of operation, and 375,000 MW-hours produced per year, on average.

CESF is expected to have a total staff of 75 persons. Staff will commute to the CESF from surrounding areas (e.g., Paso Robles, San Luis Obispo, and Bakersfield). The staff will consist of five supervisory, general, and administrative positions; 20 operations and maintenance personnel in the power block; and 50 maintenance personnel in the solar field. The facility will be staffed 24 hours per day, with the majority of staff onsite during daytime operating hours and five staff onsite during non-operating hours. As the Project will require 75 employees during operation; the annual operation payroll will be approximately $4-4.5 million for the facility.

3.5 FACILITY SAFETY DESIGN

3.5.1 Natural Hazards

The primary natural hazards at this site are seismic, flooding, wind, blowing dust, heat, and fire.

3.5.1.1 Seismic Hazards

The site is located in Seismic Risk Zone 4. Structures and their foundations and equipment anchors will be designed according to the 2001 CBC, and the San Luis Obispo County Building Code. Should there be a conflict in code requirements, the more conservative requirements will govern. In addition, all substation equipment will meet requirements of the IEEE 693-1997 Recommended Practice for Seismic Design of Substations.

3.5.1.2 Flooding

The Project site is generally not subject to flooding; however, an area along Tracy Lane beginning approximately 174 m (570 feet) south of the northeast corner of Section 28 approximately 631 m (2,070 feet) long and extending approximately 174 m onto Section 28 is within the 100 year flood zone. Base Flood Elevations (BFE) and hazard factors have not been determined for this area. The BFE will be established during final design. Structures will be elevated or "flood proofed" to 0.3 meters (1-foot) above BFE, as required.

3.5.1.3 Wind and Dust Hazards

All buildings will be designed for wind loads stated in the current edition of the CBC and the San Luis Obispo County Building Code. In addition, particular care will be taken to minimize sand and grit intrusion for areas that will be occupied by personnel and for the main equipment locations.

If needed during construction, techniques to control windblown dust will include the use of water over the surface to enhance dust control, constructing temporary enclosures to reduce wind effect, and timely revegetation of barren construction areas.

3.5.1.4 Heat

All buildings will be designed with the appropriate climate controlled environment for protection of both personnel and equipment. This will include air conditioning, insulation, landscaping, overhead covers, ventilation, and appropriate use of glass and color selection to reduce heat.

3.5.1.5 Fire

The CESF is located in a moderate fire hazard zone and outside regions where the risk of wildland fires are considered significant.

3.5.2 Emergency Systems and Safety Precautions

This section discusses the safety precautions to be used by Project personnel and the fire protection systems.

3.5.2.1 Safety Precautions

The CESF will be constructed in full compliance with federal and state occupational safety and health program requirements. Compliance with these programs will minimize Project effects on employee safety.

3.5.2.2 Fire Systems

A packaged fire protection system including pumps (diesel and electric and electric jockey pump), distribution loop and monitors, will be provided. The firewater system will be supplied with a dedicated 1,100 m^3 (300,000 gallon) from the 1,700 m^3 (450,000 gallon) raw water – fire water tank. The firewater pump will be tested once a week for ½ hour (see Appendix C, Firewater Pump Information). Raw water to the water treatment system will be taken from an elevated nozzle to ensure adequate fire protection capacity is maintained.

Fire detection throughout the plant and in buildings will be interconnected to a fire detection panel located in the control room.

A carbon dioxide (CO_2) fire protection system will protect certain turbine, generator, and accessory equipment compartments from fires. The system will have fire detection sensors in all compartments. The CO_2 will be discharged at a design concentration adequate to extinguish the fire.

The plant administrative building and other buildings will be equipped with portable fire extinguishers as required by California Department of Forestry and Fire Protection (CDF)/San Luis Obispo County Fire.

3.6 TRANSMISSION LINE SAFETY AND NUISANCE

This section discusses safety and nuisance issues associated with the proposed electrical interconnection of the CESF.

3.6.1 Transmission Line Description

As discussed in Section 3.4.11, the CESF will interconnect with the existing PG&E Morro Bay–Midway 230 kV line via a single-circuit 230 kV overhead line. The high voltage transmission line is a single circuit conductor, thermally rated to carry full plant peak output.

The single circuit 230 kV transmission line will be supported by two 35 m (115-foot) tall poles and a 45.7 m (150-foot) tall dead-end structure located within the switchyard. This will allow the 230 kV line to drop down from the interconnection with the existing 230 kV transmission line into the facility switchyard.

3.6.2 Aviation Safety

Federal Aviation Administration (FAA) Regulations, Part 77, establish standards for determining obstructions in navigable airspace and set forth requirements for notification of proposed construction. These regulations require FAA notification for any construction over 61 m (200 feet) high (above ground level). In addition, notification is required if the obstruction is lower than specified heights and falls within any restricted airspace in the approaches to airports. For airports with runways longer than 975 m (3,200 feet), the restricted space extends 6.1 km (20,000 feet, 3.3 nautical miles) from the runway. For airports with runways less than 975 m (3,200 feet), the restricted space extends 3 km (10,000 feet, 1.7 nautical miles). For heliports, the restricted space extends 1.5 km (5,000 feet, 0.8 nautical miles).

Since the new transmission towers will be less than 61 m (200 feet) tall and there are no public or military airports or heliports near enough for the Project to fall within restricted airspace, an FAA air navigation hazard review will not be necessary. The transmission line structures will pose no threat to aviation safety.

3.6.3 Electrical Clearances

High-voltage overhead transmission lines are composed of bare conductors connected to supporting structures by means of porcelain, glass, or plastic insulators. The air surrounding the energized conductor acts as the insulating medium. Maintaining sufficient clearances, or air space, around the conductors to protect the public and utility workers is paramount to the safe operation of the line. The safety clearance required around the conductors is determined by normal operating voltages, conductor temperatures,

short-term abnormal voltages, wind-blown swinging conductors, contamination of the insulators, clearances for workers, and clearances for public safety. Minimum clearances are specified in the California Public Utility Commission (CPUC) General Order 95 (GO 95). Typically, clearances are specified for the following:

- Distances between energized conductors.
- Distances between energized conductors and supporting structures.
- Distances between energized conductors and other power or communication wires on the same supporting structure, or between other power or communication wires above or below the conductors.
- Distances from energized conductors to the ground and other features such as roadways, railroads, driveways, parking lots, navigable waterways, airports, etc.
- Distances from energized conductors and buildings and signs.
- Distances from energized conductors and other parallel power lines.

3.6.4 Audible Noise and Radio Interferences

Corona may result in the production of audible noise from a transmission line. Corona is a function of the voltage of the line, the diameter of the conductor, and the condition of the conductor and suspension hardware. The electric field gradient is the rate at which the electric field changes and is directly related to the line voltage. Corona typically becomes a concern for transmission lines having voltages of 345 kV or more. Since the CESF will be connected at 230 kV, it is expected that no corona-related design issues will be encountered, and that the construction and operation of the CESF will not result in any significant increase in electromagnetic field (EMF) levels or audible noise.

3.6.5 Induced Currents and Hazardous/Nuisance Shocks

The proposed 230 kV transmission interconnection will be designed and constructed in conformance with CPUC GO95 and Title 8 CCR 2700 requirements. Therefore, hazardous shocks are unlikely to occur as a result of Project construction or operation.

3.6.6 Electric and Magnetic Fields

Operating power lines, like the energized components of electrical motors, home wiring, lighting, and all other electrical appliances, produce EMF. The EMF produced by the AC electrical power system in the United States (U.S.) has a frequency of 60 Hz, meaning that the intensity and orientation of the field changes 60 times per second.

Considerable research has been conducted over the last 30 years on the possible biological and human health effects from EMF. This research has produced many studies that offer no uniform conclusions about potential harm of long-term exposure to EMF. In the absence of conclusive or evocative evidence, California has chosen not to specify maximum acceptable levels of EMF. Instead, California mandates a program of prudent avoidance whereby EMF exposure to the public is minimized by encouraging electric utilities to use low-cost techniques to reduce EMF levels.

3.7 FACILITY RELIABILITY

3.7.1 Facility Availability

The CESF will be designed for a 30-year plant life and 95 percent long-term solar availability. The CESF will support highly flexible operations and is designed to operate between the minimum load of 8 MW net and maximum output of 177 MW net.

Operations and maintenance procedures will be implemented which are consistent with industry practices to maintain the useful life of the plant and all components.

The CESF will use fully commercial technologies for which an extended proving out period should not be required. At the conclusion of plant commissioning when the CESF is declared operational, it is expected that the facility will be fully available for its entire 30 year life with the exception of normal scheduled maintenance outages and occasional unscheduled outages.

3.7.2 Redundancy of Critical Component

The CESF will be designed to provide 200 percent of the peak summer capacity to allow for cleaning and maintenance of individual lines and/or fields, as well as provide full output all year round. All equipment essential for continuous operation will be designed and constructed with three 50 percent capacity components or two 100 percent components on reasonable failure points. In addition, appropriate storage to allow for equipment maintenance during facility operation is provided, for example wastewater storage tank. A summary of equipment redundancy is provided in Table 3.7-1.

Table 3.7-1
Major Equipment Redundancy

Equipment Description	Redundancy	Comments
STGs and Main Transformers	Two STGs/GSUs	Each STG operates fully independently
Air Compressors	2 at 100 percent each	Two compressors provide 100 percent of expected need
Feed Water Pumps	3 at 50 percent each per unit (6 total)	Two BFPs provide 100 percent of expected need for one unit

3.7.3 Water Availability

The Carrizo Plain Groundwater Basin will supply raw water to CESF via an existing onsite ground water well, which is expected to provide 100 percent of the CESF needs. Onsite storage capability is sufficient for two days of full load operation to accommodate maintenance on any of the water delivery and treatment equipment; however, in the event the groundwater basin is temporarily unable to meet CESF supply requirements, water will be transported to the site from surrounding areas (e.g., Paso Robles, San Luis Obispo, and Bakersfield). During such an event, one or two tanker trucks per day would be sufficient to sustain operations.

3.7.4 Project Quality Control

The objective of the quality control program is to ensure that all systems, equipment, and components have the appropriate quality measures applied during design, procurement, fabrication, construction, and operation of the Project. High levels of safety, constructability, reliability, availability, operability, and maintainability are the goal of the quality control program.

The required quality for a system will be assured by the application of controls to various Project activities. Appropriate controls will be determined by the specific activity. Design activity controls will include checking and review, while manufacturing and construction controls will employ inspection and testing.

For quality assurance planning purposes, the Project activities have been divided into the following stages that apply to specific periods of time during the Project:

- Conceptual Design: Activities such as definition of requirements and engineering analyses.
- Detail Design: Activities such as the preparation of calculations, drawings, and lists needed to describe, illustrate, or define systems, structures, or components.
- Procurement Specification: Activities necessary to compile and document the contractual, technical, and quality provisions for procurement specifications for plant systems, components, or services.
- Manufacturers Control and Surveillance: Activities necessary to ensure that the manufacturers conform to the provisions of the procurement specifications.
- Manufacturer Data Review: Activities required to review manufacturers' drawings, data, instructions, procedures, plans, and other documents to ensure coordination of plant systems and components and conformance to procurement specifications.
- Receipt Inspection: Inspection and review of product at the time of delivery to the construction site.
- Construction/Installation: Inspection and review of storage, installation, cleaning, and initial testing of systems, subsystems, or components at the plant site.
- System/Components Testing: Actual operation of power plant components in a system in a controlled manner to ensure that the performance of systems and components conform to specified requirements.
- Plant Operation: Actual operation of the power plant system by Carrizo Energy, LLC.

As the Project progresses, the design, procurement, fabrication, erection, and checkout of each power plant component, subsystem, and system will progress through the nine stages defined above.

The following quality control record system will be maintained and used for review and reference:

- Project equipment/vendor instructions manual
- System design calculations and drawings
- Project design manual
- Quality assurance audit reports
- Inspection and equipment testing reports

- Conformance to construction records and drawings
- Equipment procurement specifications (contract issue and change orders)
- Purchase orders and change orders
- Project correspondence

For procured component purchase orders, a list of qualified suppliers and subcontractors will be developed. Before contracts are awarded, the subcontractors' capabilities and experience will be evaluated. The evaluation will consider suppliers' and subcontractors' personnel, production capability, past experience and performance, seismic experience, and quality assurance program.

During construction, the following field activities are accomplished:

- Inspections of equipment/components as they are received
- Construction/installation of equipment
- System/component testing
- Plant startup and commissioning

The construction contractor will be contractually responsible for performing the work in accordance with all safety, environmental and quality requirements specified by applicable LORS and by the Carrizo Energy, LLC contract.

The subcontractors' quality compliance will be surveyed through inspections, audits, and administration of independent testing contracts.

3.8 FACILITY CLOSURE

3.8.1 Introduction

Facility closure can be temporary or permanent. Temporary closure is defined as a shutdown for a period exceeding the time required for normal maintenance, including closure for overhaul or replacement of the major components, such as STGs or condensers. Causes for temporary closure include inclement weather (e.g., winds in excess of 30 mph, hail, etc.), or damage to the plant from earthquake, fire, storm, or other natural acts. Permanent closure is defined as a cessation in operations with no intent to restart operations owing to plant age, damage to the plant beyond repair, adverse economic conditions, or other significant reasons. Section 3.8.2 discusses temporary facility closure; Section 3.8.3 discusses permanent facility closure.

3.8.2 Temporary Closure

For a temporary facility closure, where there is no release of hazardous materials, security of the facility will be maintained on a 24-hour basis, and the California Energy Commission (CEC) and other responsible agencies will be notified. Depending on the length of shutdown necessary, a contingency plan for the temporary cessation of operations will be implemented. The contingency plan will be conducted to ensure conformance with applicable (LORS and the protection of public health, safety, and the environment. The plan, depending on the expected duration of the shutdown, may include the draining of

chemicals from storage tanks and other equipment and the safe shutdown of equipment. Wastes will be disposed of according to applicable LORS, as discussed in Section 5.14, Waste Management.

Where the temporary closure includes damage to the facility, and there is a release or threatened release of acutely hazardous materials into the environment, procedures will be followed as set forth in a contingency plan, to be developed as described in Section 5.15, Hazardous Materials. Procedures will include methods to control releases, notification of applicable authorities and the public, emergency response, and training for plant personnel in responding to and controlling releases of hazardous materials. Once the immediate problem is solved, and the acutely hazardous materials release is contained and cleaned up, temporary closure will proceed as described above for a closure where there is no release of hazardous materials.

3.8.3 Permanent Closure

The planned life of the generation facility is 30 years; however, if the CESF is still economically viable, it could be operated longer. It is also possible that the facility could become economically noncompetitive earlier than 30 years, forcing early decommissioning. Whenever the facility is permanently closed, the closure procedure will follow a plan that will be developed as described below.

The removal of the facility from service, or decommissioning, may range from “mothballing” to the removal of equipment and appurtenant facilities, depending on conditions at the time. Because the conditions that would affect the decommissioning decision are largely unknown at this time, these conditions would be presented to the CEC and San Luis Obispo County when more information is available and the timing for decommissioning is imminent.

To ensure that public health, safety, and the environment are protected during decommissioning, a decommissioning plan will be submitted to the CEC for approval prior to decommissioning. The plan will discuss the following:

- Proposed decommissioning activities for the facility and appurtenant facilities constructed as part of the facility.
- Conformance of the proposed decommissioning activities to applicable LORS and local/regional plans.
- Activities necessary to restore the site if the plan requires removal of equipment and appurtenant facilities.
- Decommissioning alternatives other than complete restoration.
- Associated costs of the proposed decommissioning and the source of funds to pay for the decommissioning.

In general, the decommissioning plan for the facility will attempt to maximize the recycling of facility components. Carrizo Energy, LLC will attempt to sell unused chemicals back to the suppliers or other purchasers or users. Equipment containing chemicals will be drained and shut down to ensure public health and safety and to protect the environment. Nonhazardous wastes will be collected and disposed of in appropriate landfills or waste collection facilities. Hazardous wastes will be disposed of according to applicable LORS. The site will be secured 24 hours per day during the decommissioning activities, and

Carrizo Energy, LLC will provide periodic update reports to the CEC and San Luis Obispo County, and other appropriate parties as such activities progress.

3.9 LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The applicable LORS for each engineering discipline are included as part of the engineering design criteria appendices (see Appendix D, Foundation and Civil Engineering Design Criteria; Appendix E, Structural Engineering Design Criteria; Appendix F, Mechanical Engineering Design Criteria; Appendix G, Electrical Engineering Design Criteria; and Appendix H, Control Systems Engineering Design Criteria).

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SECTION 4 ALTERNATIVES

Title 20 of the California Code of Regulations requires an applicant to discuss "the range of reasonable alternatives to the project, including the no project alternative…which would feasibly attain most of the basic objectives of the project, but would avoid or substantially lessen any of the significant effects of the project, and an evaluation of the comparative merits of the alternatives."

4.1 NO PROJECT ALTERNATIVE

If the Carrizo Energy Solar Farm (CESF or Project) were not constructed, the goals and objectives of the developer, Ausra CA II, LLC (dba Carrizo Energy, LLC), would not be met. Additionally, the direction to the major California utility by the CPUC to "plan for and procure the resources necessary to provide reliable service" would not be met. The utility would not be able to utilize the Project to meet its commitments under the renewable portfolio standards (RPS).

4.2 ALTERNATIVE SITE LOCATIONS

Several alternative site locations were assessed during initial screening for the CESF site (see Figure 4.2-1). First, a screening effort was conducted, as described in Section 4.2.1 below. Initial efforts to screen sites were successful, leaving few alternative site locations for consideration. These include alternative sites in California near Daggett (see Section 4.2.2); near Harper Lake (see Section 4.2.3); near Spicer City (see Section 4.2.4); the "Old Mine" site (see Section 4.2.5); and the CESF site (see Figure 4.2-1). Although each of the alternative sites showed promise, the CESF site clearly became the preferred alternative for a variety of reasons. These include: no Federal or State land acquisition/permitting necessary, proximity to electrical transmission, relatively flat topography, large land availability (640 acres plus 380 acres of laydown), water availability, few sensitive receptors, and fewest environmental impacts.

4.2.1 Site Location Screening

In accordance with Public Resources Code Section 25540.6(b), initial screening for a preferred solar site location for the CESF included several key factors. First and foremost were the solar intensity thresholds for California, which helped define areas within California that had the potential to most efficiently generate solar power. Other site screening included evaluating proximity to necessary infrastructure (e.g., an electrical transmission system), proximity to available water, sufficient land area (needed to accommodate a minimum 640 acres of solar area and 380 acres of construction laydown), minimal or no Federal or State land ownership restrictions, flat topography with preferred slope and aspect ratios, and a lack of or minimal effects on environmentally sensitive areas. These screening criteria helped define the following alternative sites, as described below.

4.2.2 Daggett – Soppeland Alternative Site Location

The Daggett – Soppeland Alternative Site is located near Daggett in San Bernardino County, California. The site is located approximately 30 miles east of Barstow off of California State Route 58 (SR-58) (see Figure 4.2-1). There were several sites within this area that were identified as potential alternative site

locations. The location indicated in Figure 2.4-1 shows a preferred location near Daggett, California that is located on private land. Although the site had cleared many of the screening criteria, several key factors were missing; specifically, available access to transmission was restricted at this site, and utilizing Federal lands would have been necessary. The use of Federal lands could hinder the CESF from coming online in time for utilities to use the Project to meet RPS requirements before 2012.

4.2.3 Harper Lake Alternative Site Location

The Harper Lake Alternative Site is located approximately 8 miles northwest of Hinkley in San Bernardino County, California (see Figure 4.2-1). The Harper Lake site is located near another solar project and therefore, met many of the preliminary screening criteria. This site location is near the SEGS 8 & 9 projects. Prior to the SEGS development, the Harper Lake site was a vacant former alfalfa ranch in the Mojave Desert of San Bernardino County, 135 miles northeast of Los Angeles. Much of the land had been previously impacted by the farming operation. While the site was conducive to the CESF Project, it is controlled by private parties and was considered cost and time prohibitive.

4.2.4 Kern County Alternative Site Location

The Kern County Alternative Site is located near McKittrick, California where McKittrick Highway/ SR-58 and Interstate 5 (I-5) merge in Kern County, California (see Figure 4.2-1). This site included several key screening criteria, including proximity to a 230 kV transmission line. Although the site cleared many of the screening criteria, several key factors were missing. In addition, CESF project objectives were not met by this alternative site location.

4.2.5 Old Mine Alternative Site Location

The Old Mine Alternative Site is located just north of Daggett in San Bernardino County, California. The site is located just off SR-58 as shown in Figure 4.2-1. This site had restrictions similar to the Daggett – Soppeland Alternative Site.

4.3 ALTERNATE PROJECT CONFIGURATIONS

The CESF includes the construction and operation of a solar power generating facility and its ancillary systems and will consist of approximately one hundred ninety-five Compact Linear Fresnel Reflector (CLFR) solar concentrating lines, and associated steam drums, steam turbine generators (STGs), air cooled condensers (ACCs), and infrastructure, producing up to a nominal 177 megawatts (MW) net. Maps depicting the physical plant layout are presented in Section 3.0, Facility Description and Location (Figures 3.1-1 and 3.4-4). The current Project description shows the CLFR solar lines in an east-west orientation.

An alternative project configuration would have the CLFR solar lines aligned in the north-south direction. This second alternative project configuration could lend itself to more optimal solar power harnessing and is an alternative for Project engineers. Modeling and power generation estimates being completed will verify which orientation would be preferred for the CESF. Although not specifically addressed in the environmental evaluation, the change of orientation is likely to cause only minimal changes to the existing environmental analysis.

4.4 ALTERNATE TECHNOLOGIES

4.4.1 Conventional Simple Cycle

The conventional simple cycle technology uses a combustion turbine to drive a generator. The high temperature exhaust is released directly to the atmosphere rather than routed to a HRSG and steam turbine generator, as is the case with combined cycle technology. Although simple cycle combustion turbines have relatively low capital cost and rapid startup capability, the technology is relatively inefficient (with a maximum of up to approximately 38 percent). Simple cycle equipment also produces more air emissions (criteria and greenhouse gas [GHG] emissions) than more efficient technologies because the high exhaust temperature makes it difficult to add post-combustion emission control equipment, and because more fuel must be burned to generate a given amount of electrical power. Conventional simple cycle was eliminated from consideration because of its relatively low efficiency and environmental (emissions) shortcomings. Most importantly, this technology would not provide renewable energy.

4.4.2 Integrated Gasification Combined Cycle (IGCC)

IGCC technology gasifies coal or petroleum coke that is burned in a gas turbine. The coal gasification equipment is located at the same site as the power generating equipment (combustion turbine, HRSG, and steam turbine). There is a lack of commercial operating experience with IGCC, and its cost-effectiveness is uncertain. It would also require the importation by truck and/or rail of coal to the Project area from outside California or of coke from petroleum refineries. Additional issues include increased traffic levels and onsite coal/coke storage, which would require a larger site than a comparable conventional combined-cycle facility. While IGCC can have lower emissions than conventional coal-fired power plants, an IGCC plant would still have substantially more pollutant emissions (criteria and GHG emissions) than a gas-fired combined-cycle plant. Additionally, IGCC would not provide renewable energy. For these reasons, IGCC was eliminated from consideration.

4.4.3 Coal or Other Solid Fuel Conventional Furnace/Boiler – Steam Turbine

With this technology, coal, petroleum coke, or other solid fuels are burned in a boiler, creating steam that is used in a steam turbine generator. The steam is then condensed and returned to the boiler. Efficiencies would be in the range of 35 to 40 percent, which is comparable to a gas-fired boiler/steam turbine unit. This technology would require importing by rail and/or truck coal from outside the state or coke from in-state petroleum refineries, which would increase traffic and also require onsite coal/coke storage. It would also produce more emissions (criteria and GHG emissions) than a natural gas-fueled facility of equivalent size, require a larger site, and be more costly to build and operate. This technology, like the ones discussed above, would not provide renewable energy. For these reasons, this technology was eliminated from consideration.

4.4.4 Fluidized Bed Combustion

Fluidized bed combustion burns coal or other solid fuels in a hot bed of limestone-containing inert material that is kept suspended or fluidized by a hot air stream. Water coils in the furnace create steam that drives a steam turbine generator. Fluidized bed technologies (atmospheric and pressurized) have

efficiencies in the 35 to 45 percent range, and pressurized fluidized bed is not commercially available for facilities of the scale of the proposed Project. As with the other solid fuel technologies, fluidized bed technology would require importing coal from outside the state or coke from petroleum refineries; it also would require a larger site and produce higher air emission levels of both criteria and non-criteria pollutants such as carbon monoxide. Additionally, this technology would not produce renewable energy. For these reasons, fluidized bed combustion was eliminated from consideration.

4.4.5 Nuclear

Nuclear fission is an established technology. However, California law currently prohibits nuclear fission as an energy generation technology.

4.4.6 Geothermal

Geothermal was eliminated from consideration because there is no geothermal resource in the Carrizo Plain area.

4.4.7 Biomass

Biomass fuels such as wood wastes were eliminated because they are not locally available in the Project area in sufficient quantities to make them a practical alternative fuel. Biomass facilities also can produce significant air emissions. For these reasons, biomass fuels were eliminated as a viable option.

4.4.8 Wind

Wind energy involves the use of wind power to drive a rotor or propeller, which in turn drives a generator. Wind energy equipment is large (in height) and has potentially significant visual impacts. There are limited sites where there is sufficient wind available for energy generation purposes. The Carrizo Plain area is not identified as an important wind energy resource area in the Renewable Energy Atlas of the West (Nielsen et al., 2006). For these reasons, wind technology was eliminated from consideration.

4.4.9 Hydroelectric

Hydroelectric was eliminated from consideration because there is no hydroelectric resource in the Carrizo Plain area.

4.4.10 Other Solar Technologies

There are many solar technologies commercially available and in use or proposed to be in use in the California region. These include the Power Tower, the Stirling Solar Dish, Photovoltaic, and Parabolic Trough, to name a few. Carrizo Energy, LLC has a patented, reliable technology using the CLFR solar lines. The CLFR technology is the most cost-efficient due to widely available materials and factory made technology. In addition, the success of its technology on the ground has proven it to be efficient, reliable, and able to achieve all project objectives (as outlined in Section 2.0, Project Objectives). Other solar

technologies do not meet all of the CESF objectives outlined in Section 2.0, Project Objectives, and therefore, were not considered.

4.5 ALTERNATE LINEAR ROUTES

All of the anticipated linear facilities for electrical transmission and water are within the property boundaries of the Project, the Pacific Gas & Electric (PG&E) substation, or PG&E's Morro Bay–Midway right-of-way (ROW). Alternate linear routes would not be practical and would have an increased potential for environmental impacts.

4.6 WATER SUPPLY

The expected average daily water consumption for the plant is approximately 18,500 gallons, or 21.8 acre-feet per year. The design of the Project minimizes use and maximizes the recovery of process water. Wastewater discharge is routed to the onsite raw water storage tank for reuse.

The following alternative water supplies were initially considered for the CESF.

- Surface Water
- Reclaimed Wastewater
- Existing Onsite Well (Carrizo Plain Groundwater Basin)
- Truck Water in from Surrounding Areas (e.g., Paso Robles, San Luis Obispo, Bakersfield)

Based on a cursory review, the following two alternatives were deemed impractical or not possible and were dropped from consideration:

- **Surface Water –** Sources of surface water are not considered reliable or located in sufficient proximity to the CESF site for consideration as a source of water supply.
- **Reclaimed Wastewater** – The entire Carrizo Plain area is served by septic tanks and other individual disposal systems. There are no wastewater treatment plants in the area. Without wastewater treatment plants in the area, there is no source of tertiary treated water for use as raw water for the CESF.

The remaining alternatives are deemed to be feasible for use at the CESF (i.e., sufficient volume and quality is available, satisfy California Water Policy, and are safe and reliable). The relative feasibility of each alternative is based on availability of the water in the near and long term. Both of the remaining alternatives are discussed below. Additional discussion of these alternative water options is provided in Section 5.5, Water Resources.

4.6.1 Existing Onsite Well (Carrizo Plain Groundwater Basin)

A viable water supply option for the CESF is groundwater. As mentioned above, a key screening factor in the selection of the Project site was its proximity to available water. Untreated raw water for the Project will be obtained from groundwater from the Carrizo Plain Groundwater Basin via the existing onsite well near the center of Section 28. The existing onsite well is expected to adequately provide 100 percent of the CESF water needs. The water usage rates and well yield for the Project are less than

that of designed and operated water well usage at a nearby water well on Section 27 at the now dismantled ARCO Carrisa Plain Solar Project (ARCO Site). Based upon evaluation of past water demand in the CESF vicinity, the Project's water demand is not anticipated to cause any adverse water supply issues for the groundwater basin, particularly in light that there is minimal existing groundwater use in the vicinity of the CESF, and that the Project will require less water than previous uses in the area (ARCO Site). Onsite storage capability is sufficient for two days of full load operation to accommodate maintenance on any of the water delivery and treatment equipment. Additionally, as all water lines are within the property boundaries, alternate off-site water supply sources would have an increased potential for environmental impacts.

4.6.2 Trucking Water in from Surrounding Areas

A second alternative and backup for supplying water to the Project would be to truck water in from surrounding areas, such as Paso Robles, San Luis Obispo, and/or Bakersfield. While the existing onsite well is expected to adequately provide 100 percent of the CESF water needs, in the event the Carrizo Plain Groundwater Basin is temporarily unable to meet CESF water demand requirements, water may be transported to the site from surrounding areas. During such an event, one or two tanker trucks per day would be sufficient to sustain operations. However, it is not anticipated that this would be a viable alternative for long-term Project operations. To continuously haul water to the site for the life of the Project would be costly and have an increased potential for environmental impacts (e.g., traffic and air quality emissions related to truck trips).

4.7 REVERSE OSMOSIS (RO) WASTEWATER DISCHARGE OPTIONS

Sources of process wastewater include: steam turbine blow down, solar thermal system washdown, air cooled condenser washdown, and oil/water separator clear well discharge. Process wastewater is recovered from solar thermal blow down and the oil/water separator clearwell and recycled back to the water treatment system. The Project will utilize a 1,000 gallon septic tank and leach field as the Reverse Osmosis (RO) wastewater discharge preferred option. The wastewater streams are summarized in Section 3.0, Facility Description and Location (Table 3.4-3).

The entire Carrizo Plain area is served by septic tanks and other individual disposal systems. There are no wastewater treatment plants in the area, so Project wastewater cannot be sent for treatment. Thus, the proposed sanitary system will consist of a buried 1,000 gallon septic tank and leach field for all sanitary wastes including toilets, sinks, and showers. Stormwater will be collected onsite and directed to swales and detention areas for percolation into the ground. Alternate wastewater treatment methods would not be practical and would have an increased potential for environmental impacts.

4.8 SUMMARY OF WATER AND RO WASTEWATER DISCHARGE OPTIONS

The Project description (see Section 3.0, Facility Description and Location and Section 5.5, Water Resources) identifies the preferred option for water and wastewater as follows: the existing onsite well utilizing the Carrizo Plain Groundwater Basin as the source for water and use of a buried 1,000 gallon septic tank and leach field as the preferred wastewater discharge management strategy. The Project will have two wastewater streams, process wastewater and sanitary wastewater.

4.9 REFERENCES

Application for Certification for Victorville 2 Hybrid Power Project (07-AFC-1), February 2007.

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SECTION 5 ENVIRONMENTAL INFORMATION

5.1 INTRODUCTION

This section presents a discussion of the affected environment and potential environmental consequences that are associated with the Carrizo Energy Solar Farm (CESF or Project), along with measures to mitigate or avoid adverse impacts as appropriate. Supporting information to determine compliance with applicable laws, ordinances, regulations, and standards (LORS) 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 Section 3.0, Facility Description and Location, and Section 4.0, Alternatives;
- Consideration of California Energy Commission (CEC) regulations, including regulations applicable to the expedited processing of projects; and
- 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, cumulative impacts, measures proposed to mitigate significant adverse impacts, and LORS compliance.

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5.2 AIR QUALITY

This analysis of the potential air quality impacts of the Carrizo Energy Solar Farm (CESF or Project) has been conducted according to California Energy Commission (CEC) power plant siting requirements. It also addresses San Luis Obispo County Air Pollution Control District (SLOCAPCD) permitting requirements for Determination of Compliance/Authority to Construct (DOC/ATC). The analysis is organized as follows:

- Section 5.2.1, Affected Environment, describes elements of the local environment that are relevant to evaluation of the Project's air quality impacts. These include topography, climate, and existing air quality. The most representative meteorological data, including wind speed and direction, temperature, relative humidity, and precipitation, and the most representative recent measurements of ambient air pollutant concentrations in the proposed Project vicinity are summarized. Air pollutants emitted by the Project may travel in the atmosphere over long distances, but for practical purposes, the Project air quality study area can be considered to be the eastern inland section of San Luis Obispo County, in the Carrizo Plain area.
- Section 5.2.2, Environmental Consequences, evaluates the maximum potential air quality impacts due to the proposed Project's emissions of nitrogen oxides (NO_x), carbon monoxide (CO), sulfur oxides (SO_x), volatile organic compounds (VOC), particulate matter less than 10 microns in diameter (PM_{10}), and particulate matter less than 2.5 microns in diameter ($PM_{2.5}$). Estimated emissions of these pollutants are presented for the construction phase of the proposed Project, as well as for operation of the installed equipment. Because of the nature of the Project, operational emissions will be small; however, a modeling analysis conducted for operational emissions of nitrogen dioxide (NO_2), CO, sulfur dioxide (SO_2), and PM_{10} is presented. The results show that the proposed Project will neither cause an exceedance of the California and/or National Ambient Air Quality Standards (CAAQS and NAAQS), nor contribute significantly to an existing exceedance.
- Section 5.2.3, Cumulative Impacts, addresses the cumulative impacts of the proposed Project emissions with other potential new sources of air pollution in the area around the CESF site.
- Section 5.2.4, Mitigation Measures, describes the emission mitigation measures proposed for Project construction. Since the only emission source associated with the operational Project will be an emergency diesel firewater pump engine that will only be tested periodically, mitigation in the form of emission reduction credits (ERCs) is not proposed.
- Section 5.2.5, Laws, Ordinances, Regulations, and Standards (LORS), describes all applicable laws, ordinances, regulations, and standards.
- Section 5.2.6, References, lists the references used to conduct the air quality assessment.

Some air quality data are presented in other sections of this Application for Certification (AFC), including an evaluation of toxic air pollutants (see Section 5.16, Public Health and Safety) and information related to the fuel characteristics, heat rate, and expected capacity factor of the proposed facility (see Section 3.0, Facility Description and Location).

5.2.1 Affected Environment

This section describes the regional climate and meteorological conditions that influence transport and dispersion of air pollutants and the existing air quality within the Project region. The data presented in this section are considered to be reasonably representative of the CESF site.

The proposed CESF site will be a newly constructed solar power plant located near the towns of Simmler and California Valley in San Luis Obispo County, California. The CESF site will encompass approximately 640 acres of fenced area on Section 28 adjacent to California State Route 58 (SR-58)/Carrisa Highway. The 380-acre construction laydown area would be located entirely on Section 33, directly south of the Project site across SR-58. This location is within a valley between the Temblor and Caliente mountain ranges, near Carrizo Plain National Monument, and 10 miles northwest of Soda Lake (Figure 5.2-1). The Carrizo Plain is an approximately 45 mile long by 15 mile wide native grassland that follows the San Andreas Fault. The Project site is generally flat, gently sloping down in elevation to the southeast. Two existing residences are located approximately one mile north of the site. The nearest Class I area is San Rafael Wilderness, about 30 miles to the south.

5.2.1.1 Climate and Meteorology

The climate of the Central Coast is considered to be a Mediterranean classification, with warm, dry summers and mild winters. Further inland, the climate becomes increasingly arid with more extreme high and low temperatures, and decreased precipitation. The surrounding mountain areas tend to be cooler than the Carrizo Plain due to their higher elevations.

Long-term average temperature and precipitation data have been collected at the nearest surface meteorological station, approximately 8 miles west of the Project at La Panza, California. These data are summarized in Table 5.2-1. During the summer, the average minimum temperature is in the high 40s to low 50s (degrees Fahrenheit [ºF]) and the average maximum temperature is in the high 80s to mid 90s (ºF); however, summertime highs can easily reach into the 100s (ºF) and drop more than 45 ºF overnight. During the summer the northern location of the semi-permanent Pacific high-pressure system offshore California results in clear, sunny skies in the inland areas of San Luis Obispo County.

In the winter, the average minimum temperature is in the low 30s (ºF) and the average maximum temperature is in the mid 60s (ºF). Wintertime lows frequently dip below freezing.

Winds measured at La Panza, CA (approximately 8 miles west of the Project site) frequently blow up and down the Carrizo Plain, as airflow in the area is channeled between the mountain ranges that lie to the west and to the east. Winds are predominantly from the south and southeast and from the north-northwest. The winds are often calm or light. The annual average pattern of joint wind speed and wind direction frequencies in the area is illustrated in the wind rose presented in Figure 5.2-2. A detailed discussion of the meteorological data used to support dispersion modeling for evaluation of the CESF air quality impacts is presented in Section 5.2.2.4.3.

Table 5.2-1
Temperature and Precipitation Data for La Panza Station
La Panza, California

Month	Average Temperatures (ºF)		Average Precipitation (inches)
	Low	High	
Jan	32.0	60.7	1.88
Feb	34.2	61.6	2.32
Mar	35.5	65.1	0.83
Apr	36.5	70.1	0.72
May	42.7	80.0	0.40
Jun	47.3	88.3	0.02
Jul	52.9	95.7	0.04
Aug	52.1	95.0	0.00
Sep	47.8	89.8	0.07
Oct	40.7	79.6	0.35
Nov	33.2	67.1	0.87
Dec	30.0	61.0	1.39
Annual Average	40.4	76.2	8.89 (total)

Reference: Western Regional Climate Center, 1991-2006.
Note: Average temperature data for years 1991-2006, and average precipitation data for years 1996-2006.

The relative humidity in the air quality study area during the summer is very low, averaging 30 to 60 percent over a 24 hour period, with much lower humidities occurring during the hottest part of the day, and the highest humidity values occurring overnight. During the winter, relative humidities are much higher with the arrival of the rainy season, and measure from 60 to 90 percent on average in a 24 hour period. As in summer, high winter relative humidities tend to occur overnight, with the lowest humidities during the warmest part of the day.

On average, more than 80 percent of the annual precipitation at the Project site area occurs from November through March. Precipitation events are generally associated with storm systems that travel through the region during the winter months when the semi-permanent Pacific high-pressure center moves southward. Very little precipitation occurs during the summer months since the location of Pacific high pressure center is more northerly during this season. La Panza receives an average of only 8-9 inches of rain annually, although more rain occurs during El Nino winters. The Project site likely receives even less rain than La Panza because of its location further inland.

5.2.1.2 Existing Air Quality

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

The ambient air quality in San Luis Obispo County is monitored at a number of permanent air quality monitoring stations operated by the SLOAPCD and California Air Resources Board (CARB). The closest monitoring station to the proposed Project site within San Luis Obispo County is Carrizo Plains School Station, located 430 m southeast of the Project site. This station measures only ozone (O_3) and PM_{10}. Since Carrizo Plains School Station is a new station, it has only measured these pollutants since the beginning of 2006. The next closest monitoring station to the proposed Project site is Nipomo-Regional Park Station, located approximately 35 miles southwest of the CESF. The Nipomo-Regional Park Station measures the following criteria pollutants: O_3, PM_{10}, NO_2, and SO_2. The Atascadero-Lewis Avenue Station is the third closest station (located approximately 40 miles to the west northwest of the proposed CESF), and monitors O_3, PM_{10}, $PM_{2.5}$, CO, and NO_2. The Nipomo-Regional Park Station and Atascadero-Lewis Avenue Station have monitored these pollutants for the past 3 years.

Air quality measurements taken at these stations are presented in Tables 5.2-2 through 5.2-8. For the air quality impact analysis described in Section 5.2.2.4, the maximum recorded concentration from the most recent 3 years (2004–2006) at any of these monitoring stations were used to represent background air quality levels.

5.2.1.2.1 Ozone

The federal one-hour ozone standard is not longer in effect for SLOAPCD. Measurements were not taken at the Carrizo Plains School Station in 2004 or 2005 because it is new monitoring station.

In Table 5.2-2, the state one-hour O_3 CAAQS of 0.09 ppm was exceeded 6 times at the Carrizo Plains School Station in 2006. The CAAQS of 0.09 ppm was not exceeded during the past 3 years at the Nipomo-Regional Park station, and exceeded only once on July 23, 2005 at Atascadero-Lewis Avenue Station at 0.096 ppm.

The federal 8-hour O_3 NAAQS, which requires maintaining 0.08 ppm as a 3-year average of the fourth-highest daily maximum values, was not exceeded at Nipomo-Regional Park Station or Atascadero-Lewis Avenue Station during the past 3 years. At the Carrizo Plains School Station, the federal 8-hour O_3 NAAQS was exceeded 7 times in 2006, the highest concentration being 0.095 ppm on July 20, the second highest (0.087 ppm) on July 15, and the third highest (0.086 ppm) on both June 22 and June 24. The

SLOAPCD is designated as a federal unclassified area and state nonattainment for the applicable ozone standards.

Table 5.2-2
Concentration Data Summary for O_3

Year	Highest Concentration for O_3 (ppm)		Estimated Number of Days Exceeding Standards	
	1-hour	8-hour	Federal 8-hour	State 1-hour
Carrizo Plains School Station				
2006	0.128	0.095	7	6
2005	*	*	*	*
2004	*	*	*	*
Nipomo-Regional Park Station				
2006	0.064	0.06	0	0
2005	0.07	0.065	0	0
2004	0.086	0.073	0	0
Atascadero-Lewis Avenue Station				
2006	0.093	0.076	0	0
2005	0.096	0.084	0	1
2004	0.085	0.076	0	0

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

Notes:
The federal 8-hour average O3 standard is 0.08 ppm.
O_3 = ozone.
ppm = parts per million.
The state O3 standards are 1-hour average (0.09 ppm) and 8-hour average (0.07 ppm).
* Denotes that no ozone data was available.
Monitoring Site Addresses: Carrizo Plains School Station, 9640 Carrisa Highway, Santa Margarita, CA 93453; Nipomo-Regional Park Station, W. Tefft Street and Pomeroy Road, Nipomo CA 93444; Atascadero-Lewis Avenue Station, 6005 Lewis Avenue, Atascadero CA 93422.

5.2.1.2.2 Particulates

PM_{10}

Particulates in the air are caused by a combination of windblown fugitive dust (e.g., road dust; particles emitted from combustion sources (primarily carbon particles), and organic, sulfate, and nitrate aerosols formed in the air from emitted hydrocarbons, SO_x, and NO_X). Respirable particulate matter is referred to as PM_{10}, which has a diameter equal to or less than 10 microns. It can contribute to increased respiratory disease, lung damage, cancer, premature death, reduced visibility, and surface soiling. In 1987, the

United States (U.S.) Environmental Protection Agency (EPA) adopted standards for PM_{10} and phased out the total suspended particulate (TSP) standards that had previously been in effect.

The Carrizo Valley within the San Luis Obispo Air Basin is designated as state nonattainment for PM_{10} and unclassified for federal standards. The state method for measuring 24-hour particulates differs from the federal method. The state method uses an inertial separation and gravimetric analysis, while the federal method uses a gravimetric or beta attenuation method. Concentration data for this pollutant in micrograms per cubic meter ($\mu g/m^3$) that were recorded within the most recent 3 years at three monitoring stations are summarized in Table 5.2-3. This table shows that the 24-hour CAAQS for PM_{10} (50 $\mu g/m^3$) was exceeded once at Carrizo Plains School Station on July 22, 2006 when a concentration of 55 $\mu g/m^3$ was recorded. The Nipomo-Regional Park Station recorded exceedances of the 24-hour CAAQS for PM_{10} on September 12, 2004 (64 $\mu g/m^3$) and on October 26, 2006 (73 $\mu g/m^3$). The Atascadero-Lewis Avenue Station exceeded the 24-hour CAAQS for PM_{10} on October 26, 2006, (59$\mu g/m^3$). The federal 24-hour average PM_{10} NAAQS of 150 $\mu g/m^3$ was not exceeded during 2004–2006 at any of these three stations.

Prior to July 2003, the annual geometric mean PM_{10} concentration was referred to as the state annual average. Since then, the state annual average has been changed to match the federal standard (i.e., annual arithmetic mean), which is called the national annual average and calculated as the arithmetic average of the four arithmetic quarterly averages. The federal annual PM_{10} standard was revoked by the EPA in 2006 due to a lack of evidence linking health problems to long-term exposure to coarse particle pollution. The measured national arithmetic mean concentrations recorded at the nearest air monitoring stations to the CESF were below the California PM_{10} ambient air quality standard of 20 $\mu g/m^3$, except for in 2004 at Nipomo-Regional Park Station, which measured at 23.7 $\mu g/m^3$. The background PM_{10} values used for construction and operational modeling in Tables 5.2-15 and 5.2-16 are from the Carrizo Plains School Station because of its close proximity to the CESF site.

Table 5.2-3
Concentration Data Summary for PM_{10}

Year	Highest 24-hour Concentration for PM_{10} ($\mu g/m^3$)		Annual Arithmetic Mean for PM_{10} ($\mu g/m^3$)	Estimated Number of Days Exceeding Standards	
	Federal	State		Federal 24-hour	State 24-hour
Carrizo Plains School Station					
2006	55	55	18	0	1
2005	*	*	*	*	*
2004	*	*	*	*	*
Nipomo-Regional Park Station					
2006	71	73	19.1	0	5.8
2005	42	43	18.6	0	0
2004	63	64	23.7	0	*

Table 5.2-3
Concentration Data Summary for PM_{10}
(Continued)

Year	Highest 24-hour Concentration for PM_{10} (µg/m³)		Annual Arithmetic Mean for PM_{10} (µg/m³)	Estimated Number of Days Exceeding Standards	
	Federal	State		Federal 24-hour	State 24-hour
Atascadero-Lewis Avenue Station					
2006	58	59	18.1	0	5.8
2005	45	45	17.1	0	0
2004	42	41	18.7	0	*

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

Notes:
The federal 24-hour average PM_{10} standard is 150 µg/m³.
The state PM_{10} standards are annual arithmetic mean: 20 µg/m³ and 24-hour average: 50 µg/m³.
* Denotes that there were insufficient (or no) data available to determine the value.
Monitoring Site Addresses: Carrizo Plains School Station, 9640 Carrisa Highway, Santa Margarita, CA 93453; Nipomo-Regional Park Station, W. Tefft Street and Pomeroy Road, Nipomo, CA 93444; Atascadero-Lewis Avenue Station, 6005 Lewis Avenue, Atascadero CA 93422.

$PM_{2.5}$

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

The $PM_{2.5}$ data presented in Table 5.2-4 for the Atascadero-Lewis Avenue Station show that the federal 24-hour average NAAQS of 35 µg/m^3 is not exceeded in the proposed Project vicinity. The highest 24-hour $PM_{2.5}$ concentration of 30.7 µg/m^3 was measured during 2004. No separate state standard exists for the 24-hour averaging time. The annual average $PM_{2.5}$ data are also presented in this table. The methods for measuring the annual arithmetic mean for $PM_{2.5}$ differ between federal and state standards. The state standard uses gravimetric or beta attenuation, while the federal uses inertial separation and gravimetric analysis. The measured annual arithmetic mean concentrations were below the California $PM_{2.5}$ ambient air quality standard of 12 µg/m^3. The maximum annual arithmetic mean concentration recorded was 8.3 µg/m^3 in 2004 and 2006, which is also below the federal annual $PM_{2.5}$ NAAQS of 15 µg/m^3. The background $PM_{2.5}$ values used for construction and operational modeling in Tables 5.2-15 and 5.2-16 are the highest concentration measurements from Atascadero-Lewis Avenue Station in 2004. $PM_{2.5}$ concentrations within the San Luis Obispo Air District are in attainment of the state ambient standards and federal standards.

Table 5.2-4
Concentration Data Summary for Particulate Matter (PM_{25})
at Atascadero-Lewis Avenue Station

Year	Highest 24-hour Concentration for $PM_{2.5}$ (μg/m³)	Annual Arithmetic Mean for $PM_{2.5}$ (μg/m³)		Estimated Number of Days Exceeding Standards
	Federal	Federal	State	Federal
2006	25.4	8.3	NA	0
2005	29.2	NA	7.1	0
2004	30.7	8.3	8.3	0

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

Notes:
The federal $PM_{2.5}$ standards are 24-hour average (35 μg/m³) and annual arithmetic mean (15 μg/m³).
The state $PM_{2.5}$ standard is annual arithmetic mean: 12 μg/m³.
NA = There were insufficient data available to determine the value.
Monitoring Site Address: 6005 Lewis Avenue, Atascadero CA 93422.

5.2.1.2.3 Carbon Monoxide

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

Recorded CO monitoring data for the Atascadero-Lewis Avenue Station monitoring station are summarized in Table 5.2-5. The data in this table indicate that maximum 1-hour average CO levels comply with the NAAQS and CAAQS of 20.0 ppm. This limit also was not exceeded in 2004, when CO monitoring data were available at this station. The maximum 1-hour concentration was 2.1 ppm in 2004. This table also shows that maximum recorded 8-hour average CO levels comply with the NAAQS and CAAQS of 9.0 ppm in 2004. The maximum 8-hour concentration was 1.23 ppm in 2006. The background CO values used for construction and operational modeling in Tables 5.2-15 and 5.2-16 are from the 2004 data collected at Atascadero-Lewis Avenue Station. San Luis Obispo Air District is in federal and state attainment for CO.

Table 5.2-5
Concentration Data Summary for Carbon Monoxide (CO)
at Atascadero-Lewis Avenue Station

Year	Highest Concentration for CO (ppm)		Estimated Number of Days Exceeding Standards (Days)			
	1-hour	8-hour	Federal 1-hour	Federal 8-hour	State 1-hour	State 8-hour
2006	*	*	*	*	*	*
2005	*	*	*	*	*	*
2004	2.1	1.23	0	0	0	0

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

Notes:
The federal CO standards are 1-hour average (35 ppm) and 8-hour average (9 ppm).
The state CO standards are 1-hour average (20 ppm) and 8-hour average (9 ppm).
* Denotes that no CO data available to determine value.
Monitoring Site Address: 6005 Lewis Avenue, Atascadero, CA 93422.

5.2.1.2.4 Nitrogen Dioxide

Nitrogen oxide emissions are primarily generated from the combustion of fuels. Nitrogen oxides include nitric oxide (NO) and NO_2. Because nitric oxide converts to NO_2 in the atmosphere over time and NO_2 is the more toxic of the two, NO_2 is the listed criteria pollutant. The control of NO_2 also is important because of this pollutant's role in the atmospheric formation of ozone, the principal component of smog. It also can provoke lung irritation and damage.

Recorded NO_2 concentration data for the Nipomo-Regional Park Station and Atascadero-Lewis Avenue Station are summarized in Table 5.2-6. As supported by this table, the San Luis Obispo Air District has been in attainment of NO_2 for many years.

Table 5.2-6
Concentration Data Summary for Nitrogen Dioxide (NO_2)

Year	Highest 1-hour Concentration for NO_2 (ppm)	Annual Average for NO_2 (ppm)	Estimated Number of Days Exceeding Standards (days)	
			Federal	State
Nipomo-Regional Park Station				
2006	0.039	0.004	0	0
2005	0.039	0.004	0	0
2004	0.043	0.005	0	0

Table 5.2-6
Concentration Data Summary for Nitrogen Dioxide (NO_2)
(Continued)

Year	Highest 1-hour Concentration for NO_2 (ppm)	Annual Average for NO_2 (ppm)	Estimated Number of Days Exceeding Standards (days)	
			Federal	State
Atascadero-Lewis Avenue Station				
2006	0.056	0.009	0	0
2005	0.052	0.007	0	0
2004	0.051	0.008	0	0

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

Notes:
The federal NO_2 standard is annual average: 0.053 ppm.
The current state NO_2 standard is 1-hour average: 0.25 ppm. A new state 1-hour standard of 0.18 ppm will be effective later in 2007. A new state annual average standard of 0.030 ppm will also be effective later in 2007.
Monitoring Site Address: Nipomo-Regional Park, W. Tefft Street and Pomeroy Road, Nipomo CA 93444; Atascadero-Lewis Avenue Station, 6005 Lewis Avenue, Atascadero CA 93422.

Maximum annual average (arithmetic mean) NO_2 levels comply with the federal NAAQS of 0.053 ppm at both the Nipomo-Regional Park Station and the Atascadero-Lewis Avenue Station. The maximum annual average concentration was 0.005 ppm in 2004 at Nipomo-Regional Park Station and 0.009 ppm in 2006 at Atascadero-Lewis Avenue Station. The data in the table also show that maximum 1-hour NO_2 levels consistently complied with the CAAQS of 0.25 ppm in the last 3 years. The maximum 1-hour concentration was 0.043 ppm in 2004 for Nipomo-Regional Park Station, and 0.056 ppm in 2006 for Atascadero-Lewis Avenue Station. The background one hour and annual NO_2 concentrations used for construction and operational modeling in Tables 5.2-15 and 5.2-16 are the highest concentration measurements from these two stations which occur at Atascadero-Lewis Avenue Station in 2006.

On February 23, 2007, the CARB approved new stricter ambient California standards for NO_2. The new 1-hour standard will be 0.18 ppm not to be exceeded, and the new annual average standard will be 0.030 ppm. San Luis Obispo County monitoring stations for this pollutant indicate that the County will be compliant with these new standards when they take effect. These new standards are expected to go into effect later in 2007 after approval by the Office of Administrative Law.

5.2.1.2.5 Sulfur Dioxide

Sulfur dioxide is produced when any fuel containing sulfur is burned. It is also emitted by chemical plants that treat or refine sulfur or sulfur-containing chemicals. Natural gas contains trace amounts of sulfur, while fuel oils may contain much larger amounts. SO_2 can increase lung disease and breathing problems for asthmatics. It reacts in the atmosphere to form acid rain, which is destructive to crops and vegetation, as well as to buildings, materials, and works of art.

Summaries of monitored SO_2 concentration data are presented in Tables 5.2-7 for the Nipomo-Regional Park Station. The Atascadero Lewis Avenue Station did not monitor for SO_2. SLOAPCD is in attainment for all applicable state and federal ambient standards for SO_2.

The SO_2 data in Table 5.2-7 demonstrates that neither the 24-hour average CAAQS of 0.04 ppm nor the NAAQS of 0.14 ppm has been exceeded in the proposed Project vicinity between 2004 and 2006. The maximum 24-hour SO_2 monitored concentration of 0.02 ppm was measured at the Nipomo-Regional Park monitoring station in 2004. The recorded annual average (arithmetic mean) SO_2 concentrations at the monitoring station are also presented in Table 5.2-7 and in all cases are well below the federal ambient air quality standard of 0.03 ppm. The maximum 1-hour average SO_2 levels in the last 3 years easily comply with the CAAQS of 0.25 ppm. The maximum 1-hour concentration was 0.118 ppm at the Nipomo-Regional Park monitoring station in 2004. The background SO_2 values used for construction and operational modeling in Tables 5.2-15 and 5.2-16 are the highest concentration measurements from Nipomo-Regional Park Station in 2004.

Table 5.2-7
Concentration Data Summary for Sulfur Dioxide (SO_2) at Nipomo-Regional Park Station

Year	Highest Concentration for SO_2 (ppm)			Annual Average for SO_2 (ppm)	Estimated Number of Days Exceeding Standards (days)				
	1-hour	3-hour	24-hour		Federal 3-hour	Federal 24-hour	Federal Annual Mean	State 1-hour	State 24-hour
2006	0.052	0.032	0.008	0.002	0	0	0	0	0
2005	0.046	0.028	0.008	0.002	0	0	0	0	0
2004	0.118	0.042	0.020	0.003	0	0	0	0	0

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

Notes:
The federal SO_2 standards are annual average (0.03 ppm) and 24-hour average (0.14 ppm).
The state SO_2 standards are 24-hour average (0.04 ppm), 3-hour average (0.50 ppm) and 1-hour average (0.25 ppm).
Monitoring Site Address: Nipomo-Regional Park, W. Tefft Street and Pomeroy Road, Nipomo CA 93444.

5.2.1.2.6 Lead

Lead exposure can occur through multiple pathways, including inhalation of air and ingestion of lead in food from water, soil, or dust contamination. Excessive exposure to lead can trigger seizures, mental retardation, or behavioral disorders, and other central nervous system damage. Lead gasoline additives, nonferrous smelters, and battery plants were the most significant contributors to atmospheric lead emissions. Legislation in the early 1970s required gradual reduction of the lead content of gasoline over a period of time, which has dramatically reduced lead emissions from mobile and other combustion sources. In addition, unleaded gasoline was introduced in 1975, and together these controls have essentially eliminated violations of the lead standard for ambient air in urban areas. Measured lead concentration levels are presented in Table 5.2-8 at the nearest lead monitoring station, which is located at

Parlier, California in Fresno County (about 90 miles northeast of the Project) for 2006. The data in this table supports the attainment status of the San Luis Obispo Air District for lead.

Table 5.2-8
Summary of Recent Lead (Pb) Concentration Data at Parlier, California

Year	Highest 24-hour Concentration for Lead ($\mu g/m^3$)	Estimated Number of Days Exceeding Federal and State Standards (days)
2006	0.02	0
2005	*	*
2004	*	*

Reference: EPA Air Data (http://www.epa.gov/air/data/index.html).

Notes:
The federal lead standard is 1.5 $\mu g/m^3$ on a quarterly average basis.
The state lead standard is 1.5 $\mu g/m^3$ on a 30 days average basis.
* Denotes no Pb data available to determine value.
Monitoring Site Address: 13900 Tuolumne Street, Parlier, CA 93648.

5.2.1.2.7 Particulate Sulfates

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

5.2.1.2.8 Other State-Designated Criteria Pollutants

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

5.2.2 Environmental Consequences

This section describes the analyses conducted to assess the potential air quality impacts of the proposed Project. Impacts due to the proposed Project would be considered significant if, when combined with background ambient concentrations, they would exceed an ambient air quality standard. These standards are discussed in Section 5.2.5. Emissions estimates for both construction and operation of the proposed Project are presented in this section. Dispersion model selection and setup are also described (i.e., emissions scenarios and release parameters, building wake effects, meteorological data, and receptor locations) and analysis results are presented.

5.2.2.1 Project Construction Emissions

The primary emission sources during construction of the proposed Project would include exhaust from heavy construction equipment and vehicles and fugitive dust generated in areas disturbed by grading, excavating, and erection of facility structures. The projected construction schedule has a total duration of 35 months. Different areas within the proposed Project site and nearby temporary construction laydown areas would be disturbed at different times over this period. Estimated land disturbance for major construction activities is summarized in Section 3.0, Facility Description and Location. For purposes of this analysis, the assumed Project construction area is 640 acres for the main site and 380 acres for the laydown area.

Fugitive dust emissions from the construction of the CESF will result from:

- Site grading/excavation at the construction site;
- Onsite travel on unpaved surfaces;
- Aggregate and soil loading and unloading operations; and
- Wind erosion of areas disturbed during construction activities.

Combustion emissions during construction will result from:

- Exhaust from the diesel construction equipment used for site grading, excavation, and construction of onsite structures;
- Exhaust from water trucks used to control construction dust emissions;
- Exhaust from pickup trucks, diesel trucks, and buses used to transport workers and materials around the construction site;
- Exhaust from diesel trucks used to deliver concrete, equipment, and construction supplies to the construction site; and
- Exhaust from buses and vehicles used by workers to commute to the construction site.

Construction equipment and vehicle exhaust emissions were estimated using equipment lists and construction scheduling information provided by the Project design-engineering firm, which are presented in Table 5.2-9.

Equipment-specific emissions factors were used to estimate mass emissions for all criteria pollutants from diesel-fueled construction equipment and vehicles using South Coast Air Quality Management District (SCAQMD) OFFROAD Emission Factors. Assumptions used in calculating Project construction emissions included a 35-month construction period; five (5) construction days per week; and a 12-hour workday. The list of fueled equipment needed during each month of the construction effort served as the basis for estimating pollutant emissions throughout the term of construction and helped to identify the periods of probable maximum short-term emissions. An ultra-low fuel sulfur content of 0.0015 percent by weight (15 ppm) was assumed for all diesel construction equipment operations. Detailed spreadsheets are provided in Appendix I-A, Air Quality, which show the calculation of emissions from all Project construction activities and equipment, and the data and assumptions used in these calculations.

5.2.2.2 Construction Equipment Schedule

Fugitive dust emissions resulting from onsite soil disturbances were estimated using the *SCAQMD California Environmental Quality Act (CEQA) Air Quality Handbook* (SCAQMD, 1993) emission factors for bulldozing and dirt-pushing, travel on unpaved roads, and handling/storage of aggregate materials. A dust control efficiency of 90 percent for the proposed Project site and temporary construction area activities was assumed to be achieved for these activities by frequent watering or other measures when required.

Emissions from on-road delivery trucks and worker commute trips were estimated using trip generation information presented in Section 3.0, Facility Description and Location, and emission factors provided by SCAQMD for Onroad Vehicles from the EMFAC2007 model. Construction workers were assumed to commute to the proposed Project site from locations within a 65 mile radius.

Table 5.2-9
Construction Equipment Schedule

Construction Equipment Description	HP	Month																																			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
Pick Up Truck (1/2T)	150	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Flatbed – Stake Body Truck (1T)	250	3	5	5	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Dump Truck (15cy)	250	7	9	9	9	9	9	9	9	9	9	8	6	6	5	5	5	3	2	2	2	1	1													
Truck Tractor	250			1	1	1	1	1	1	1	1	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1							
Compactor	50	1	3	4	4	4	4	4	2	1	1																							1	1	
Excavator	120	1	3	3	3	3	3	3	3	3	3	2	1	1	1	1	1	1	1	1	1	1	1													
Dozer	250	4	4	4	4	3	2	2																												
Scraper	120	4	4	4	4	2	2	1																												
Grader	120	2	4	4	4	3	2	2	2	2	2	2	2	1	1	1	1																1	1	1	1
Wheel Loader	120	2	3	3	3	3	2	2	1	1	1	1	1	1	1	1	1																			
Backhoe	50	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Water Truck	250	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1				
Fuel Truck	250		2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1
Bus (50 Seat)	275	2	2	4	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	5	4	4	3	3
Bus (20 Seat)	225	2	5	6	6	6	6	6	6	6	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	6	4
ATV	10	5	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Pile Driving Hammer	120			1	1	1																														
Hydraulic Mobile Crane	120		1	2	3	3	3	3	4	5	6	6	6	6	6	6	6	6	6	6	6	6	6	5	5	5	4	4	3	3	3	3	2	2	1	1
Crane	250							1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1									
Forklift	50											2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1		
Concrete Pump Truck	250					1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1												
Telescopic Handler	50		3	4	4	4	4	5	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Portable Welding Machine	50	1	1	1	1	1	1	1	1	1	1	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Engine Generator Set	50	1	2	2	3	3	3	4	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5	5	5	5	5	5	5	5	5	5	5	3	3
Plate Compactor	15		2	4	4	4	4	5	6	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	6	4	2			
Manlift	50	1	2	2	2	2	3	4	4	4	4	5	5	5	5	5	6	6	7	7	8	8	8	8	8	8	7	7	3	3	3	1	1	1	1	
Light Plant	15		1	1	1	1	1	2	3	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	3	3	3	3	3	3	2	2	2	1	1
	Total:	45	71	81	86	83	80	85	85	86	90	92	90	89	88	87	88	83	83	83	84	83	83	79	78	77	74	73	68	65	63	57	53	52	44	40

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The short-term maximum combustion emissions were calculated using construction equipment listed in Table 5.2-9 for Month 11 of the construction schedule, which is anticipated to have the heaviest construction equipment usage of any month. The short-term maximum fugitive emissions were calculated using Month 4 construction activities. Activities in the fourth month would include grading, bulldozing, excavating, and onsite pipeline and facility construction. Annual emissions were based on the worst 12 consecutive months of the construction period, which were Months 7-18 for combustion emissions and Months 1-12 for fugitive emissions.

The emissions from each disturbed area are presented as either area sources for fugitive dust (PM_{10} and $PM_{2.5}$) or point sources for combustion emissions for all pollutants.

The equipment point source emissions were calculated by means of an Excel Workbook (presented in Appendix I-A, Air Quality) and generic stack parameters for diesel IC engines. These stack parameters were obtained from the *Risk Management Guidance for the Permitting of New Stationary Source Diesel-Fueled Engine* (CARB, 2000).

Tables 5.2-10 and 5.2-11, respectively, present the estimated maximum daily emissions and maximum annual emissions of air pollutants due to Project construction.

5.2.2.3 Operational Emissions

The only operational stationary source of emissions for the proposed Project will be an emergency firewater pump engine powered by diesel fuel. The firewater pump engine will be rated at approximately 300 horsepower and will be tested thirty minutes per week (26 hours per year). Estimated hourly and annual emissions and stack parameters for the engine are provided in Table 5.2.-12. Emission rates shown in this table are based on vendor-supplied emission factors. The engine fuel will be ultra-low sulfur diesel containing a maximum of 15 ppm sulfur. Detailed emissions calculations for the firewater pump engine are presented in Appendix I-B, Air Quality.

Table 5.2-10
Estimated Daily Maximum Construction Emissions of Criteria Pollutants (lbs/day)

Activity	PM_{10}	$PM_{2.5}$	CO	ROC	NO_x	SO_x
Onsite Combustion Emissions						
Diesel Construction Equipment	11.85	10.9	95.61	34.19	149.57	0.15
Dump Trucks, Pickup Trucks, Buses, and Worker Vehicles	0.23	0.2	2.41	0.47	4.97	0.01
Construction Combustion Subtotal (lbs)	*12.1*	*11.1*	*98.0*	*34.7*	*154.5*	*0.2*
Onsite Fugitive Dust Emissions						
Vehicle Travel on Unpaved Roads and Parking Lot	3.06	0.65				
Earth Clearing/Bulldozing	11.24	2.34				

Table 5.2-10
Estimated Daily Maximum Construction Emissions of Criteria Pollutants (lbs/day)
(Continued)

Activity	PM_{10}	$PM_{2.5}$	CO	ROC	NO_x	SO_x
Earth Loading/Storage	3.83	0.8				
Subtotal of Offsite Emissions (lbs)	*18.1*	*3.8*				
Offsite On-Highway Emissions						
Worker Passenger Vehicle and Buses – Combustion Emissions	2.63	1.99	168.31	18.56	54.37	0.59
Worker Passenger Vehicle and Buses – Paved Road Dust	108.81	14.36				
Subtotal of Offsite Emissions (lbs)	111.45	16.35	168.31	18.56	54.37	0.59
Total Max. Daily Emissions (lbs)	141.65	31.2	266.3	53.2	208.9	0.8

Notes:
PM_{10} = particulate matter less than 10 micrometers in diameter.
$PM_{2.5}$ = particulate matter less than 2.5 micrometers in diameter.
ROC = reactive organic compounds.
CO = carbon monoxide.
NO_x = nitrogen oxides.
SO_x = sulfur oxides.
lb/day = pounds per day.

Table 5.2-11
Estimated Maximum Annual Construction Emissions of Criteria Pollutants (tons/year)

Activity	PM_{10}	$PM_{2.5}$	CO	ROC	NO_x	SO_x
Onsite Combustion Emissions						
Diesel Construction Equipment	1.42	1.3	11.6	4.18	17.69	0.02
Gasoline Construction Equipment	0.02	0.02	1.07	0.59	0.01	0.0
Dump Trucks, Pickup Trucks and Worker Vehicles	0.02	0.02	0.24	0.05	0.46	0.0
Construction Combustion Subtotal (tpy)	*1.5*	*1.3*	*12.9*	*4.8*	*18.2*	*0.0*
Onsite Fugitive Dust Emissions						
Vehicle Travel on Unpaved Roads and Parking Lot	0.45	0.1				
Earth Clearing/Bulldozing	0.77	0.16				
Earth Loading/Storage	0.33	0.07				
Subtotal of Offsite Emissions (tpy)	*1.6*	*0.3*				

Table 5.2-11
Estimated Maximum Annual Construction Emissions of Criteria Pollutants (tons/year)
(Continued)

Activity	PM_{10}	$PM_{2.5}$	CO	ROC	NO_x	SO_x
Offsite On-Highway Emissions						
Worker Passenger Vehicle and Buses– Combustion Emissions	1.42	0.1	17.37	1.78	1.8	0.07
Worker Passenger Vehicle and Buses – Paved Road Dust	14.36	2.43		1.78	1.8	0.07
Subtotal of Offsite Emissions (tpy)	15.78	2.53	17.37			
Total Max. Daily Emissions (tpy)	18.8	4.2	30.3	6.6	20.0	0.1

Notes:
PM_{10} = particulate matter less than 10 micrometers in diameter.
$PM_{2.5}$ = particulate matter less than 2.5 micrometers in diameter.
ROC = reactive organic compounds.
CO = carbon monoxide.
NO_x = nitrogen oxides.
SO_x = sulfur oxides.
tpy = tons per year.

Table 5.2-12
Firewater Pump Engine Emission Parameters

Pollutant	Emissions (lb/hr)	Emissions (lb/yr)
NO_X	1.41	36.71
CO	0.11	2.84
VOC	0.11	2.75
SO_X	0.001	0.04
PM_{10}	0.05	1.20
Source Parameters: Annual emissions based on 26 hours of operation. Stack top height: 18 feet above ground level. Stack diameter: 5 inches. Stack exhaust flow rate at full firing: 1,740 ACFM or 64.825 m/s. Stack exhaust temperature at full firing: 770 ºF.		

Notes:
lb/hr = pounds per hour.
lb/yr = pounds per year.
ACFM = actual cubic feet per minute.
m/s = meters per second.

5.2.2.3.1 Emissions Scenarios for Modeling

The proposed Project includes just one operational emission source, the emergency firewater pump engine. The scheduled operation of this emission source is 30 minutes each week for testing purposes. The reasonable worst-case Project emissions scenario developed includes 26 hours of engine operation each year.

5.2.2.3.2 Greenhouse Gas Emissions

In 2006, the California Assembly passed a law (AB32) directing CARB to develop regulations to reduce statewide greenhouse gas emissions to 1990 levels by 2020. Potential greenhouse gas emissions from the proposed Project were calculated using the California Climate Action Registry power/utility protocol (Version 1.0 April 2005). The estimated annual greenhouse gas emissions from the firewater pump engine, the only stationary source of the operational Project, are presented in Table 5.2-13. Additional calculation details are provided in Appendix I-C, Air Quality.

Table 5.2-13
Maximum Potential Greenhouse Gas Emissions from the Proposed Project

Emission Rate (metric tons/year)	
Firewater pump	Total CO_2 Equivalent
1.46	1.46

5.2.2.4 Air Quality Impacts Analysis

The purpose of the air quality impact analyses is to evaluate whether criteria pollutant emissions resulting from the proposed Project, would cause or contribute significantly to a violation of a California or National ambient air quality standard or contribute significantly to degradation of air quality related values in designated Class I areas. Mathematical models designed to simulate the atmospheric transport and dispersion of airborne pollutants are used to quantify the maximum expected impacts of Project emissions for comparison with applicable regulatory criteria. Potential impacts of toxic air contaminant emissions from the proposed Project are evaluated in Section 5.16, Public Health and Safety.

Separate criteria pollutant modeling analyses were conducted to address the air quality impacts of emissions from Project construction activities and facility operations, because these activities would occur at different times. Impacts from construction activities include fugitive dust from grading and excavation of disturbed areas and exhaust combustion products from diesel- and gasoline-fueled construction equipment and vehicles. The impacts from operations would be associated with diesel combustion in the emergency firewater pump engine.

5.2.2.4.1 Construction Model and Model Option Selections

The impacts of Project construction on offsite criteria pollutant concentrations were evaluated using the American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD)

(version 07026). AERMOD is appropriate for this Application because it has the ability to assess dispersion of emission plumes from multiple point, area, or volume sources in flat, simple, and complex terrain, and to use sequential hourly meteorological input data. The regulatory default options were used including building and stack tip downwash, default wind speed profiles, exclusion of deposition and gravitational settling, consideration of buoyant plume rise, and complex terrain.

For the AERMOD simulations to evaluate construction impacts of NO_2 concentrations, the ozone-limiting method option of the model was used to take into account the role of ambient ozone in limiting the conversion of emitted NO_X (which occurs mostly in the form of NO) to NO_2, the pollutant regulated by ambient standards. The input data to the AERMOD-OLM model includes representative hourly ozone monitoring data for the same years corresponding to the meteorological input record. These simulations used the ozone data from the SLOAPCD Nipomo Regional Park Station for the years 2001 through 2005.

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

Section 5.2.2.2 describes the development of Project construction emissions estimates over the planned 35-month construction period. An Excel workbook was created to estimate pollutant emissions from construction activities, with separate worksheets for the equipment exhaust and fugitive dust emissions associated with maximum short-term and annual activity levels. Emissions from worker commuter trips and heavy duty trucks delivering equipment and materials to and from the Project site during specific construction activities were also included (see Appendix I-A, Air Quality).

- Worst-case modeling was conducted for short-term averaging times using all construction equipment from Month 11 for combustion emissions and Month 4 for fugitive dust emissions. Annual emissions were modeled for Months 7-18 of the construction schedule for combustion emissions and Months 1-12 for fugitive dust emissions.

All construction activities were assumed to occur during a 12-hour work day. Short-term emission rates incorporated time-of-day emission factors with emission sources operating only between the hours of 7 a.m. and 7 p.m. Calculation of annual emissions was based on a summation over all construction activities for the consecutive 12-month period that would produce the highest emissions of targeted pollutants. Supporting modeling files may be found on the attached CD/DVD.

5.2.2.4.2 Operations Model and Model Option Selections

The impacts of operational emissions of criteria pollutants were evaluated using the screening level dispersion model SCREEN3. SCREEN3 is an appropriate EPA approved model for situations were there is only one source and simple building structures. The only source of emissions during normal plant

operations is the weekly testing of the diesel emergency firewater pump engine. The exhaust stack from the firewater pump engine will exit through the roof of the firewater pump building. CEC staff advised that the use of a screening model would be acceptable for predicting the impacts from the firewater pump engine, thus it was determined that SCREEN3 would be the most appropriate model for this analysis.

The SCREEN3 model was run with the full meteorology option that examines a range of stability classes and wind speeds. Building downwash was taken into account for the firewater pump building. Two analyses were conducted, one with simple terrain out to 10 kilometers, and another with complex terrain out 2 kilometers. For the complex terrain run, the maximum terrain height, regardless of direction from the source, was input into the model every 250 meters out to 2 km. The maximum concentration predicted by SCREEN3 occurs at a specified distance from the source regardless of direction.

The SCREEN3 model was run with a unit emission rate (1 g/s) for the source to calculate the χ/Q "unit" ground-level 1-hour concentration in ($\mu g/m^3$)/(g/s). The 1-hour χ/Q concentration was converted to 3-hour, 8-hour, 24-hour and annual concentrations by multiplying it by 0.9, 0.7, 0.4 and 0.08, respectively, per the United States (U.S.) Environmental Protection Agency (EPA) Screening Procedures (EPA, 1992). This χ/Q concentration was then multiplied by the emission rate in g/s for each pollutant and appropriate averaging time from the firewater pump to get the ground level concentrations for the criteria pollutants. Supporting modeling files may be found on the attached CD/DVD.

5.2.2.4.3 Meteorological Data

The proposed Project is located in an agricultural valley between two mountain regions, where winds predominantly blow from the south and southeast, as shown in Figure 5.2-2. A representative record of hourly surface meteorological data collected at La Panza, CA Remote Automated Weather Station (RAWS), approximately 8 miles west of the CESF was used as the basis for the AERMOD meteorological input data. The following meteorological parameters were collected at this location: wind speed and direction, temperature, relative humidity, and solar radiation.

The La Panza meteorological data can be considered site specific because they meet the U.S. EPA criteria (U.S. EPA, 2000) for representativeness, as follows:

- *Proximity*: The data were collected in close proximity to the proposed Project site, and thus meet the criteria for proximity.
- *Complexity of Terrain and Exposure of Meteorological Monitoring Site*: Both the proposed Project site and the La Panza monitoring station are located within the Carrizo Valley native grassland between the Temblor and Caliente mountain ranges.
- *Period of Data Collection*: The 2001 through 2005 data set represents data collection over 5 full years. Although only 1 year of onsite data is required, a 5-year data set was used to better represent Project site conditions, as well as to capture worst-case meteorological conditions.
- *Data Quality*: The quality of the La Panza monitoring equipment was good and the site was maintained on a regular basis.

The La Panza monitoring station data were processed following the site-specific data procedures set forth in the U.S. EPA *Meteorological Monitoring Guidance for Regulatory Modeling Applications* (EPA,

2000). To create the meteorological data input files for AERMOD, the onsite data were processed with National Weather Service (NWS) surface data and upper air data in the AERMET program.

The nearest and most representative NWS surface station was determined to be the Paso Robles station. Upper air data were obtained from the Oakland station for 2001-2005.

Figure 5.2-2 presents the annual wind rose based on the 2001-2005 meteorological data from the La Panza meteorological station site. Seasonal windroses based on the 5 years of La Panza surface meteorological wind data are provided as Appendix I-D, Air Quality. Winds for all seasons blow predominantly from the south and southeast, and from the northwest.

Table 5.2-14 gives surface input parameters for AERMET processing that were used in AERMOD construction modeling. It is important to note that these surface parameters were not used for operational modeling because AERMOD was only used to model construction. The AERMET surface parameters were determined from using EPA's "*User's Guide for the AERMOD Meteorological Preprocessor (AERMET).*"

Table 5.2-14
AERMET Stage 3 Parameter Inputs

Season	Albedo	Bowen Ratio	Surface Roughness
Spring	0.16	1.00	0.04
Summer	0.19	1.70	0.15
Fall	0.20	2.00	0.03
Winter	0.40	2.00	0.01

The CESF site is agricultural/grassland in all directions out to a 3 km radius. Thus the entire range of 0º-360º around the site was selected as agricultural/grassland. Since boundary layer parameters change seasonally, separate Spring, Summer, Fall, and Winter parameters were chosen. The Bowen ratio was approximated for each season assuming dry conditions, based on data from the Western Regional Climate Center website showing that the site area receives an average of 8.89 inches of rain a year (Table 5.2-1).

The SCREEN3 model, which was used to conduct a screening analysis of the proposed Project's operational impacts, does not use actual meteorological data, but rather a series of worst-case combinations of meteorological parameters to ensure that maximum potential impacts of operational emissions would be addressed.

5.2.2.4.4 Receptor Locations

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

- 25-meter spacing along the fence line and extending from the fence line out to 100 meters beyond the property line;.and
- 100-meter spacing from 100 m to 2 km beyond the property line.

Figure 5.2-3 show the placement of receptor points. Terrain heights at receptor grid points were determined from U.S. Geological Survey (USGS) digital elevation model (DEM) files.

The SCREEN3 model used to estimate maximum operational air quality impacts from the diesel firewater pump engine was run twice, once to analyze impacts in simple terrain out to 10 kilometers, and a second time to analyze impacts in complex terrain out 2 kilometers. In the simple terrain analysis, SCREEN3 calculates impacts at automatically generated distances out to 10 kilometers. For the complex terrain run, the maximum terrain height, regardless of direction from the source, was input into the model every 250 meters out to 2 km.

5.2.2.5 Modeling Results – Compliance with Ambient Air Quality Standards

Air dispersion modeling was performed according to the methodology described in Section 5.2.2.4 to evaluate the maximum increase in ground-level pollutant concentrations resulting from proposed Project emissions, and to compare the maximum predicted impacts, including background pollutant levels, with applicable short-term and long-term CAAQS and NAAQS. The impacts from construction activities and plant operations were analyzed separately because they would occur during different time periods. The 5-year record of hourly meteorological data described in Section 5.2.2.4 was used in the AERMOD modeling to evaluate construction impacts.

In evaluating construction impacts, the AERMOD model was used to predict the increases in criteria pollutant concentrations at all receptor concentrations due to Project emissions only. For Project operational emissions, SCREEN3 was used to evaluate Project impacts. The maximum modeled incremental increases for each pollutant and averaging time were added to the maximum background concentrations, based on air quality data collected at the most representative monitoring stations during the last 3 years (i.e., 2004 through 2006). These background concentrations are presented and discussed in Section 5.2.1.1. The resulting total pollutant concentrations were then compared with the most stringent CAAQS or NAAQS.

5.2.2.5.1 Construction Impacts

Section 5.2.2.1 describes how different months of the construction schedule were selected to represent worst-case combustion and fugitive emission conditions for the purpose of analyzing peak short-term impacts to local air quality. Annual impacts were modeled with all emissions that would occur during Months 7-18 or Months 1-12, depending on the pollutant impact being evaluated. Some notes regarding the modeling results for specific pollutants are provided below.

As reflected in the construction modeling results presented in Table 5.2-15, PM_{10} concentrations above the California 24-hour standard for this pollutant have been recorded on multiple occasions at San Luis Obispo County monitoring stations during recent years. Because of the land use characteristics of this area, it is highly probable that these conditions result primarily from high wind episodes, agricultural activities or other soil disturbances. The predicted contribution of the proposed construction activities

would be minor by comparison with these sources, but would have the potential to temporarily contribute to existing violations of the state and federal PM_{10} standards if construction occurs during a period of high background concentrations.

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

Table 5.2-15
Maximum Modeled Criteria Pollutant Impacts Due to CESF Construction Emissions

Pollutant	Averaging Period	Maximum Modeled Impact (μg/m³)	Background[1] (μg/m³)	Maximum Total Predicted Concentration (μg/m³)	Most Stringent AAQS (μg/m³)	UTM Coordinates	
						East (m)	North (m)
Construction Impacts							
CO	1 hour	97.14	2415	2512.1	23,000	766,200	3,914,900
	8 hour	25.71	1367	1392.7	10,000	767,900	3,919,600
NO_2	1 hour[2]	148.87	105.3	254.2	470[4]	766,200	3,914,900
	Annual[2]	7.83	17.0	24.8	100[4]	767,956	3,919,085
PM_{10}	24 hour	9.41	55.0[3]	64.4	50	767,337	3,919,069
	Annual	1.34	18.0	19.3	20	767,956	3,919,085
$PM_{2.5}$	24 hour	2.21	30.7	32.9	35	767,783	3,919,080
	Annual	0.87	8.3	9.2	12	767,956	3,919,085
SO_2	1 hour	0.19	309.2	309.4	655	766,100	3,915,000
	3 hour	0.09	109.2	109.3	1,300	768,600	3,920,000
	24 hour	0.01	52.5	52.5	105	768,900	3,919,700
	Annual	0.01	8.0	8.0	80	767,956	3,919,085

Notes:
[1] Background represents the maximum values measured at the monitoring stations described in previous sections, for 2004-2006.
[2] Results for NO_2 during construction used ozone limiting method (OLM) with ambient ozone data collected at the Nipomo-Regional Park Station for the years 2001 through 2005.
[3] PM_{10} 24 hour background levels exceed state standards.
[4] In February 2007, the CARB approved new, more stringent CAAQS for NO_2. The new standards, which are expected to take effect fully in late 2007, are 338 μg/m³ (1 hour) and 56 μg/m³ (annual).
μg/m³ = micrograms per cubic meter.
AAQS = Most stringent ambient air quality standard for the averaging period.
CO = carbon monoxide.
NA = Not applicable.
NO_2 = nitrogen dioxide.
OLM = ozone limiting method.
PM_{10} = particulate matter less than or equal to 10 microns in diameter.
$PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter.
SO_2 = sulfur dioxide.
UTM = Universal Transverse Mercator.

5.2.2.5.2 Operational Impacts

As described previously, the emissions used in the SCREEN3 model for the Project operations were based on weekly testing of the emergency firewater pump engine. The 1-hour and annual emissions used for each pollutant are quantified in Table 5.2-11. Peak concentrations for multiple-hour averaging times are conservatively estimated from the maximum one-hour concentration predicted from SCREEN3 using scaling factors approved by US EPA. The maximum 1-hour χ/Q concentration was predicted from the simple terrain analysis, thus this value was used as the basis for calculating the concentrations for all pollutants and averaging time. The maximum predicted operational impacts of the proposed Project are presented in Table 5.2-16. Supporting calculations can be found in Appendix I-E, Air Quality. The table shows that the modeled impacts due to the Project emissions, in combination with conservative background concentrations, would not cause a violation of any CAAQS or NAAQS and would not significantly contribute to the existing violations of the federal and state PM_{10} and $PM_{2.5}$ standards.

Table 5.2-16
Maximum Modeled Criteria Pollutant Impacts Due to CESF Operation Emissions

Pollutant	Averaging Period	Maximum Predicted Concentration (µg/m³)	Background Concentration[1] (µg/m³)	Total Concentration (µg/m³)	NAAQS (µg/m³)	CAAQS (µg/m³)
NO_2	1-hour	127.3	105.3	232.6	NA	470[2]
	Annual	0.030	17.0	17.0	100	100[2]
SO_2	1-hour	0.134	309.2	309.3	NA	655
	3-hour	0.040	109.2	109.2	1,300	NA
	24-hour	0.002	52.5	52.5	365	105
	Annual	0.00003	8.0	8.0	80	NA
CO	1-hour	9.836	2415.0	2,424.8	40,000	23,000
	8-hour	0.861	1367.0	1,367.9	10,000	10,000
PM_{10}	24-hour	0.070	55.0[3]	55.1	150	50
	Annual	0.001	18.0	18.0	50	20
$PM_{2.5}$	24-hour	0.070	30.7	30.8	65	NA
	Annual	0.001	8.3	8.3	15	12

Notes:
[1]Background represents the maximum values measured at the monitoring stations described in previous sections, for 2004-2006.
[2]In February 2007, the CARB approved new, more stringent CAAQS for NO_2. The new standards, which are expected to take effect fully in late 2007, are 338 µg/m³ (1 hour) and 56 µg/m³ (annual).
[3]PM_{10} 24 hour background levels exceed state standards.

5.2.3 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. There are no other potential sources of criteria pollutant emissions within 6 miles 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, thus no additional cumulative analysis will be conducted.

5.2.4 Mitigation Measures

5.2.4.1 Construction Emissions Mitigation

The criteria pollutant emissions from the Project's only source, the diesel firewater pump, will be mitigated by the use of best available control technology (BACT).

AIR-1: The following mitigation measures are proposed to control exhaust emissions from the diesel heavy equipment used during construction of CESF:

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

AIR-2: The following mitigation measures are proposed to control fugitive dust emissions during construction of the Project:

- Use either water application, chemical dust suppressant application, or other suppression technique to control dust emissions from onsite unpaved road travel and unpaved parking areas;
- Use vacuum sweeping and/or water flushing of paved road surface to remove buildup of loose material to control dust emissions from travel on the paved access road (including adjacent public streets impacted by construction activities) and paved parking areas;
- Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least two feet of freeboard;
- Limit traffic speeds on all unpaved site areas to 5 mph;
- Install sandbags or other erosion control measures to prevent silt runoff to roadways;
- Replant vegetation in disturbed areas as quickly as possible;
- Use wheel washers or wash off tires of all trucks exiting construction site; and
- Mitigate fugitive dust emissions from wind erosion of areas disturbed from construction activities (including storage piles) by application of either water, chemical dust suppressant, or other suppression technique.

5.2.4.2 Operational Emissions Mitigation: Best Available Control Technology Analysis

In accordance with the requirements of SLOAPCD rules, the proposed Project will be required to use BACT to minimize emissions from the proposed firewater pump engine. There are no other emission sources for the operational Project. Table 5.2-17 presents the proposed BACT emission levels for the firewater pump engine, based on the assessment described below.

Table 5.2-17
Summary of Proposed BACT

Pollutant	Control Technology	Concentration
Emergency Firewater Pump Engine (240 horsepower)		
NOx	U.S. EPA Tier II	4.27 grams per brake horsepower hour (g/bhp-hr)
CO	U.S. EPA Tier II	0.33 g/bhp-hour
ROC	U.S. EPA Tier II	0.32 g/bhp-hour
SO_2	U.S. EPA Tier II	Diesel fuel with sulfur content no greater than 0.0015% by weight
PM_{10}	U.S. EPA Tier II	0.14 g/bhp-hour

Notes:
BACT = Best Available Control Technology.
CO = carbon monoxide.
NO_x = nitrogen oxides.
PM_{10} = particulate matter less than or equal to 10 microns in diameter.
ROC = reactive organic compounds.
SO_2 = sulfur dioxide.

40 CFR part 89 and CCR Title 13 and Title 17 require certified EPA TEIR III emergency internal combustion engines, but engines compliant with Tier III standards are currently commercially unavailable. A search of the CARB BACT determination clearinghouse was made and recent BACT determinations for internal combustion engines are presented in Table 5.2-18. The equipment proposed for the CESF satisfies the emission requirements of recent BACT determinations for similar equipment in several different regulatory jurisdictions within California.

Table 5.2-18
Summary of Recent California BACT Determinations for Diesel Internal Combustion Engines

Name	Location	Application Date	Rating (Hp)	Control Technology	Emission Limit (g/bhp-hr)			
					VOC	NO_x	CO	PM_{10}
East Los Angeles College	Monterey Park, CA	12/2003	160	Engine design	0.09	3.9	0.45	0.22
Los Angeles County	Downey, CA	12/2003	160	Engine design	0.12	4.2	0.44	0.14
Los Angeles County Probation Facility	Los Angeles, CA	8/2002	240	Engine design	NA	4.2	0.44	0.14
Johnson Power Systems	Los Angeles, CA	8/2002	764	Engine design	0.03	6.19	0.37	0.04

Notes:
Hp = horsepower.
g/bhp-hr = grams per brake horsepower – hour.
NA = data not available.
Emissions corrected to 3 percent O_2.

5.2.5 LORS Compliance

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

5.2.5.1 Federal

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

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

Applicable requirements of the State of California and the local SLOAPCD are discussed in Sections 5.2.5.2 and 5.2.5.3, respectively, including regulations that apply to both construction and operations.

5.2.5.1.1 Air Quality Control Regions

Because air pollution is a regional problem and not limited to political or state boundaries, the federal Clean Air Act (CAA) established Air Quality Control Regions (AQCR). This is a method of dividing the

country into regional air basins. The proposed Project site is located in the South Central Coast Intrastate Air Quality Control Region (40 CFR Part 81.167).

5.2.5.1.2 National Ambient Air Quality Standards

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

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

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

The court required revisions in both standards before EPA could enforce them. The U.S. Supreme Court upheld an appeal of the District Court decision in February 2001. Under an interim policy, the preexisting federal PM_{10} and 1-hour O_3 standards would continue to be implemented for the next several years until required actions by EPA were completed. In 1997, EPA established annual and 24-hour NAAQS for $PM_{2.5}$ for the first time. In 2006, the federal annual PM_{10} standard was revoked by the federal EPA due to a lack of evidence linking health problems to long-term exposure to coarse particle pollution. The 3-year average of the 98th percentile of 24-hour PM_{10} concentrations (35 $\mu g/m^3$) became effective on December 17, 2006. The State of California has adopted CAAQS that are in some cases more stringent than the federal NAAQS. The state and federal AAQS relevant to the proposed Project are summarized in Table 5.2-19.

The EPA, CARB, and the local air pollution control districts determine air quality attainment status by comparing local ambient air quality measurements from the state or local ambient air monitoring stations with the federal and state AAQS. Those areas that meet ambient air quality standards are classified as "attainment" areas; areas that do not meet the standards are classified as "nonattainment" areas. Areas that have insufficient air quality data may be identified as unclassifiable areas. These attainment designations are determined on a pollutant-by-pollutant basis. The proposed Project vicinity is designated a state nonattainment area for O_3 and PM_{10} based on air quality monitoring data showing exceedances of the state standards. Table 5.2-20 presents the attainment status (both federal and state) for the SLOAPCD.

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

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

Table 5.2-19
National and California Ambient Air Quality Standards

Pollutant	Averaging Time	NAAQS[1]		CAAQS[2]
		Primary[3,4]	Secondary[3,5]	Concentration[3]
Ozone (O_3)	1-Hour	Revoked[6]	Same as Primary Standard	0.09 ppm (180 µg/m^3)
	8-Hour	0.08 ppm		0.07 ppm (137 µg/m^3)
Carbon Monoxide (CO)	8-Hour	9 ppm (10 mg/m^3)	None	9.0 ppm (10 mg/m^3)
	1-Hour	35 ppm (40 mg/m^3)		20 ppm (23 mg/m^3)
Nitrogen Dioxide (NO_2)	Annual Average	0.053 ppm (100 µg/m^3)	Same as Primary Standard	-
	1-Hour	-		0.25 ppm (470 µg/m^3)
Sulfur Oxides (SO_2)	Annual Average	0.03 ppm (80 µg/m^3)	-	-
	24-Hour	0.14 ppm (365 µg/m^3)	-	0.04 ppm (105 µg/m^3)
	3-Hour	-	0.5 ppm (1300 µg/m^3)	-
	1-Hour	-	-	0.25 ppm (655 µg/m^3)
Suspended Particulate Matter (PM_{10})	24-Hour	150 µg/m^3	Same as Primary Standard	50 µg/m^3
	Annual Arithmetic Mean	Revoked[7]		20 µg/m^3
Fine Particulate Matter ($PM_{2.5}$)[8]	24-Hour	35 µg/m^3	Same as Primary Standard	-
	Annual Arithmetic Mean	15 µg/m^3		12 µg/m^3
Lead (Pb)	30-Day Average	-	-	1.5 µg/m^3
	Quarterly Average	1.5 µg/m^3	Same as Primary Standard	-
Hydrogen Sulfide (HS)	1-Hour	No Federal Standards		0.03 ppm (42 µg/m^3)
Sulfates (SO_4)	24-Hour			25 µg/m^3
Visibility Reducing Particles	8-Hour (10 am-6 pm, Pacific Standard Time)			In sufficient amount to produce an extinction coefficient of 0.23 per kilometer due to particles when the relative humidity is less than 70 percent.

Table 5.2-19
National and California Ambient Air Quality Standards
(Continued)

Reference: EPA-NAAQS (http://www.epa.gov/air/criteria.html); CARB-CAAQS (http://www.arb.ca.gov/aqs/aaqs2.pdf).
Notes:
$\mu g/m^3$ = micrograms per cubic meter.
mg/m^3 = milligram per cubic meter.
ppm = parts per million.
[1] National standards (other than ozone, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration in a year, averaged over 3 years, is equal to or less than the standard. For PM_{10}, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 $\mu g/m^3$ is equal to or less than one. For $PM_{2.5}$, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over 3 years, are equal to or less than the standard. Contact EPA for further clarification and current federal policies.
[2] California standards for ozone, carbon monoxide (except Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide, suspended particulate matter—PM_{10}, $PM_{2.5}$, and visibility-reducing particles, are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.
[3] Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.
[4] National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.
[5] National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.
[6] On June 15, 2005, the 1-hour ozone standard (0.12 ppm) was revoked for all areas except the 8-hour ozone nonattainment Early Action Compact (EAC) Areas. The state of California currently does not have any EAC areas.
[7] Due to a lack of evidence linking health problems to long-term exposure to coarse particle pollution, the agency revoked the annual PM_{10} standard in 2006 (effective December 17, 2006).
[8] To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35 $\mu g/m^3$ (effective December 17, 2006).

Table 5.2-20
Attainment Status for San Luis Obispo County with Respect to
Federal and California Ambient Air Quality Standards

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

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

Regional or local air quality management districts (or air districts), such as SLOAPCD, are responsible for preparation of plans for achieving attainment of federal and state standards. CARB is responsible for overseeing attainment of the CAAQS, implementation of nearly all phases of California's motor vehicle emissions program, and oversight of the operations and programs of the regional air districts. Each air district is responsible for establishing and implementing rules and control measures to achieve air quality attainment within its jurisdictional boundaries. The air district also prepares an air quality management plan (AQMP) that includes an inventory of all emission sources within the district (both manmade and natural), a projection of future emissions growth, an evaluation of current air quality trends, and an assessment of any rules or control measures needed to attain the federal and state AAQS. This AQMP is submitted to CARB, which then integrates the plans from all air districts within the state into the SIP. The responsibility of the air districts is to maintain an effective permitting system for existing, new, and modified stationary sources, to monitor local air quality trends, and to adopt and enforce such rules and regulations as may be necessary to achieve the federal and state AAQS.

5.2.5.1.3 Prevention of Significant Deterioration Requirements

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

The PSD regulations define a "major stationary source" as any source type belonging to a list of 28 source categories that emits, or has the "potential to emit" 100 tons per year or more of any pollutant regulated under the CAA, or any other source type that has the potential to emit such pollutants in amounts equal to or greater than 250 tons per year. If a source is considered major for PSD purposes because of one pollutant, then PSD review is applicable for those other pollutants emitted from the source in amounts greater than the PSD significance levels. The PSD regulations require major stationary sources to undergo a preconstruction review that includes an analysis and implementation of BACT, a PSD increment consumption analysis, an ambient air quality impact analysis, and analysis of air quality-related values (AQRVs), i.e., impacts on soils, visibility, and vegetation. The CESF project will not be a major source and is not subject to these requirements.

The CESF operational emissions of all pollutants would be well below the PSD thresholds. Thus, the Project would not trigger PSD requirements.

5.2.5.1.4 New Source Review Requirements

The federal CAA, EPA regulations, and the California CAA establish the criteria for siting new and modified emission sources. The federally mandated process for permitting new or modified sources in federal nonattainment areas is referred to as Nonattainment New Source Review (NNSR); however, as described previously, San Luis Obispo County is classified as attainment for all federal ambient air quality standards.

5.2.5.1.5 New Source Performance Standards

New source performance standards (NSPS) have been established by EPA to limit air pollutant emissions from certain categories of new and modified stationary sources. The NSPS regulations are contained in 40 CFR Part 60 and cover many different industrial source categories. This Project will have no sources that are regulated by the NSPS.

5.2.5.1.6 Maximum Achievable Control Technology Standards

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

5.2.5.1.7 Federally Mandated Operating Permits

Title V of the CAA requires EPA to develop a federal operating permit program that is implemented under 40 CFR 70. This program is administered by SLOAPCD under Regulation II, Rule 216. Permits must contain emission estimates based on potential-to-emit, identification of all emission sources and controls, a compliance plan, and a statement indicating each source's compliance status. The permits must also incorporate all applicable federal, state, or Air Quality Control District orders, rules and regulations. Annual operational emissions for the CESF will be well below the thresholds triggering a Title V permit.

5.2.5.1.8 Risk Management Plan

Regulations (40 CFR 68) under the CAA are designed to prevent accidental releases of hazardous materials. The regulations require facilities that store more than a threshold quantity of a listed regulated substance to develop a Risk Management Plan (RMP), including an offsite-consequence analysis for the worst-case accidental release of a hazardous substance, hazard assessments, and response programs to prevent accidental releases of listed chemicals. Section 112(r)(5) of the CAA discusses the regulated substances. These substances are listed in 40 CFR 68.130. The proposed Project will not store or handle hazardous materials in quantities sufficient to trigger RMP requirements.

5.2.5.2 State

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

5.2.5.2.1 California Clean Air Act

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

5.2.5.2.2 Toxic Air Contaminant Program

The Toxic Air Contaminant Identification and Control Act of 1983 created a state process to identify toxic air contaminants and to control their emissions. CARB identifies and prioritizes the pollutants to be considered for identification as toxic air contaminants. CARB assesses the potential for human exposure to a substance while the Office of Environmental Health Hazard Assessment (OEHHA) evaluates the corresponding health effects. These agencies prepare a risk assessment report to determine whether the substance poses a significant health risk and should be identified as a toxic air contaminant. This program includes the 189 HAPs named by the CAAA. If necessary, CARB develops air toxics control measures to reduce emissions. No measures in this program are applicable to the proposed Project, since the Project would not exceed the Title V threshold of 10 tpy of any single HAP, or 25 tpy of a combination of HAPs.

5.2.5.2.3 Air Toxics Hot Spots Program

As required by the California Health and Safety Code Section 44300 (originally Assembly Bill 2588 – Air Toxics "Hot Spots" Information and Assessment Act), this program was created in 1987 to develop a statewide inventory of air toxics emissions from stationary sources. Applicable facilities must prepare: (1) an emissions inventory plan identifying sources of air toxics; (2) an emission inventory report quantifying air toxics emissions; and (3) a health risk assessment, if air toxics emissions are at high levels. Facilities whose air toxics pose a significant health risk must prepare and implement risk reduction plans. This requirement is applicable only after the start of operations. Section 5.16, Public Health and Safety, indicates that air toxics impacts from the proposed Project would be insignificant.

5.2.5.2.4 Permit to Construct and Permit to Operate/Determination of Compliance Process

Under Regulation II, Rule 202, SLOAPCD administers the air quality regulatory program for the construction, alteration, replacement, and operation of new emission sources within its jurisdiction. Specifically, this rule governs the requirements for issuance of air permits (i.e., Authority to Construct [ATC] and Permit to Operate [PTO]). This permitting process allows the SLOAPCD to adequately review new and modified air pollution sources to ensure compliance with all applicable prohibitory rules and to ensure that appropriate emission controls are used. An ATC allows for the construction of the air pollution source and remains in effect until the PTO application is granted, denied, or canceled. For power plants under the siting jurisdiction of the CEC, the SLOAPCD issues a Determination of Compliance (DOC) in lieu of a PTC under Regulation II, Rule 223. The DOC is incorporated into the CEC license. Once the Project commences operations and demonstrates compliance with the DOC, SLOAPCD will issue a PTO. The PTO specifies conditions that the air pollution source must meet to comply with the air quality standards, including applicable DOC requirements.

5.2.5.2.5 Power Plant Sitting Requirements

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

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

5.2.5.2.6 CEC and CARB Memorandum of Understanding

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

5.2.5.2.7 Consistency with State Requirements

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

5.2.5.3 Local – SLOAPCD

The SLOAPCD has the delegated authority for implementing local, state, and federal air quality regulations in San Luis Obispo County. The SLOAPCD prepares an Air Quality Plan to define its strategies for attaining the state and federal ambient air quality standards, and its relevant control measures for implementing those strategies (Health and Safety Code Section 40914).

The SLOAPCD Rules and Regulations are authorized by Health and Safety Code (H&SC) Section 4000 *et seq*., and Section 40200 *et seq*. This section presents the SLOAPCD requirements that are applicable to the proposed Project. The proposed Project is subject to District regulations that apply to new source review of emissions, prohibitory regulations, and requirements for toxic air pollutants. The following sections evaluate the proposed Project's compliance with applicable District requirements.

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

5.2.5.3.1 Rules and Regulations

The following paragraphs outline the SLOAPCD rules and regulations that apply to the proposed Project:

Regulation II – Permits

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

Rule 202 – Permit to Construct, Permit to Operate, Temporary Permit to Operate

A project shall not construct or modify any nonexempt equipment that emits, eliminates, reduces, or controls pollution without first obtaining the Authority to Construct (ATC) from the Air Pollution Control Officer (APCO). Before such equipment may be operated or used, a Permit to Operate (PTO) must be obtained from the APCO. The Applicant will need to obtain an ATC permit prior to installation of the proposed Project.

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

Rule 204 – Requirements: Control Technology, Offsets, Exemptions from BACT and Offsets

Rule 204.A says that an application for an Authority to Construct for any new emission unit that has the potential to emit any affected pollutants will be denied by the APCO unless the new emission unit is equipped with the current BACT for all subject air contaminants for which the emission unit's potential to emit is more than 25 lbs per day, or equipped with the current Reasonably Available Control Technology (RACT) if the potential to emit is less than 25 lbs per day. Offsetting would then apply as stated in Rule 204.B. However, Rule 204.C. gives exemptions from BACT/RACT and Offsets, and expresses that an emission unit shall be exempt from Rule 204.A and Rule 204.B if the "stationary source's net emissions increase of regulated pollutants is less than 0.1 tons per year," which would be the case for the CESF project (see Table 5.2-11).

Rule 211 – Emission Banking

The requirements for banking emission reductions of reactive organic gases (ROG), nitrogen oxides (NO_x), particulate matter less than 10 microns (PM_{10}), carbon monoxide (CO) and sulfur oxides (SO_x) are described in this Rule. Eligibility standards and practices at the facility are included as a check against the Federal criteria that any emission reductions intended to be banked must be real, quantifiable, permanent, enforceable, and surplus.

Rule 216 – Federal Part 70 Permits

This rule specifies the requirements and procedures by which a specific source may obtain a federally enforceable operating permit in accordance with the requirements of Part 70 to Title 40 of the Code of Federal Regulations. The requirement to obtain a Part 70 permit pursuant to this Rule shall apply to any stationary source located in a contiguous area and under common control with a potential to emit air

pollutants above certain threshold values, as established by regulations promulgated by the Administrator of the EPA. The Part 70 permit issued by the District fulfills the requirements of Title V of the CAA and 40 CFR Part 70. This permit also fulfills the requirements of Rule 202, Permits. However, emissions from the proposed CESF will be well below the Part 70 permit trigger levels.

Rule 218 – Federal Requirements for Hazardous Air Pollutants

Rule 218 applies to any owner or operator who constructs a major source of HAPs. The CESF project will not be a major source of HAPs, and therefore, Rule 218 does not apply.

Rule 219 – Toxics New Source Review

Rule 219 provides a mechanism for evaluating potential toxic impacts of air emissions of toxic substances from new, modified, and relocated sources including devices and processes that are required to obtain a permit pursuant to the Rules and Regulations of the SLOAPCD. This Rule applies where there is an increase in toxic emissions or a decrease in the distance between the source and the nearest receptor. The rule limits the allowable incremental risk at the nearest receptor and maximum exposed individual from facility-wide emissions to no more than one excess cancer per million population (1.0 E-06) or the health hazard index to no more than 0.10 for either acute or chronic non-cancer effects.

The APCO requires documentation that consists of: (a) a list identifying all of the possible air emissions of toxic substances which might be emitted from the proposed source, including an estimate of the maximum and average hourly emission rates and annual emission rate for each substance based on each permit unit's potential to emit; (b) the distances to the nearest receptors including residences, offsite worksites, schools and health care facilities; (c) results of a screening or refined risk assessment which shows to the satisfaction of the APCO that the toxic impact from facility-wide emissions on the public will not result in a cancer risk equal to or greater than one in a million (1.0E-06) or an acute or chronic non-cancer HHI of equal to or greater than 0.10 at the maximum exposed individual and nearest receptor; and (d) the APCO may require public notification of the risk associated with the construction or modification of any source where the cancer risk exceeds ten (10.0) in a million or the HHI is greater than one (1.0). The content, format, and duration of the public notification shall be determined at the time that this option is implemented. As shown in Section 5.16, Public Health and Safety, health risks from the operational CESF are expected to be well below the limits specified in this rule.

Rule 223 – Power Plants

This rule applies to all power plants with a gross electrical generating capacity of 50 megawatts or more that are proposed to be constructed in the SLOAPCD and for which an AFC has been filed with the CEC. Upon receipt of an AFC for a power plant, the APCO shall conduct a determination of compliance (DOC) review. This determination shall consists of a review identical to that which would be performed if an application for an Authority to Construct had been received for the power plant. The applicant, in accordance with Rule 302, Schedule of Fees, shall reimburse the APCO for all costs incurred while complying with the provisions of this Rule.

If all applicable conditions from a DOC are included in the license issued by the CEC to an applicant pursuant to section 25500 *et seq*. of the Public Resources Code (PRC), the issuance of the Commission's

certificate shall confer the same rights and privileges, and enforcement powers as an Authority to Construct. After construction, an applicant found to be in compliance with the CEC license shall be issued a Permit to Operate by the APCO.

Regulation III – Fees

Rule 301 – Permit Fees

All filing fees and fees for an Authority to Construct or Permit to Operate and other fees provided for in these Rules and Regulations shall be adopted by resolution of the Air Pollution Control Board of San Luis Obispo County, which resolution shall set such fees in reasonable amounts based as much as possible on the cost of the services performed for which such fee is charged. The Applicant will submit the required fees with the application for permit modification, in compliance with this rule.

Rule 302 – Schedule of Fees

This rule describes fee units, filing fees, Authority to Construct fees, permit to operate fee, and the permit renewal fee schedule.

Rule 308 – Fees for Air Toxics "Hot Spots" Program

This Rule applies to any stationary source which is subject to the requirements of the Air Toxics "Hot Spots" Information and Assessment Act, and manufactures, formulates, uses, or releases a listed substance or any other substance which reacts to form any listed substance and emits less than ten (10) tpy of any criteria pollutant and is included in any class listed in Appendix E to the latest version of the Emissions Inventory Criteria and Guidelines Report, as incorporated by reference in Section 93300.5 of Title 17 of the California Code of Regulations. The District shall notify and assess the operator of each stationary source subject to Section A of this Rule in writing of the fee due. The operator shall remit the fee to the District within thirty (30) calendar days of the date of the fee assessment notice. The CESF project's emissions of criteria pollutants will not exceed 10 tpy, so it will not be subject to the requirements of this rule.

Regulation IV – Source Emission Standards, Limitations and Prohibitions

This regulation restricts visible emissions, odor nuisance, sulfur compound, nitrogen oxide, and carbon monoxide emissions standards, control of oxides of nitrogen from industrial boilers, steam generators, and process heaters, and stationary internal combustion engines.

Rule 401 – Visible Emissions

Rule 401 prohibits the discharge of any air contaminant from a single source for more than three minutes in any one hour that produces visible emissions of specified opacity or shade (designated on the Ringlemann Chart). No visible emissions are expected with the operation of the diesel fuel firewater pump driver engine, which will be the proposed Project's only source of air pollutant emissions.

Rule 402 – Nuisance

This rule prohibits the discharge from any source of air contaminant that could cause injury, detriment, nuisance or annoyance to any considerable number of persons or to the public, or which endangers the comfort, repose, health or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property. No such nuisance is expected with the operation of the proposed fuel firewater pump driver or emergency generator utilizing diesel fuels.

Rule 403 – Particulate Matter Emission Standards

Rule 403 describes that an operation shall not discharge into the atmosphere from any source particulate matter in excess of 0.1 grains per cubic foot of dry gas at standard conditions. The particulate matter process weight will follow the table in Rule 403.B that describes the prohibitions of particulate matter discharge in excess of process weight rates. Particulate emissions from fuel burning equipment shall not exceed 0.12 pounds per million Btu of fuel input. Internal combustion engines are not subject to this rule.

Rule 404 – Sulfur Compounds Emission Standards, Limitations and Prohibitions

This rule expresses that any non-mobile fuel burning equipment that is built, erected, installed, or expanded cannot discharge more than 200 pounds per hour of sulfur compounds, calculated as sulfur dioxide, into the atmosphere. Sulfur compound emissions will not reach this limit with the operation of the diesel fuel firewater pump driver for the CESF project.

Rule 405 – Nitrogen Oxides Emission Standards, Limitations, and Prohibitions

Rule 405 prohibits the discharge of NO_x emissions from any fuel burning equipment unit in excess of 140 pounds per hour, calculated as nitrogen dioxide. NO_x emissions due to operation of the diesel firewater pump driver for the CESF project will be far below this limit.

Rule 406 – Carbon Monoxide Emission Standards and Limitations

This rule prohibits any operations that discharge carbon monoxide into the atmosphere in concentrations exceeding 2,000 ppm by volume measured on a dry basis. The provisions of this Rule do not apply to emissions from internal combustion engines.

Rule 430 – Control of Oxides of Nitrogen from Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters

The provisions of this Rule applies to boilers, steam generators, and process heaters with rated heat input capacities greater than or equal to 5 million BTUs per hour used in all industrial and commercial operations. The proposed Project will not include any fuel burning boilers, steam generators, or process heaters.

Rule 431 – Stationary Internal Combustion Engines

This rule is applicable to any stationary internal combustions engine rated at greater than 50 brake horsepower and operated on any gaseous or liquid fuel, including gasoline and diesel fuel. Requirements

limit NO_x and CO emissions from spark-ignited engines. However, the CESF firewater pump driver and emergency generator will be exempt from this rule under Rule 431.C, since the engines are planned to be used for periodic testing less than 200 hours per calendar year for emergency purposes only.

It is important to understand that recordkeeping and reporting requirements necessary to justify this exemption must be complied with. Recordkeeping is to be done on a monthly basis, and needs to include the date and results of each engine inspection, the total hours of operation, and the type and quantity of fuel used. The operator needs to maintain the inspection log for a 3 year period. On or before March 1 of each year, each owner or operator with engines subject to this rule will submit a report to the APCO specifying the actual annual fuel usage and operating hours for each affected engine. The report must also include the engine manufacturer, model number, facility-defined equipment identification number, and a summary of the maintenance reports.

Regulation VI -- New Source Performance Standards

Rule 601 – New Source Performance Standards (NSPS)

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

Table 5.2-21 summarizes applicable LORS.

Table 5.2-21
Summary of Applicable LORS

Jurisdiction	LORS	Requirements	Conformance Section	Administering Agency
Federal				
	CAA 171-193, 42 USC 7501 *et seq*. (New Source Review)	Requires new source review (NSR) facility permitting for construction or modification of stationary sources. NSR applies to pollutants for which ambient concentrations are higher than NAAQS.	5.2	SLOAPCD, with EPA Region IX oversight
State				
	H&SC 4430-44384; title 17 of the California Code of Regulations (17 CCR 9330-93347 [Toxic "Hot Spots" Act])	Requires preparation and biennial updating of facility emission inventory of hazardous substances; health risk assessments.	5.16, Public Health and Safety	SLOAPCD, with CARB oversight
	H&SC 41700 (Nuisance)	Provides that no person shall discharge form any source quantities of air contaminants or material which cause injury,	5.2, 5.16	SLOAPCA, with CARB oversight

Table 5.2-21
Summary of Applicable LORS
(Continued)

Jurisdiction	LORS	Requirements	Conformance Section	Administering Agency
		detriment, nuisance, or annoyance to considerable number of persons or to the public witch endanger the comfort, repose, health or safety or which can cause injury or damage to business or property.		
	California Public Resources Code 25523(a); 20 CCR 1752, 2300-2309 and Div. 2, Chap. 5, Art. 1, Appendix B, Park (k) (CEC and CARB Memorandum of Understanding)	Requires that CEC's decision on the AFC include requirements to assure protection of environmental quality; AFC is required to address air quality protection.	5.2.6.2	CEC
Local				
	SLOAPCD Rule 202 Permits	Requires an Authority to Construct before construction of an emission source occurs. Prohibits operation of any equipment that emits or controls air pollutants without first obtaining a permit to operate.	5.2.6.3	SLOAPCD, with CARB and EPA Region IX oversight
	SLOAPCD Rule 204 Requirements: Control Technology, Offsets, Exemptions from BACT and Offsets	Specifies BACT/RACT technology requirements for a new emissions unit that has potential to emit any affect pollutants.	5.2.5	SLOAPCD
	SLOAPCD Rule 211Emission Banking	Describes the eligibility standards and practices for the banking of emission reductions of certain pollutants.	5.2.4, 5.2.6.3	SLOAPCD
	SLOAPCD Rule 216 Federal Part 70 Permits	Specifies requirements and procedures by which a source may obtain a Federally enforceable operating permit in accordance with part 70 of	5.2.6.3	SLOAPCD, with CARB and EPA Region IX oversight

Table 5.2-21
Summary of Applicable LORS
(Continued)

Jurisdiction	LORS	Requirements	Conformance Section	Administering Agency
		Title 40 of the Code of Federal Regulations.		
	SLOAPCD Rule 218 Federal Requirements for Hazardous Air Pollutants	Describes requirements to any owner or operator who constructs a major source of HAPs.	5.2.6.3	SLOAPCD
	SLOAPCD Rule 219Toxics New Source Review	Provides a mechanism for evaluating potential toxic impacts of air emissions of toxic substances from new sources.	5.2.6.3	SLOAPCD
	SLOAPCD Rule 223 Power Plants	Describes the procedure of a DOC for a plant with a gross capacity of 50 MW or more constructed in the District.	5.2.6.3	SLOAPCD
	SLOAPCD Rule 301 Permit Fees	Identifies fess that are applicable to permit modifications, new facilities, and permitted emissions.	5.2.6.3	SLOAPCD
	SLOAPCD Rule 302 Schedule of Fees	Describes fee units, filing fees, authority to conduct fees, permit to operate fee, and permit renewal fee schedule.	5.2.6.3	SLOAPCD
	SLOAPCD Rule 308 Fees for Air Toxics "Hot Spots" Program	Describes fees that apply to any stationary sources which are subject to the requirements of the Air Toxics "Hot Spots" Information and Assessment Act.	5.2.6.3	SLOAPCD
	SLOAPCD Rule 401 Visible Emissions	Prohibits the discharge of any air contaminant from a single source for more than 3 minutes in any one hour that produces visible emissions of specified opacity or shade designed on the Ringlemann Chart.	5.2.6.3	SLOAPCD
	SLOAPCD Rule 402 Nuisance	Prohibits the discharge from any source of any air	5.2.6.3	SLOAPCD

Table 5.2-21
Summary of Applicable LORS
(Continued)

Jurisdiction	LORS	Requirements	Conformance Section	Administering Agency
		contaminant that may cause injury, detriment, nuisance, or annoyance to any considerable number of persons or the public, or which endangers such persons or public or which may cause injury or damage to business or property.		
	SLOAPCD Rule 403 Particulate Matter Emission Standards	Prohibits the discharge of particulate matter into the atmosphere at specified concentrations.	5.2.6.3	SLOAPCD
	SLOAPCD Rule 404 Sulfur Compounds Emissions Standards, Limitations and Prohibitions	Prohibits the discharge of more than 200 pounds per hour of sulfur compounds into the atmosphere.	5.2.2, 5.2.6.3	SLOAPCD
	SLOAPCD Rule 405 Nitrogen Oxide Emission Standards, Limitations, and Prohibitions	Prohibits the discharge of more than 140 pounds per hour of nitrogen dioxide into the atmosphere.	5.2.2, 5.2.6.3	SLOAPCD
	SLOAPCD Rule 406-- Carbon Monoxide emission Standards and Limitations	Prohibits the discharge of more than 2,000 ppm by volume carbon monoxide by volume on a dry basis into the atmosphere.	5.2.2, 5.2.6.3	SLOAPCD
	SLOAPCD Rule 430 Control of Oxides of Nitrogen from Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters	Prohibits the discharge of oxides of nitrogen form industrial, institutional, and commercial boilers, steam generators, and process heaters into the atmosphere at specified concentrations. Internal combustion engines are not applicable to this rule.	5.2. 6.3	SLOAPCD
	SLOAPCD Rule 431 Stationary Internal Combustion Engines	Prohibits NO_x and CO emissions at specific concentrations from stationary internal combustion engines	5.2.6.3	SLOAPCD

Table 5.2-21
Summary of Applicable LORS
(Continued)

Jurisdiction	LORS	Requirements	Conformance Section	Administering Agency
		greater than 50 brake horsepower. Engines operating less than 200 hours per year are exempt. However, recordkeeping and reporting is necessary for compliance.		
	SLOAPCD Rule 601 New Source Performance Standards (NSPS)	Specifies that all new stationary sources of air pollution will comply with the standards, criteria, and requirements in NSPS. Projects with no sources are not applicable to this rule.	5.2.6.1, 5.2.6.3	SLOAPCD

5.2.5.4 Agencies and Agency Contacts

Agency contacts regarding this air quality assessment of the proposed Project are shown in Table 5.2-22.

Table 5.2-22
Agency Contact List for LORS

	Agency	Contact	Address	Telephone
1	California Energy Commission	Joe Loyer, Associate Mechanical Engineer	1519 Ninth Street Sacramento, CA 95814	(916) 654-4287
2	San Luis Obispo Air Pollution Control District	Permit Engineers	3433 Roberto Court San Luis Obispo, CA 93401	(805) 781-5912

5.2.5.5 Permits Required and Permitting Schedule

Under Regulation II, SLOAPCD regulates the construction, alteration, replacement, and operation of new sources of air pollutants by issuance of ATC and PTO (see Table 5.2-23). For power plants under the siting jurisdiction of the CEC, the SLOAPCD issues a Determination of Compliance (DOC) in lieu of an ATC. The DOC is incorporated into the CEC license. When the proposed Project commences operation and demonstrates compliance with the DOC, SLOAPCD will issue a PTO. The PTO specifies conditions that the air pollution source must meet to comply with other air quality standards and will incorporate applicable DOC requirements. The final PTO should be issued within 6 months after receipt of a complete application.

Table 5.2-23
Applicable Permits

Responsible Agency	Permit/Approval	Schedule
San Luis Obispo County Air Pollution Control District (SLOAPCD)	Authority to Construct/Permit to Operate	Application to be filed concurrent with AFC filing. 180-day application review period will be requested.

5.2.6 References

- American Meteorological Society. Journal of Applied Meteorology, 17(5): 636-643. "Correlation of Land Use and Cover with Meteorological Anomalies," August Auer Jr., May 1978.
- California Air Resources Board, Risk Management Guidance for the Permitting of New Stationary Diesel-Fueled Engines, October 2000.
- South Coast Air Quality Management District, CEQA Air Quality Handbook, April 1993.
- United States Environmental Protection Agency (EPA), 1992. Screening Procedures for Estimating the Air Quality Impact of Stationary Sources, Revised, EPA-454/R-92-019, October 1992.
- United States Environmental Protection Agency, Meteorological Monitoring Guidance for Regulatory Modeling Applications, EPA-454/R-99-005, February 2000.
- United States Environmental Protection Agency, 2004. User's Guide for the AMS/EPA Regulatory Model-AERMOD. September 2004.
- United States Environmental Protection Agency, 2005. AERMOD Implementation Guide. September 2005.
- United States Environmental Protection Agency, 2006. Addendum to User's Guide for the AMS/EPA Regulatory Model-AERMOD. December 2006.
- United States Environmental Protection Agency, 2006. USEPA AirData database.
- United States Environmental Protection Agency. "User's Guide for the Aermod Meteorological Preprocessor (AERMET)," 4-46–4-51. Nov 2004.
- WRCC, California Climate Data Archive, http://www.calclim.dri.edu/scaall.html, 1991-2006.

5.3 GEOLOGICAL HAZARDS AND RESOURCES

5.3.1 Affected Environment

The Carrizo Energy Solar Farm (CESF or Project) will encompass approximately 640 acres of fenced area on Section 28 adjacent to California State Route 58 (SR-58)/Carrisa Highway. The site is within the Carrizo Plain, a narrow, northeast-southwest trending plain and alluvial valley. The valley is flat lying and surrounded by mountains; erosion off the mountains and the presence of internal drainages has resulted in the deposition of clay and sand, as well as some silt and gravel, throughout the basin. The site is in a highly seismic region of California, with the San Andreas Fault located approximately 5 miles east of the Project.

The CESF will consist of approximately one hundred and ninety-five Compact Linear Fresnel Reflector (CLFR) solar concentrating lines, and associated steam drums, steam turbine generators (STGs), air cooled condensers (ACCs), and infrastructure, producing up to a nominal 177 megawatts (MW) net. The reflectors will cover the majority of Section 28 (see Figure 5.3-1). Most of the other components and equipment will be located within the power block area along the north-central side of Section 28. The northern portion of Section 33 immediately to the south of the CESF site will be used as a construction laydown area.

The site is adjacent to an existing 230 kilovolt (kV) transmission line operated by Pacific Gas & Electric (PG&E). The Project will be connected to the existing Morro Bay–Midway 230 kV with a 850-foot long segment of overhead transmission line supported by a dead-end structure in the Project's switchyard and two 30 meter (100-foot), 230 kV type A poles. The transmission line is within the Project site boundary except for a 90-foot long segment that connects to the PG&E tower.

The reflectors will be lightly loaded, with uplift/overturning forces expected to dominate engineering design considerations. The ACCs are expected to be the most highly loaded structures in the power block. Vertical loads (dead plus live plus operating loads) are expected to range from 100 to 400 kips, and maximum lateral loads are expected to be approximately 80 to 90 kips. The ACCs and potentially the turbine building will likely be supported on driven piles or drilled piers (also called cast-in-drilled hole [CIDH] piles). Other equipment in the power block will be supported on shallow footings or mat-type foundations. The reflectors will be supported on shallow foundations or small-diameter pile/anchor-type foundations. The new steel poles for the transmission line connection will be supported on CIDH piles.

Site grading will be performed to create level pads for the equipment and reflectors with cuts and fills across most of the site expected to be approximately 5 feet or less, with larger cuts and fills in isolated areas. Grading (over excavation and replacement) may also be required below shallow and mat foundations; over excavation depths are not expected to exceed several feet. Localized grading may be performed in the construction laydown area.

This section describes the existing geologic and soil conditions, geologic hazards and geologic and mineral resources in the proposed Project area. The Project area is shown on the Vicinity Map in Figure 5.3-1.

5.3.1.1 Geology

The primary geologic sources of published information used for this report include the United States Geologic Survey (USGS), the California Geological Survey (CGS) (formerly California Division of Mines and Geology, CGMG), the United States Department of Agriculture (USDA), and the County of San Luis Obispo. Much of the geologic information in this region is based on geologic mapping performed by Tom Dibblee. Specific references include: "Regional Geologic Map of San Andreas and related faults in Carrizo Plain, Temblor, Caliente, La Panza Ranges, and vicinity, California: A Digital Database" (USGS, 1999); the "Soil Survey of San Luis Obispo County, California, Carrizo Plain Area" (USDA, 2003); and the "Safety Element, San Luis Obispo County General Plan," (San Luis Obispo County Department of Planning and Building, 1999). All sources are cited in Section 5.3.6, References.

A preliminary geotechnical investigation was performed at the site by URS Corporation Americas (URS). The results were presented in a report titled "Preliminary Geotechnical Investigation, CESF, San Luis Obispo County, California," dated October 1, 2007 (final). The report is provided in Appendix J.

A prior solar project, the ARCO Carrisa Plain Solar Project, was previously constructed on Section 27, immediately east of the Project site. A geotechnical investigation and water well drilling exploration, coordinated by Bechtel Civil & Minerals, Inc., were performed as part of that project. The boring logs from the geotechnical investigation are not available, however, the results of geotechnical laboratory testing performed by Harding Lawson Associates in 1984 were provided. In addition, an internal Bechtel memorandum dated June 15, 1984, presents a water well drilling report prepared by Don's Drilling Company. The available data is appended in the Preliminary Geotechnical Investigation Report (URS, 2007).

5.3.1.1.1 Physiographic Setting

The site is within the Coast Ranges geomorphic province, which incorporates most of the central California coast. It is also within the northern portion of the Carrizo Plain physiographic subunit. The Carrizo Plain is a narrow, northeast-southwest trending plain and alluvial valley. The flat lying valley is surrounded by mountains and has internal surface drainage. The Temblor Range separates the plain from the San Joaquin Valley to the northeast, and the Caliente Range and La Panza Mountains bound the plain to the southwest and west, respectively. A schematic cross section through the area is presented as Figure 5.3-2.

The lowest point in the Carrizo Plain is at Soda Lake, an alkali wetland about 10 miles south of the Project, where the ground surface is about 1,900 feet mean sea level (MSL). The highest part of the plain is at about elevation 2,100 feet. The Temblor Range reaches elevations ranging from 3,000 to 4,300 feet MSL, and the Caliente Range is as high as 5,100 feet MSL. The Carrizo Plain is perched, and is about 1,000 feet higher than the Cuyama Valley and about 1,500 feet higher than the nearest portion of the San Joaquin Valley (Arrowsmith, 1995). The surrounding mountains are steep and rugged with some rolling hills. The northwestern portion of the Carrizo Plain is dissected by the San Juan drainage, which flows to the Salinas River.

The Project lies entirely within the alluvial basin of the Carrizo Plain as shown on Figures 5.3-1 and 5.3-3. Ground surface elevations on Section 28 range from approximately elevation 2,064 feet MSL near

the northeast corner to about 2,014 feet MSL near the southwest corner, generally gently sloping down to the southwest (Vaughan Surveys, Inc., 2007). In the proposed construction laydown area, ground surface elevations range from about 2,020 to 2,000 feet MSL, sloping toward a drainage that traverses the area (USGS, 1966, 1973, and 1982).

5.3.1.1.2 Regional Geology

A regional geologic map is presented on Figure 5.3-3 and the associated legend is included as Figure 5.3-4 (Dibblee, 1999). As shown on the map, the San Andreas Fault dominates the geology in the Carrizo Plain. It forms the northeast boundary of the Carrizo Plain, passing through the foothills of the Temblor Range. The San Juan, Big Spring, and Morales faults pass through the hills to the west and southwest of the plain. Faulting has caused deformation and uplift of the hills, which have been subsequently eroded.

The majority of the Temblor and Caliente Ranges are composed of Miocene-age sedimentary rock consisting of sandstone, shale, conglomerate, and siltstone. These materials were originally deposited in ocean water or fresh water.

Quaternary-age alluvium blankets the Carrizo Plain. It is up to several hundred feet thick, and is thickest at Soda Lake. The alluvium consists of interbedded gravel, sand, silt, and clay. The recent alluvium is underlain by the Paso Robles Formation, which outcrops in the hills along the northeast side of the plain. The Paso Robles Formation is a Pleistocene-age alluvial deposit and is about 3,000 feet thick near the San Andreas Fault (USDA, 2003). Both the young alluvium and the Paso Robles Formation are derived from material eroded off the surrounding mountains.

5.3.1.1.3 Geologic Structure

This portion of California is within the broad boundary zone between the North America tectonic plate to the east and the Pacific tectonic plate to the west. The San Andreas Fault is the primary element of this boundary, located approximately 5 miles east of the Project. The compression and shearing in the boundary zone between these two plates have resulted in the broad zone of complex faulting and folding experienced along the northeast margin of the Carrizo Plain. The major faults further divide the area into four distinct seismotectonic domains. The Carrizo Plain is within the Salinian Domain, characterized by northwest-trending faults and granitic and crystalline metamorphic basement rocks (San Luis Obispo County Department of Planning and Building, 1999).

5.3.1.1.4 Local Geology

A geologic map at 1:24,000 scale is presented as Figure 5.3-5 (Dibblee, 1999). Geologic units encountered within two miles of the site are described in Table 5.3-1. The geologic units are discussed below.

Surficial Deposits: Quaternary alluvium forms the valley fill deposits. The borings, cone penetration tests and laboratory test results performed as part of the preliminary geotechnical investigation (URS, 2007) indicate that the alluvial soil within the upper 100 feet of the site is primarily clayey sand, sandy clay, and clay, with minor amounts of silty sand, silt, and gravel. The results of laboratory testing demonstrate that both the near surface and deeper clayey soils show moderate expansion potential in

some locations. The alluvial deposits are generally characterized by layered intervals of clay and clayey sand without obvious lateral continuity. This suggests that these materials were deposited in a low energy alluvial-plain type environment, with small-scale drainages and streams that shifted location often.

Paso Robles Formation: Pleistocene-age deposits of older alluvial material underlie the surficial deposits and are exposed at the surface approximately one mile east of the Project. The formation is more than 3,000 feet thick on the east side of the valley, near the San Andreas Fault, with decreasing thickness to the west. (DWR, 2004)

Tertiary Sedimentary Rock: The Miocene-age sedimentary rocks that comprise the upper portions of the Temblor and Caliente Ranges adjacent to the site are composed of interlayered sandstone, shale, and basalt.

Table 5.3-1
Geologic Conditions[1]

Geologic Unit/Structure	Formation Name	Description/Comments
Qa	Alluvium	Upper Pleistocene to Holocene; gravels, sand, silt and clay.
Qtp	Paso Robles	Pleistocene; primarily poorly sorted, loosely consolidated gravels, sands, and silts.
Tsm	Santa Margarita	Miocene; Sandstone.
Tmw	Monterey Shale	Miocene; Whiterock Bluff Shale Member.
Tb	Basalt	Miocene; Intrusive and extrusive volcanic rock.
Tma	Monterey Shale	Miocene; Saltos Shale Member.
Tvp	Vaqueros	Miocene; Painted Rock Sandstone Member.

Reference: [1] Data from Dibblee, et al., 1999.

Groundwater was observed in some borings drilled at the site for the preliminary geotechnical investigation, and the cone penetration tests also provided an indication of groundwater levels (URS, 2007). Across Section 28, groundwater was measured within about 30 feet of the ground surface at the end of drilling. It was most shallow at the southwest corner of the site, closest to the drainage, where it was encountered at a depth of 13.5 feet below the ground surface (bgs). On the north and east sides of the Section, the depth was between 25 and 30 feet bgs. These levels fluctuate over the years depending on recharge rates.

5.3.1.1.5 Faults and Seismicity

Active and potentially active faults have been mapped in the region and documented by a number of government agencies and scientific entities. Numerous published maps and reports have been prepared by the USGS, the CGS, and other state or public agencies such as Southern California Earthquake Center (SCEC) that present information on fault location and activity. Table 5.3-2 presents a list of active and potentially active faults within approximately 60 miles of the Project. Fault characteristics listed in Table

5.3-2 are based on published data. The San Andreas fault is clearly the dominant seismic source in the area. The San Juan fault is the next closest fault to the Project considered capable of generating earthquakes. The fault is considered potentially active by San Luis Obispo County (San Luis Obispo County Department of Planning and Building, 1999). SCEC reports some evidence for active faulting at the northern end of the fault and notes that the remainder of the fault appears much less active. The San Juan fault is included in regional seismic hazard models as a potential source (CGS, 2003) and is characterized in Table 5.3-2 below.

The Project area is seismically very active given the proximity and number of potential seismic sources. Figure 5.3-6 presents a regional fault and epicenter map showing the approximate location of the Project relative to seismic sources and past earthquakes. Notable historic seismic events affecting the Project area are presented in Table 5.3-3.

Seismicity is concentrated along the right-lateral strike-slip faults along the eastern and western margins of the Salinian Domain; the inactive Nacimiento fault bounds the area to the west; and the San Andreas Fault bounds the area to the east. In the Western San Joaquin Valley Domain, immediately east of the San Andreas, seismicity is caused by thrust and reverse faulting, which creates active folding. While the historical record in the area goes back only about 200 years, several significant earthquakes have occurred in the recent past. The largest reported historic earthquake in the area was the 1857 Fort Tejon Earthquake (Magnitude 7.9). This earthquake was reported to have ruptured 345 kilometers (km) of the San Andreas Fault near the Carrizo Plain. Further east, the high seismicity of the folding regime in the San Joaquin Valley was seen in the 1983 Coalinga Earthquake (Magnitude 6.7). The 1952 Arvin-Tehachapi (Kern County) Earthquake occurred on the White Wolf Fault near Bakersfield. The magnitude is estimated at 7.5. The 1934 and 1966 Parkfield Earthquakes occurred on the San Andreas Fault near the northeast corner of San Luis Obispo County. The Parkfield Earthquakes had magnitudes of 6.0 and 5.5, respectively (San Luis Obispo County Department of Planning and Building, 1999).

Table 5.3-2
Seismic Source Characteristics

Fault Name	Nearest Distance to Project (Miles)[1]	Type of Faulting[2]	Fault Length (miles)[2]	Slip Rate[2] (mm/year)	Maximum Magnitude Earthquake[2] (Mmax)
San Andreas – Carrizo Segment	5	Right-lateral strike-slip	91	34	7.4
San Juan	6	Right-lateral strike-slip	56	0.5	7.0
Rinconanda	24	Right-lateral strike-slip	118	1.0	7.5
Pleito Fault Zone	26	Reverse	27	2	7.0
Hosgri	50	Right-lateral strike-slip	105	2.5	7.5
Santa Ynez – Western Segment	55	Left-lateral strike-slip	40	2.0	7.1
Big Pine	62	Left lateral strike-slip	25	0.8	6.9
White Wolf	63	Left-lateral reverse	41	2.0	7.3
San Andreas – Mojave Segment	70	Right-lateral strike-slip	64	30	7.4

Table 5.3-2
Seismic Source Characteristics
(Continued)

Fault Name	Nearest Distance to Project (Miles)[1]	Type of Faulting[2]	Fault Length (miles)[2]	Slip Rate[2] (mm/year)	Maximum Magnitude Earthquake[2] (Mmax)
Garlock – Western Section	74	Left-lateral strike-slip	61	6	7.3

References:
[1]Fault distances based on Jennings, 1994.
[2]Data based on CGS, 2003a and Southern California Earthquake Data Center website (SCEDC, 2007).

Table 5.3-3
Significant Historic Earthquakes

Date	Approximate Distance to Project Segment 4[1] (Miles)	Earthquake Magnitude[2]	Name, Location or Region Affected	Comments[2]
December 8, 1812	185	7.5	Wrightwood Earthquake	Caused collapse of Mission at San Juan Capistrano resulting in the death of 40 people.
January 9, 1857	31	Estimated from 7.9 to 8.25	Fort Tejon Earthquake	One of the largest earthquakes ever reported in the U.S. This earthquake caused damage from Monterey to San Bernardino and caused a surface rupture of greater than 220 miles in length. Due to sparse population at the time, it only resulted in 2 deaths. Average displacement along the fault was 15 feet, with a maximum displacement of 30 feet in the Carrizo Plain area.
July 29, 1925	70	6.3	Santa Barbara Earthquake	Resulted in 13 deaths and around $8 million in damage.
November 4, 1927	112	7.1	Lompoc Earthquake	One of the strongest earthquakes of the 20th century. Occurred off shore so there was relatively little damage. A concrete highway near Lompoc cracked, and sand and water were spewed from the ground. Created a tsunami two meters high.
June 30, 1941	70	5.5	Santa Barbara Earthquake	Resulted in about $150,000 in damages, and was felt as far away as San Diego.
July 21, 1952	62	7.5	Kern County Earthquake	Resulted in the death of 12 people and $60 million in property damage.

Table 5.3-3
Significant Historic Earthquakes
(Continued)

Date	Approximate Distance to Project Segment 4[1] (Miles)	Earthquake Magnitude[2]	Name, Location or Region Affected	Comments[2]
June 27, 1966	50	6.0	Parkfield Earthquake	Caused very little damage.
August 13, 1978	70	5.1	Santa Barbara Earthquake	Resulted in 65 injuries and $15 million in property damage. Derailed a freight train.
June 10, 1988	75	5.4	Tejon Ranch Earthquake	Caused the Edmunston Pumping Plant along the California Aqueduct to temporarily shut down and was felt throughout most of southern California.
May 27, 1993	52	5.2	Wheeler Ridge Earthquake	Caused little damage, but was felt throughout most of southern California.

References:
[1]Earthquake magnitudes and locations before 1932 are estimated by Toppozada and others (1978, 1982) based on reports of damage and felt effects.
[2]Earthquake damage information compiled from the Southern California Earthquake Data Center (SCEDC, 2007) website.

5.3.1.2 Geologic Hazards

5.3.1.2.1 Surface Fault Rupture/Fault Displacement

The San Andreas Fault is the nearest active fault to the Project, located approximately 5 miles to the east. No known active faults, potentially active faults, or earthquake fault zones are present within the Project site; therefore, there are no faults with significant potential for fault rupture and no known hazards associated with fault rupture along an active fault at the Project.

5.3.1.2.2 Seismic Shaking

Due to the proximity to the San Andreas and other faults, the Project area could be subject to moderate to strong ground shaking in response to a local or more-distant large-magnitude earthquake occurring during the expected life span of the proposed Project. Regional planning level estimates of ground motion are presented in the CGS Probabilistic Seismic Hazards Mapping Ground Motion Page (CGS, 2003b). This Probabilistic Seismic Hazards Assessment (PSHA) model estimates that the peak ground acceleration for the Project area is about 0.56 g (percentage of gravity) for the hazard level associated with a 10 percent probability of exceedance in 50 years. For the 2 percent probability of exceedance in 50-year hazard level, the USGS National Seismic Hazard Maps show a peak ground acceleration of about 0.88g (CGS, 2003b).

5.3.1.2.3 Landslides (Mass Wasting and Slope Stability)

Landslides can occur due to the presence of steep slopes in combination with saturated soil or rock and/or seismic activity. The site is on relatively level ground; therefore, the risk of land sliding is very low. The hills to the east and west of the site could experience landslides; however, due to their distance from the site and proposed improvements, the potential for landslides to affect the Project is low. Further, the landslide hazards map in the San Luis Obispo County General Plan (San Luis Obispo County Department of Planning and Building, 1999) shows the Project within an area with low potential for landslides.

5.3.1.2.4 Liquefaction, Seismic Settlement, and Lateral Spreading

Liquefaction is a phenomenon where loose, saturated coarse-grained soils (with less than 50 percent passing the No. 200 sieve) lose their strength and acquire some mobility from strong ground motion induced by earthquakes. The secondary effects of liquefaction include sand boils, settlement, reduced soil shear strength, lateral spreading, and global instability due to liquefaction (flow slides) in areas with sloping ground.

The liquefaction hazards map in the San Luis Obispo County General Plan (San Luis Obispo County Department of Planning and Building, 1999) shows the site within an area with a high potential for liquefaction. This designation is due to the presence of variable alluvial soil in the Carrizo Plain. Groundwater levels across most of the site range from about 15 to 30 feet bgs, and liquefaction is not known to occur deeper than about 50 feet bgs; therefore, the zone between the ground surface and 50 feet bgs was evaluated for liquefaction as part of the Preliminary Geotechnical Investigation (Appendix J). Within these depths, the soil was observed to be primarily clay and sandy clay, although minor sand layers were present. These sand layers were typically one to two feet thick, generally dense, and not considered susceptible to liquefaction. An exception was in the boring at the southwest corner of Section 28, closest to the drainage, where a potentially liquefiable layer of clayey sand approximately ten feet thick was encountered. While the soil has a high silt and clay content and would not typically be considered liquefiable, strong ground accelerations could occur due the proximity of the site to the San Andreas Fault. Liquefaction within this layer could cause some settlement at the ground surface. Additional discussion is provided in the Preliminary Geotechnical Investigation (Appendix J).

In general, the potential for liquefaction to occur at the Project site is low with the exception of soil at the southwest corner. Site-specific data obtained from the Preliminary Geotechnical Investigation (URS,

2007) indicates that the soil observed below the groundwater table typically either has sufficiently high clay content or is sufficiently dense sandy material to reduce the potential for liquefaction to occur. Where zones of looser, cleaner sand do exist at the site, such as at the southwest corner, they are likely to be limited in extent; liquefaction-induced settlement is likely to be localized and confined to the southwest corner of the site. Potentially liquefiable material was not found in the subsurface in the area proposed for the power block.

Seismically induced settlement of dry soils (seismic compaction) can occur during strong ground shaking in loose, clean granular deposits above the water table, resulting in ground surface settlement. The soil observed above the groundwater level was typically either sufficiently dense or contains a high clay fraction, and therefore the potential for seismic compaction is low. Where zones of looser sand deposits are present, the resulting settlement at the ground surface is expected be less than ¼ inch, which is not considered to represent a significant seismic hazard.

Lateral spreading is a phenomenon in which surficial soil displaces along a shear zone that has formed within an underlying liquefied layer. Upon reaching mobilization, the surficial blocks are transported down slope or in the direction of a free face by earthquake and gravitational forces. Because of the absence of significant slopes, the site is not considered prone to lateral spreading. Further, continuous potentially liquefiable soil layers, along which lateral spreading typically occurs, were not encountered during the geotechnical investigation; therefore, lateral spreading is not considered a significant seismic hazard.

5.3.1.2.5 Expansive Soils and Settlement

The results of laboratory testing demonstrate that both the near surface and deeper clayey soils show moderate expansion potential (i.e., a plasticity index (PI) greater than 22 and a low natural moisture content) in some locations. The results from the previous investigation on Section 27 encountered some soil with a high expansion potential. This condition is common in arid climates with low rainfall and high evaporation. When expansive soil with low moisture content is exposed to moisture it can swell, and lightly loaded structures supported on expansive soil can be damaged due to uplift caused by swelling. Over excavation and replacement with non-expansive soil may be required below shallow foundations at the site to reduce the potential for heave of the structures. As an alternative, the structures could be supported on small-diameter piles that gain support in friction in the soil below the upper zone where volume change can occur.

Settlement of structures can occur as a result of geologic conditions if the foundations are not properly designed. Clay, especially soft saturated materials, can compress under the weight of foundation loads. The clayey soils at the site are typically stiff to hard and are not highly susceptible to compression or consolidation; however, the ACC, turbine building, and some other structures within the power block are heavily loaded. Should these structures be supported on shallow foundations, excessive settlement could occur; therefore, these structures will likely be supported on driven or drilled piles.

The upper two to four feet of soil has been disturbed due to agricultural activities at the Project site and therefore may not be suitable for support of surface improvements such as foundations, roads, building floor slabs and hardscape. Local over excavation and recompaction may be required to provide stable foundations or support for the planned structures.

Collapsible soils are unsaturated materials that undergo a volume change upon saturation. They are typically Aeolian (wind-deposited) sand or silt, or loess, a silt deposit, with high void ratios and low cohesion. The soil observed above the groundwater level during the geotechnical investigation generally has high clay content with moderate plasticity and is not susceptible to collapse. One zone of sandy silt about five feet thick was observed at the southwest corner of the Section 28. The material was found to be very stiff and is just above the groundwater level where it has likely been exposed to water during high rainfall events; therefore, the potential for soil collapse to occur at the site is low.

5.3.1.2.6 Subsidence

Subsidence caused by groundwater withdrawal is common in agricultural areas that use irrigation from groundwater. The Carrizo Plain is primarily used for grazing and dry farming. While some groundwater wells are present in the area, the water is typically pumped from deep aquifers (several hundred feet deep) and is primarily for domestic use. Groundwater levels in the shallow aquifer have not been substantially affected and therefore the potential for subsidence in the area is low.

5.3.1.2.7 Tsunamis and Seiches

Tsunamis are seismically induced waves generated by sudden movements of the ocean bottom during submarine earthquakes, landslides, or volcanic activity. Seiches are similarly generated but are waves in lakes or reservoirs. The site is about 10 miles from Soda Lake, the nearest body of water. Based on the location of the Project and elevation, the potential for damage due to a tsunami or seiche is low.

5.3.1.3 Geologic Resources

Geologic resources of recreational, commercial, or scientific value in the Project vicinity that could be affected comprise sand, gravel, mineral mines, oil, and gas reserves. Oil, gas, and hydrogeologic resources of value were evaluated by reviewing maps on the California Division of Oil, Gas & Geothermal Resources (DOGGR) website and a map of gas and oil resources and extraction facilities presented in the Energy Element of the San Luis Obispo County General Plan (San Luis Obispo County Department of Planning and Building, 1995). Mineral resources data was obtained from published USGS data and the USGS website (http://mrdata.usgs.gov/). The geologic resources are discussed below because of their economic value and proximity to the Project site.

5.3.1.3.1 Sand, Gravel, and Mineral Resources

Due to the clayey nature of the soil at the Project site and the significant depth to bedrock, the potential for significant sand and gravel resources on the Project site is considered negligible. Similarly, the potential for mineral resources on or near the Project site is considered low.

Surface and near-surface mining has been performed in the vicinity of the Project, both in the alluvial valley as well as the in the hills to the east and west. In the immediate vicinity of the Project, only one active mine is reported; the 'Farm Camp Quarry No. 5' is a surficial gypsum-anhydrite mine about 8 miles southeast of the Project near California Valley (USGS, 2007). The approximate location of the quarry is shown on Figure 5.3-3. Numerous other inactive or closed mines are present in the vicinity,

including other gypsum mines in the valley, a sodium mine at Soda Lake, gold and uranium mines in the foothills, and scattered sand and gravel mines. The closest of these is about 4 miles from the Project.

5.3.1.3.2 Oil and Gas

Oil production occurs throughout San Luis Obispo County, as well as in Kern County to the east. Several oil and gas fields are located in the hills immediately east of the site near the San Andreas Fault, including the Temblor Hills, Belgian Anticline, Temblor Ranch, East Temblor, Cymric, and Chico Martinez Fields. The majority of the wells drilled at those locations were abandoned or not developed. Numerous exploratory wells have also been drilled about six miles southeast of the site in California Valley, and along SR-58 about two miles west of the Project. Additional wells have been drilled within one mile of the site, as shown on Figure 5.3-5, although they were for exploratory purposes and are not active. (DOGGR, 2005; San Luis Obispo County Department of Planning and Building, 1995).

Based on the information reviewed, the Project and surrounding area are not within an oil, gas or geothermal field (DOGGR, 2005), and no significant oil and gas reserves or geothermal resources have been found within 10 miles of the Project.

5.3.2 Environmental Consequences

Potential impacts of the Project on the geologic or mineral resources and potential impacts of geologic hazards on the Project can be divided into those related to construction activities and those related to plant operation and maintenance.

5.3.2.1 Construction Related Impacts

Construction related impacts to the geologic or mineral resources primarily involve grading operations and installation of foundations. The proposed improvements include excavation and minor grading for building and equipment pads and foundations, utility trenches, and for drainage of surface water flow. Site grading will involve cuts and fills on the order of five feet to create level pads for equipment and buildings. Minor grading may be performed within the laydown area.

The presence of potentially expansive and/or loose near-surface soil will affect the depth of excavation required for construction of shallow foundations, which will be determined as part of a final geotechnical investigation. Temporary construction slopes will be required for these foundation excavations, as well as for utility trenches and any septic systems or leach fields, however the slopes will be stable. Pile foundations may also be required to limit settlement of heavily loaded structures. Other potentially significant impacts by geologic conditions on the construction are not anticipated, and Project site development is not anticipated to result in significant adverse impacts to geologic or mineral resources. With implementation of the mitigation measures outlined in Section 5.3.4, impacts to plant construction by the geologic environment will be reduced to less than significant levels.

5.3.2.2 Operation Related Impacts

No significant impacts to geologic or mineral resources have been identified as a result of operation. Potential impacts of geologic hazards on the Project and ancillary facility operations include seismic shaking and

the presence of near-surface expansive soil. With implementation of the mitigation measures outlined in Section 5.3.4, impacts to plant operations from geologic hazards will be reduced to a less than a significant level.

5.3.3 Cumulative Impacts

No cumulative impacts to the geologic and mineral resources at the site have been identified.

5.3.4 Mitigation Measures

5.3.4.1 Seismic Hazards

The potential exists for strong ground shaking from a variety of nearby seismic sources, including the San Andreas Fault. The reflectors, the equipment and buildings within the power block, and the lateral transmission line will need to be designed and constructed to withstand strong earthquake shaking as specified in the 2001 California Building Code (CBC) for Seismic Zone 4 in accordance with San Luis Obispo County requirements.

GEO-1: Project facilities shall be designed in accordance with applicable building codes' seismic design criteria. Seismic design criteria are provided in Appendix J. Other project elements would be designed and constructed in accordance with the appropriate industry standards and good engineering and construction practices and methods, as applicable.

As a result of strong seismic shaking, localized settlement due to liquefaction could occur in the southwest corner of Section 28. Additional subsurface investigation should be performed as part of a design level geotechnical investigation to further evaluate the potential for liquefaction and determine whether mitigation is required. Mitigation against liquefaction, if required, could include extending pile foundations below the liquefiable zone or designing the foundations or the structures to accept some differential settlement.

GEO-2: A design level geotechnical investigation shall be performed prior to final design. As part of the field investigation, explorations would be advanced at critical structure locations, as well as across the site to provide spatial coverage. Recommendations would be provided for the design of the various types of structures and equipment planned for the Project site. Evaluation of expansive soil, foundation capacity and settlement, and liquefaction potential would be included, and the recommendations would be incorporated into the design of the facility. The design level geotechnical study would be performed by professional civil or geotechnical engineers and engineering geologists licensed in the state of California and would provide design and construction recommendations, as appropriate, to reduce potential impacts from geologic hazards or soil conditions.

5.3.4.2 Expansive Soil and Settlement

Near-surface expansive soils are present in some areas of the Project site and could negatively affect lightly loaded structures supported directly on the soil. The effects of expansive soils can be mitigated by either removing the soil and backfilling with non-expansive soil, chemically stabilizing the soil to reduce

the expansion potential, or by constructing the structure foundations to resist uplift caused by expansive soil.

Heavily loaded structures have the potential to compress the underlying soil, causing settlement of the structure. Pile foundations may be required to support heavy equipment within the power block to mitigate the potential for damage to the structures as a result of settlement. Further, the upper two to four feet of soil has been disturbed by agricultural activities at the site or may have deleterious properties and therefore may not be suitable for support of surface improvements such as foundations, roads, building floor slabs and hardscape. Appropriate mitigation will be required to reduce the potential for damage to the Project elements as a result of settlement of near-surface soil.

Preliminary recommendations to mitigate the effects of expansive soil and settlement are presented in Appendix J. A design level geotechnical investigation should be performed prior to final design to confirm the geotechnical design parameters and evaluate the most appropriate foundations and soil preparation methods to mitigate the potential for foundation damage. Mitigation measure GEO-2 above is applicable to expansive soil and settlement. Further, the following mitigation measure applies.

GEO-3: Site grading or other measures shall be performed to mitigate the potential for structural damage due to expansive and loose surficial soil. To reduce the potential for heave of shallow foundations founded on the expansive clay, over excavation of the surficial clays and replacement with non-expansive fill may be required depending on foundation design. Recommended over excavation depths would likely be 12 to 18 inches below hardscape and 2 to 3 feet below footings mat foundations. Details of these recommendations are provided in the Appendix J. Additional field and laboratory testing will be required during the final investigation to further evaluate the extent of the moderately expansive and loose surficial soil and the best methods to address these issues.

5.3.4.3 Grading

A grading permit is required prior to commencing site work, as listed in Table 5.3-6. Construction activities would also be performed in accordance with the soil erosion/water quality protection measures to be specified in the Construction Storm Water Pollution Prevention Plan (SWPPP) for the Project. The SWPPP is discussed further in Section 5.5, Water Resources.

5.3.4.4 Geologic Resources

There are no significant impacts to geologic resources; therefore, no mitigation is recommended.

5.3.5 LORS Compliance

Applicable LORS are discussed in this section and summarized in Table 5.3-4.

5.3.5.1 Federal

There are no federal regulations, plans, or standards for geological hazards and resources.

5.3.5.2 State

5.3.5.2.1 California Public Resources Code 25523(a): 20 CCR § 1252 (b) and (c)

None of the Project components are located within or cross an Alquist–Priolo Earthquake Fault Zone. The Project will not be subject to requirements for construction within an Alquist–Priolo Earthquake Fault Zone. The administering agency for the above authority is the California Energy Commission (CEC).

5.3.5.2.2 Seismic Hazards Mapping Act, California Public Resources Code 2695(a): (1) and (3)-(5)

The Seismic Hazards Mapping Act of 1990 (Public Resources Code, Chapter 7.8, Division 2) directs the CGS to delineate seismic hazard zones. The purpose of the Act is to reduce the threat to public health and safety and to minimize the loss of life and property by identifying and mitigating seismic hazards. Cities, counties, and state agencies are directed to use seismic hazard zone maps developed by CGS in their land-use planning and permitting processes. The Act requires that site-specific geotechnical investigations be performed prior to permitting most urban development projects within seismic hazard zones. It addresses the effects of strong ground shaking, liquefaction, landslides, or other ground failure and other seismic hazards caused by earthquakes.

The Act also addresses tsunamis and seiches. It states that maps may include potential effects of tsunami and seiche when information becomes available from other sources and the state geologist determines the information is appropriate for use by local government. The administering agency for the above authority is the CEC.

5.3.5.2.3 California Building Code (CBC)

The CBC 2001 edition contains clauses specifically tailored to geologic hazards in California.

Chapter 16: Structural Design Requirements, Division IV Earthquake Design: This section requires structural designs to be based on geologic information for seismic parameters, soil characteristics, and site geology.

Chapter 18: Foundations and Retaining Walls, Division I: This section sets requirements for excavations and fills, foundations, and retaining structures, with regard to expansive soils, subgrade bearing capacity and seismic parameters, and addresses waterproofing and damp-proofing foundations. In seismic zones 3 and 4, as defined by the CBC, liquefaction potential at the site should be evaluated. Division III contains requirements for mitigating effects of expansive soils for slab-on-grade foundations.

Chapter 33: Site Work, Demolition and Construction, and Appendix Chapter 33: These sections establish rules and regulations for construction of cut-and-fill slopes, fill placement for structural support, and slope setbacks for foundations.

The administering agency for the above authority is the CEC.

5.3.5.2.4 California Environmental Quality Act of 1970 (CEQA)

The CEC will be the lead agency for rules and regulations to implement the CEQA. Appendix G, Section VI of the CEQA guidelines contains the geologic hazards and resources related to the Project.

5.3.5.3 Local

5.3.5.3.1 Safety Element of the San Luis Obispo County General Plan (1999)

The element provides policies and measures to minimize injuries and loss of life and reduce property damage from seismic and geologic hazards. The element includes the following policies: S-18 Fault Rupture Hazards, to address the Alquist-Priolo Earthquake Fault Zoning Act; S-19 Reduce Seismic Hazards, to address design issues related to ground shaking; S-20 Liquefaction and Seismic Settlement, to evaluate the potential for these hazards in accordance with the current building code; and S-21 Slope Instability, to require studies in steep slope areas or areas with a history of land sliding. The administering agency for the above authority is the San Luis Obispo County Department of Planning & Building.

5.3.5.3.2 Energy Element of the San Luis Obispo County General Plan (1995)

The Energy Element provides goals, policies, guidelines, and programs related to energy development in the county. The element includes Guideline 29.11 that states, "Locate proposed facilities in a geologically stable area, or all significant impacts from erosion, landslides, and seismic activity should be mitigated to insignificant levels." The administering agency for the above authority is the San Luis Obispo County Department of Planning & Building.

Table 5.3-4
Summary of LORS

Jurisdiction	LORS	Requirements	Conformance Section	Administering Agency	Agency Contact
Federal					
	None applicable (NA)	NA	NA	NA	NA
State					
	California Public Resource Code 25523(a), Alquist-Priolo Earthquake Fault Zone	NA	5.3.5.2	CEC	Eileen Allen
	California Public Resource Code 2695(a): (1) and (3)-(5))	Identify and address seismic hazards identified by CGS and/or city, county, or state agency.	5.3.5.2, Appendix J	CEC	Eileen Allen

Table 5.3-4
Summary of LORS
(Continued)

Jurisdiction	LORS	Requirements	Conformance Section	Administering Agency	Agency Contact
	2001 California Building Code	Meet seismic, foundation and retaining wall design requirements. Control excavation, grading, construction to safeguard life and property welfare.	5.3.5.2, Appendix J	CEC	Eileen Allen
Local					
	Safety Element of the San Luis Obispo County General Plan (1999)	Address geologic and seismic hazards as part of development process.	5.3.5.3, Appendix J	San Luis Obispo County	Lew Rosenberg
	Energy Element of the San Luis Obispo County General Plan (1995)	Locate energy facilities in geologically stable areas or address geologic hazards.	5.3.5.3, Appendix J	San Luis Obispo County	Lew Rosenberg

5.3.5.4 Agencies and Agency Contacts

The CEC and the San Luis Obispo County Department of Planning & Building are the administering agencies for the Project. The CEC may consult with CGS regarding geological issues during the review process. The contacts provided in Table 5.3-5 have not been consulted in preparation of this section, but are identified as the lead contacts for the various disciplines.

Table 5.3-5
Agency Contact List for LORS

	Agency	Contact	Address	Telephone
1	CEC Facilities Siting Division	Eileen Allen, Energy Facility Licensing Program	1516 Ninth Street, MS-15 Sacramento, CA 95814	(916) 654-4082
2	San Luis Obispo County Department of Planning & Building, Environmental and Resource Management Division	Lew Rosenberg, Geology	County Government Center San Luis Obispo, CA 93408	(805) 781-4577
3	San Luis Obispo County Department of Planning & Building	Cheryl Journey, Building Division	County Government Center San Luis Obispo, CA 93408	(805) 781-1314

Table 5.3-5
Agency Contact List for LORS
(Continued)

	Agency	Contact	Address	Telephone
4	CGS	Dale Stickney, Library	801 K Street, MS 14-34 Sacramento, CA 95814	(916) 327-1850
5	CGS	Lena Dida	801 K Street, MS 14-33 Sacramento, CA 95814	(916) 654-5076

5.3.5.5 Permits Required and Permitting Schedule

The permits required for this Project are listed in Table 5.3-6. A Grading Permit will be required prior to construction.

Table 5.3-6
Applicable Permits

Responsible Agency	Permit/Approval	Schedule
Federal	None required	N/A
State	None required	N/A
Local	Grading Permit	Fall 2008

5.3.6 References

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United States Geologic Survey (USGS), 2007. http://mrdata.usgs.gov/, Mineral Resources On-Line Spatial Data, various pages accessed in August 2007.

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5.4 SOIL RESOURCES

This section describes the affected environment and the environmental effects of the Carrizo Energy Solar Farm (CESF or Project) on soil resources in accordance with California Energy Commission (CEC) requirements. Impacts are assessed for the construction and operations of the proposed new solar plant structures. As appropriate, soils-related mitigation measures are also included in this section. The affected environments for the soils resource and agriculture are described in 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 Affected Environment

The CESF site is located along California State Route 58 (SR-58)/Carrisa Highway, approximately 2 miles west of Soda Lake Road. The Project area is in the Carrizo Plain, an isolated part of the unincorporated area of eastern San Luis Obispo County. The Carrizo Plain is isolated from the west by the La Panza Mountains and from the east by the Temblor Ranges. The Carrizo Plain is a bolson, or nearly level valley, that has internal surface drainage.

5.4.1.1 Soil Resources

Soil formation is a complex phenomenon. The soils within the Project area reflect the underlying geologic deposits, the extent of weathering of those deposits, the degree of slope, the climate the soils have been exposed to, and the degree of modification by human activities. Soil data for the Project were obtained primarily from United States Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS) publications and online data. The primary sources of information include the Soil Survey of San Luis Obispo County, California, Carrizo Plain Area (USDA, 2003) and Soil Survey Geographic (SSURGO) database for the Carrizo Plain area, California (Publication Date: 2004).

The site is underlain by alluvial deposits laid down in a bolson. To the northeast, the foothills of the Temblor Range are underlain by older alluvial deposits of the Paso Robles Formation. To the southwest lie Syncline Hill and the foothills of the San Juan Hills. Syncline Hill is composed of sandstone deposits of the upper Miocene Santa Margarita Formation and the adjacent San Juan Hills are comprised primarily of various subunits of the middle Miocene Monterey Shale. The soils formed in the bolson floor include the Yeguas-Pinspring complex and minor occurrences of the Thornhill and Wasioja soils. More distant to the site are areas underlain by distal fan deposits and the folded sedimentary rock of the adjacent foothills. The soil units in these areas are formed on generally moderate to steep slopes and include soils from a variety of complexes. Specific soils mapped within a 2-mile radius of the Project are described in Table 5.4-1 and shown graphically in Figure 5.4-1.

The entire CESF site has been previously disturbed by agriculture production as well as livestock grazing. Refer to Section 5.3, Geological Hazards and Resources, and the associated geotechnical report (Appendix J, Preliminary Geotechnical Investigation) for the site-specific engineering characteristics of the subsurface soils.

Table 5.4-1
Soil Types in the Carrizo Plain Part of San Luis Obispo County
(In Proximity to CESF)

Map Unit	Detailed Map Unit Name and Description
Solar Farm Area	
310	Yeguas-Pinspring complex, 0 to 2 percent. Very deep, well drained on alluvial flats and fans.
311	Yeguas-Pinspring complex, 2 to 5 percent. Very deep, well drained on alluvial flats and fans.
Construction Laydown Area	
310	Yeguas-Pinspring complex, 0 to 2 percent. Very deep, well drained on alluvial flats and fans.
321	Thornhill loam, 2 to 5 percent. Very deep, well drained, on alluvial flats and fans.
Soils within 2 Miles of Project	
440	Bellyspring-Panoza complex, 9 to 15 percent. Moderately deep, well drained, on hills and mountains.
109	Capay clay, 0 to 2 percent. Very deep, well drained on alluvial flats and fans.
110	Capay clay, 2 to 9 percent. Very deep, well drained on alluvial flats and fans.
350	Jenks clay loam, 2 to 9 percent. Moderately deep, well drained, on hills.
134	Kilmer-Nacimiento-Aido complex, 30 to 60 percent. Moderately deep, well drained, on hills and mountains.
531	Saltos-Millsholm complex, 15 to 30 percent. Very shallow, well drained, on hills and mountains
290	San Timoteo-San Andreas-Bellyspring complex, 15 to 30 percent. Moderately deep, well drained, on hills and mountains.
291	San Timoteo-San Andreas-Bellyspring complex, 30 to 50 percent. Moderately deep, well drained, on hills and mountains.
281	Seaback-Panoza-Jenks complex, 15 to 30 percent. Shallow and moderately deep, well drained, on hills and mountains.
280	Seaback-Panoza-Jenks complex, 9 to 15 percent. Shallow and moderately deep, well drained, on hills and mountains.
490	Wasioja loam, 0 to 2 percent. Very deep, well drained, on alluvial fan remnants.
491	Wasioja-Pinspring-Yeguas complex, 2 to 5 percent. Very deep, well drained, on alluvial flats and fan remnants.

Note: USDA, NRCS, Soil Survey of San Luis Obispo County, California, Carrizo Plain Area, Issued 2003.

The general soil map unit present at the vicinity of the CESF site and surrounding property is the Yeguas-Pinspring complex. At the detailed soil map unit level, the site is underlain primarily by Yeguas-Pinspring complex, 0 to 2 percent slope with a minor area of Yeguas-Pinspring complex, 2 to 5 percent slope in the northeast corner of the site. The majority of the construction laydown area is also underlain by Yeguas-Pinspring complex, 0 to 2 percent slope with a lesser zone of Thornhill loam, 0 to 2 percent slope in the southwest corner of the area. The Yeguas-Pinspring complexes are described below. Other soils in the vicinity and their soil properties are presented in Table 5.4-2.

Table 5.4-2
Properties of Detailed Soil Map Units
Carrizo Plain Part of San Luis Obispo County
(In Proximity to CESF)

Map Unit Name	Texture[1] (USCS symbol)	Permeability[2]	Water Erosion Susceptibility[3] (Kw factor)	Wind Erodibility Group[4]	Land Capability Class[5] (N/I)
Yeguas-Pinspring complex, 0 to 2 percent (310).	Loam (CL)	Moderately slow and slow	0.37	6	4s/2s
Yeguas-Pinspring complex, 2 to 5 percent (311).	Loam (CL)	Moderately slow and slow	0.37	6	4e/2e
Thornhill loam, 2 to 5 percent (321).	Loam (CL-ML, ML)	Moderately slow	0.28	6	4e/2e
Bellyspring-Panoza complex, 9 to 15 percent (440).	Sandy Loam (SM)	Moderate and moderately slow	0.32	5	4e/---
Capay clay 0 to 2 percent (109).	Clay (CH, CL)	Slow	0.20	7	4s/2s
Ca[ay clay 2 to 9 percent (110).	Clay (CH, CL)	Slow	0.20	7	4e/2e
Jenks clay loam 2 to 9 percent (330).	Clay Loam (SM)	Moderately slow	0.20	4	4e/---
Kilmer-Nacimiento-Aido complex (134).	Loam (CL-ML, ML)	Slow and moderately slow	0.32	4	6e & 7e/ ---
Saltos-Millsholm complex 15 to 30 percent (531).	Loam (CL)	Moderately slow	0.28	5	7e/---
San Timoteo-San Andreas-Bellyspring complex 15 to 30 percent (290).	Sandy Loam (SM)	Moderately rapid	0.28	3	4e/---
San Timoteo-San Andreas-Bellyspring complex 30 to 50 percent (291).	Sandy Loam (SM)	Moderately rapid and moderately slow	0.28	3	6e/---
Seaback-Panoza-Jenks complex 15 to 30 percent (281).	Loam (CL, CL-ML)	Moderate and moderately slow.	0.28	4	7e & 4e/---
Seaback-Panoza-Jenks complex 9 to 15 percent (280).	Loam (CL, CL-ML)	Moderate and moderately slow.	0.28	4	7e & 4e/---
Waioja loam 0 to 2 percent (490).	Loam (CL, CL-ML)	Moderately slow.	0.32	5	4c/1
Wasioja-Pinspring-Yeguas complex 2 to 5 percent (497).	Loam (CL, CL-ML)	Moderately slow	0.32	5	4e/2e

Notes:
[1] Texture = USDA texture of surface layer, Unified Soil Classification System symbol in parentheses.
[2] Permeability refers to saturated hydraulic conductivity (um/sec). Values listed are for the surface horizon.
[3] Soil erodibility factor: low susceptibility range = 0.05 to 0.2; moderate = 0.25 to 0.4; high > 0.4.
[4] Wind erodibility groups range from 1 to 8 with Group 1 being the most susceptible and Group 8 not subject to wind erosion.
[5] N/I = Land Capability Classification listed for non-irrigated/irrigated; indicates no classification (not calculated) for the irrigated condition.

5.4.1.1.1 Yeguas-Pinspring Soil Complex

The Yeguas series soils and the Pinspring series soils are similar fine-grained soils, which are considered together as a complex for detailed soil mapping. In general, soils in this complex are Capability Class 4 for nonirrigated conditions and Capability Class 2 for the irrigated condition. Class 4 soils have very severe limitations that restrict the choice of plants or that require very careful management, or both. Class 2 soils have moderate limitations that restrict the choice of plants or that require moderate conservation practices. Permeability of these soils is slow or moderately slow, with an available water capacity that is high. Runoff is medium, and the hazard of water erosion is moderate and the hazard of wind erodibility is low to moderate.

The surface layers (A-horizons) for these soils tend to be relatively thin, ranging from 14 to 19 inches and include a plowed surficial zone. Below the A-horizon, clay enriched subsoil layers (B-horizons) extend to depths of 50 to 60 inches. The site has been historically disturbed with dry agriculture production, and is currently fallow with livestock grazing.

The CESF site is relatively flat, unpaved, and does not have existing unnatural runoff drainage. A natural drainage is located along the southeast corner of the proposed laydown area.

5.4.1.2 Agriculture and Prime Farmland

The CESF site is disturbed land and has been used as agricultural land or for grazing. Based on the assessments presented in Section 5.9, Land Use, the proposed Project area does not contain prime or non-prime farmlands, nor is the Project area situated on Williamson Act Lands (see Figure 5.4-1 and Section 5.9, Land Use; Figure 5.9-3). CESF's impact on agricultural lands is described in Section 5.9, Land Use.

5.4.2 Environmental Consequences

Significance criteria have been selected based on California Environmental Quality Act (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; and
- 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 duration 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.

5.4.2.1 Construction and Operation-Related Impacts

The CESF will consist of approximately one hundred and ninety-five Compact Linear Fresnel Reflector (CLFR) solar concentrating lines, and associated steam drums, STGs, air cooled condensers (ACCs), and infrastructure, producing up to a nominal 177 megawatts (MW) net. The Project site will be situated on approximately 640 acres within Section 28. Most of the other components and equipment will be located within the power block area along the north-central side of Section 28. The CESF will utilize a construction laydown area of approximately 380 acres within the northern half of Section 33.

Project construction activities (including site preparation) at the CESF site are estimated to be conducted during a 35-month period, which will be followed by commissioning activities before the facility is operational. Site grading will be performed to create level pads for the equipment and reflectors with cuts and fills across most of the 640-acre Project site expected to be approximately 5 feet or less, with larger cuts and fills in isolated areas. Grading (over excavation and replacement) may also be required below shallow and mat foundations; over excavation depths are not expected to exceed several feet. Localized grading may be performed in the construction laydown area.

Excavation work will consist of the removal, storage, and/or disposal of topsoil, vegetation, organic matter, loose material, 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. 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.

Filling 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 90 percent of the maximum dry density (determined by ASTM D1557) as recommended by the geotechnical investigation and specified by the grading plan. Wall backfill, 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 Yequas-Pinspring complex in the site area are considered moderate to low for erosion by water or wind. Project-related soil erosion will be minimized through implementation of erosion control measures described in Section 5.5, Water Resources; therefore, impacts from soil erosion are expected to be less than significant.

Construction of the proposed solar plant will result in soil compaction due to the site grading and the placement 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 during Project construction, described in Section 5.5, Water Resources, 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 onsite construction zones, 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, impacts to the potential receiving waters will be less than significant. As applicable, engineered 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 majority of the plant site will be compacted, with minor areas 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 5.5, Water Resources expected to limit impacts to the soils resource to insignificant levels. Operation of the CESF will not expose soils and vegetation to increased levels of air pollutants as discussed in Section 5.2, Air Quality.

5.4.3 Cumulative Impacts

Soil erosion and sedimentation impacts associated with CESF 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 currently in use as grazing land. Agricultural impacts are described in Section 5.9, Land Use. 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 Section 5.14, Waste Management.

5.4.4 Mitigation Measures

As stated, the Project site is currently utilized primarily as grazing land. Anticipated impacts to the surrounding area from the construction of the CESF will be minimized by the use of best management practices and the implementation of erosion control plans and stormwater pollution prevention plans. No additional mitigation measures are proposed, as impacts to soils during construction and operation are anticipated to be minimal. See Section 5.5, Water Resources for additional mitigation measures.

5.4.5 LORS Compliance

The following laws, ordinances, regulations, and standards (LORS) are applicable to protection of soils resource and surface water quality from Project-induced erosion impacts. Table 5.4-3 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.

5.4.5.1 Federal

5.4.5.1.1 The Federal Water Pollution Control Act of 1972; Clean Water Act (CWA) of 1977 (Including 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.

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

5.4.5.1.2 USDA, Soil Conservation Service (SCS). National Engineering Handbook (1983), Sections 2 and 3

The USDA prescribes standards of technical excellence for the SCS, now called the NRCS, for the planning, design, and construction of soil conservation practices.

The administering agency for the above authority is the NRCS.

5.4.5.2 State

5.4.5.2.1 California Public Resources Code (PRC) § 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 CESF, 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.

The administering agency for the above authority is the CEC.

5.4.5.2.2 CEQA, California PRC § 21000 *et seq.;* Guidelines for Implementation of the CEQA 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 non-agricultural use.

The administering agency for the above authority is the CEC.

5.4.5.2.3 The California Porter-Cologne Water Quality Control Act of 1952; California Water Code (CWC), § 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 (CWC §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 RWQCB, 1996, Erosion and Sediment Control Field manual.

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

5.4.5.3 Local

5.4.5.3.1 San Luis Obispo 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.

The administering agency for the above authority is San Luis Obispo County.

Table 5.4-3
Summary of LORS

LORS	Applicability	Conformance Section
Federal		
The Federal Water Pollution Control Act of 1972; CWA 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.	5.4.2, 5.4.3
USDA, SCS. National Engineering Handbook (1983), Sections 2 and 3.	Planning, design, and construction of best management practices to minimize soil erosion.	5.4.2, 5.4.3
State		
California PRC § 25523(a): CCR § 1752, 1752.5, 2300-2309, and Chapter 2, Subchapter 5, Article 1, Appendix B, Part (i).	Protection of environmental quality.	5.4.2, 5.4.3
CEQA, California PRC § 21000 *et seq.*; Guidelines for Implementation of the CEQA of 1970, 14 CCR § 15000-1 5387, 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	5.4.2, 5.4.3

Table 5.4-3
Summary of LORS
(Continued)

LORS	Applicability	Conformance Section
	farmland of statewide importance, to non-agricultural use.	
The California Porter-Cologne Water Quality Control Act of 1952; CWC, § 13260 – 13269; 23 CCR Chapter 9.	Requires adequate protection of water quality by appropriate design, sizing, and construction of erosion and sediment controls.	5.4.2, 5.4.3
Local		
San Luis Obispo County Ordinance Code, Title 15: Chapter 15.28.	Establishes grading and excavation requirements during the construction phase of the Project.	5.4.2, 5.4.3

5.4.5.4 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 5.4-4. The contacts provided below have not been consulted in preparation of this section but are identified as the lead contacts for the various disciplines.

Table 5.4-4
Agency Contacts

Agency	Contact	Address	Telephone
CEC Facilities Siting Division	Eileen Allen, Energy Facility Licensing Program	1516 Ninth Street, MS-15 Sacramento, CA 95814	(916) 654-4082
San Luis Obispo County Department of Planning & Building	Elizabeth Szwabowski	County Government Center San Luis Obispo, CA 93408	(805) 781-5725

5.4.5.5 Permits Required and Permitting Schedule

Table 5.4-5 lists all applicable permits for the CESF in the area of soil resources.

Table 5.4-5
Applicable Permits

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

5.4.6 References

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

United States Department of Agriculture, Natural Resources Conservation Service, 2003. Soil Survey of San Luis Obispo County, California, Carrizo Plain Area.

5.5 WATER RESOURCES

The existing conditions in the Project area and the water demands for the Carrizo Energy Solar Farm (CESF or Project) 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. Details of this evaluation are presented below and in Appendix K, Water Resources.

5.5.1 Affected Environment

This section describes the existing environment relative to water resources in the vicinity of CESF.

5.5.1.1 Groundwater Quality and Supply

The CESF site overlays the Carrizo Plain Groundwater Basin; bounded on the east by the Temblor Range and on the west by the Caliente Range and San Juan Hills. The basin surface area is approximately 270 square miles (California Department of Water Resources (DWR), Bulletin 118, 2004 update).

Groundwater is found in alluvium and the Paso Robles and Morales Formations. The upper Pleistocene to Holocene alluvium consists of unconsolidated to loosely consolidated sands, gravels, and silts with a few beds of compacted clays. The Pleistocene Paso Robles Formation consists of poorly sorted, mostly loosely consolidated gravels, sands, and silts. The upper Pliocene Morales Formation consists of sands, gravels, and silts, which generally are more stratified and compacted than those in the overlying Paso Robles Formation. The Carrizo Plain stratigraphic units are provided in Appendix K, Water Resources.

The total groundwater storage capacity of the basin is estimated to be 400,000 acre-feet (AF) and the usable capacity is one-quarter of the storage capacity. The basin's safe yield is estimated to be 600 AF per year (AFY) which is equal to the natural recharge of the basin. Total dissolved solids concentrations in groundwater samples from wells within the basin ranged from 161 to 94,750 milligrams per liter (mg/l). Highly mineralized groundwater is found near Soda Lake (southeast of the proposed Project). Well yields within the basin can reach 1,100 gallons per minute (gpm) but well completion reports indicate that 10 to 500 gpm is typical. Water wells average 200 feet in depth but may be up to 600 feet deep. Recharge of the groundwater basin is largely by percolation of stream flow and infiltration of rainfall to the valley floor.

There is an existing well near the center of Section 28 (see Figure 5.5-1). The well is approximately 180 m (591 feet) deep and is lined with a 35.6 millimeter (mm) (14 inch) diameter steel casing and screen. At the time the well was drilled in 1965, depth to groundwater was 30 feet below ground surface (bgs) and the well yield was 500 gpm with a 370-foot drawdown after 8 hours (see Appendix K, Water Resources, for well driller's report). The water quality analysis from the groundwater well is summarized in Table 5.5-1. There are no other known active groundwater supply wells within one-half mile of the Project site.

Table 5.5-1
CESF Groundwater Supply Water Quality Analysis

Component	Unit	Average
Bicarbonate	mg/L	150
Boron	mg/L	0.77
Calcium	Mg/L	90
Carbonate	mg/L	ND
Chloride	mg/L	69
Hardness (total)	mg/L	290
Hydroxide Alkalinity	mg/L	ND
Magnesium	mg/L	17
Nitrate as N	mg/L	15
Nitrite as NO_2	mg/L	65
pH, Field	pH	8.0
pH, Lab	pH	7.4
Potassium	mg/L	ND
Sodium	mg/L	150
Specific conductance	µmhos/cm	1100
Sulfate	mg/L	330
Total Dissolved Solids	mg/L	790
Total Cations	mg/L	12
Total Anions	mg/L	12

Notes:
BC Laboratories Water Analysis of sample collected 12 December 2005.
mg/L = milligrams per liter.

There is no active groundwater level data monitoring occurring near the site. However, based upon historic groundwater well data obtained from the Regional Water Quality Control Board (RWQCB), DWR, and other local well data groundwater levels in the area have fluctuated over the years between a minimum of 4.3 m (14 feet) bgs to approximately 16 m (54 feet) bgs.

5.5.1.2 Surface Water Quality

The CESF is located within the Central Coast Hydrologic Region that covers approximately 11,300 square miles in central California (see Figure 5.5-2). There are no known named drainages within the CESF with beneficial uses listed within the Central Coast RWQCB Basin Plan for the Carrizo Plain Hydrologic Unit. CESF surface water is intermittent and drains to local surface depressions and channels tributary to a larger intermittent stream running through the southern portion of the construction laydown area. CESF surface water that does not percolate into the ground would ultimately be tributary to Soda

Lake, over 10 miles downstream. Based upon the proposed 2006 Clean Water Act (CWA), Section 303(d) list of water quality limited segments, Soda Lake is impaired by ammonia (unionized). See Figure 5.5-1 for the watersheds in the vicinity of the Project.

5.5.1.3 Climate and Precipitation

DWR Bulletin 118 indicates that the average annual precipitation ranges from 7 to 9 inches in the Carrizo Plain basin. There are no official County rain gauges in the vicinity of the CESF; however, the County provides access to active and historic rainfall data from other voluntary sources. Evaluation of this data indicates that the average annual precipitation in the vicinity of the CESF is closer to 10 inches. Most of the rainfall occurs from November through May with minimal rainfall during the summer months. The historic rainfall distribution for the closest (inactive) rainfall gauge to the CESF is provided in Table 5.5-2.

Table 5.5-2
Historic Seasonal Rainfall Amounts

Month	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Yearly Total
Average (inch)	0.03	0.03	0.14	0.33	0.85	1.51	2.01	1.93	1.68	0.95	0.21	0.03	9.68
Maximum (inch)	0.52	0.63	2.07	1.76	3.06	4.90	8.62	7.21	5.10	4.60	1.44	0.34	22.30
Minimum (inch)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.88

Reference: San Luis Obispo County Public Works, Volunteer Precipitation Gauge Station, Monthly Precipitation Report.

Notes:
Station Name: Cavanaugh Ranch #78 (Inactive).
Station Location - Lat 35º21'30", Long 120º02'30", Water Years 1938/39 to 1981/82.

5.5.1.4 Water Supply and Use

According to the Shandon-Carrizo Area Plan (San Luis Obispo, 2003), the current pattern of water supply in the planning area is localized groundwater use. Water needs are met by pumping groundwater in the immediate vicinity of the point of use; there is no extensive transmission of water from point of source to point of use. For example, water service in the California Valley area is provided by a system constructed by the developers of California Valley and now operated by California Valley Community Services District (CVCSD). DWR Groundwater Bulletins indicate an average annual safe yield of 600 AFY. The San Luis Obispo County Master Water Plan Update of 2001 indicates an existing water demand in Water Planning Area 8 (which includes the CESF site) is 930 AFY (200 AFY for agricultural uses and 730 AFY for rural uses). The projected water demand by 2020 is expected to be 1,260 to 1,300 AFY (170 to 210 AFY for agricultural uses and 1,090 AFY for rural uses). These results are also provided in the San Luis Obispo County Integrated Regional Water Management Plan of 2007. Based upon comparison of available public agency publications, the Carrizo Plains area is currently in an overdraft situation.

It should be noted that there is little confirmed or conclusive evidence of overdraft to the basin based upon DWR and RWQCB groundwater well monitoring data, and there is lack of information available regarding groundwater level trends per the DWR Bulletin 118 data. DWR monitoring well data is available only from years 1963 to 1978 and indicates a decrease in depth to groundwater (increase in groundwater table level) during this period (see Appendix K, Water Resources, for data). Based upon the RWQCB self-reporting monitoring well data in the Carrizo Plain area approximately 12 miles southeast of the CESF site, there have been increases and decreases in groundwater elevation since 2001 (Dockter Environmental Consulting, 2007) likely in direct response to rainfall patterns. Because of the poor quality (some groundwater obtained in the area is unsuitable for either agricultural or domestic uses) and limited water quantity, the most probable supply for large scale potable water demands associated with potential future development is importation of supplemental water, which is in conflict with the San Luis Obispo County Integrated Regional Water Management Plan goal of avoiding dependence on imported water.

5.5.1.5 Wastewater Streams

There are no known sources of wastewater streams on the Project site or adjacent to the site that would drain through the site.

5.5.1.6 Stormwater Runoff

The Project site is generally flat, sloping gently to the southwest with elevations ranging from approximately 2,064 feet to 2,014 feet above mean sea level (MSL). See Figure 5.5-1 for site topography. The portion of stormwater runoff that is not absorbed into the ground is sheet flow and follows the terrain to the south and west, is tributary to the main Carrizo Plain ephemeral drainage channel that crosses through the southern portion of the construction laydown area, and then is tributary to Soda Lake over ten miles downstream. Portions of the main Carrizo Plain drainage within the temporary construction staging area is classified as a Waters of the United States (WUS)

5.5.1.7 Flooding Hazards

Federal Emergency Management Agency (FEMA)'s Flood Insurance Rate Map (FIRM) Community Panel Numbers 0603040550B and 06030400575B (1982) show that the CESF and construction laydown area are within FEMA designated 100-year 'Zone A' floodplain areas within Sections 28 and 33 (see Figure 5.5-1). As discussed in Section 3.0, Facility Description and Location, the CESF site is generally not subject to flooding; however an area along Tracy Lane beginning approximately 174 m (570 feet) onto Section 28 is within the 100-year flood zone. Additionally, the main Carrizo Plain drainage feature running through the southern portion of Section 33 within the construction laydown area is within a FEMA designated 'Zone A' floodplain boundary. Base Flood Elevations (BFE) and hazard factors have not been determined for these areas. The BFE will be established during final design. Structures will be elevated or "flood-proofed" to 0.3 m (1-foot) above BFE, as required by San Luis Obispo County Title 22, Land Use Ordinance.

5.5.2 Environmental Consequences

This section provides details on the proposed water use, availability, supply, water quality, and surface water. In summary, untreated raw water for the CESF will be obtained from groundwater via an existing onsite well. The design of the CESF minimizes use and maximizes the recovery of process water. Blowdown and an oil/water separator (OWS) clear discharge will be routed to an onsite raw water storage tank for reuse. Stormwater will be collected onsite and directed to swales and detention areas for percolation into the ground. The following sections describe in more detail the potential water resources related environmental consequences associated with the CESF.

5.5.2.1 Water Supply and Use

The Carrizo Plain Groundwater Basin will supply raw water to the CESF via an existing onsite groundwater well, which is expected to provide 100 percent of the CESF needs.

Water will be required for the following:

- Make up to the steam turbine system.
- Washing of solar system reflectors and collectors.
- Potable Water: Potable water will be supplied from a potable water skid for use by plant personnel.
- Service Water: Untreated water will be required for general site uses.
- Fire Protection.

Table 5.5-3 provides the CESF water usage rates. The amount of process water used by the CESF is expected to be reasonably uniform. The expected average daily water consumption for the plant is approximately 70 m^3 (18,500 gallons), or 21.8 AFY, based on the assumption of two units operating at full load for 13 hours per day. The expected peak water consumption for the facility is approximately 195 liters per minute (51 gallons per minute) based on full plant output for 4,765 hours per year. Total peak daily use is about 282 m^3 or 0.7 million gallons per day (MGD), based on a 13 hour operating day. Average annual raw water consumption is estimated to be 17.2 acre-feet per year (AFY). Plant water used for the CESF is shown in Section 3.0, Facility Description and Location (see Figure 3.4-17).

Raw water for CESF use will be obtained from the existing onsite well discussed above. Based upon Table 5.5-3, the average annual (39 gpm), average daily (41 gpm), and maximum daily (101 gpm) CESF water uses are below the original existing well yield of 500 gpm. Additionally, these proposed water demands are in the range of the typical well yields in the area which range from 10 to 500 gpm. Furthermore, the water usage rates and well yield are less than that of designed and operated water well usage at a nearby water well at the now dismantled ARCO Carrisa Plain Solar Project (ARCO Site).

Section 27, located adjacent and east of CESF, contained the now dismantled 177-acre ARCO Site from approximately the mid-1980s to the late 1990s. Research and testing was conducted prior to construction to determine whether the underlying Carrizo Plain Groundwater Basin could support the proposed water requirements for that project. A design long term mean of 115 gpm was proposed (maximum seasonal water requirement of 190 gpm for 4 months from June to September and 24-hour peak demands of 250 gpm). Testing on Section 27 was conducted in 1984 by Bechtel Civil & Minerals, Inc. (Bechtel). A

review of the data and analyses of the pumping test conducted at test well 3A (W-3A) indicated that the well was capable of yielding the design water requirements (115 gpm) and could meet both seasonal and peak demands. W-3A is presumably located 36 feet north of pilot hole W-3 (pilot hole W-3 was located 120 feet north and 120 feet east of the southwest corner of Section 27). Testing commenced on May 2, 1984. The static level of water in the well before pumping was 40 feet below ground surface and the pumping rate was set to 305 gpm initially. There was a drawdown of 333 feet resulting in a water level of 373 feet below ground surface. The pumping rate was reduced to 265 gpm after 90 minutes because of mechanical problems. Pumping rates over the following 3 days varied between 254 to 268 gpm, with an average pumping rate of 265 gpm. The well recovered to 340 feet below surface level and then again began dropping slowly. At the end of 3 days, the water level was 368 feet below ground surface. Based on the well's performance and adjusting the well's performance to a rate of the desired 115 gpm over 20 years (projected operational period of the ARCO Site), Bechtel indicated that "the aquifer is capable of providing the water requirement and the extraction would not interfere with existing users." Similarly, Bechtel noted that preliminary literature reviews followed by discussions with local farmers indicated that the groundwater resources at the proposed site should be sufficient to meet the water requirements. Bechtel concluded that the maximum long-term mean capacity of the well is calculated to be 170 gpm. See Appendix K, Water Resources, for backup information on ARCO Site water demand and supply.

Table 5.5-3
Carrizo Energy Solar Farm Water Usage Rates[1]

Water Use	Average Annual (lpm/gpm)[2]	Average Daily (lpm/gpm)[3]	Maximum Daily (lpm/gpm)[4]
EQUIPMENT MAKEUP WATER REQUIREMENTS			
Steam Cycle Makeup to DI Tank	103 / 27	103 / 27	190 / 50
Reflector Wash Water	19 / 5	28 / 7	51 / 13
ACC Wash Water	0.9 / 0.25	0.9 / 0.25	121 / 32
Media Filter Back Wash[5]	0.006 / 0.01	0.05 / 0.01	0.03 / 0.009
Misc. Drains, etc. to OWS	5.4 / 1.4	2 / 0.6	4 / 1
Potable Water	20 / 5.3	20 / 5.3	20 / 5.3
Total Equipment Makeup Requirements	149 / 39	154 / 41	387 / 101
Recovered Water[6]			
Steam Drum Flash Steam	12 / 3	12 / 3	23 / 6
Blowdown Flash Tank Condensate	91 / 24	91 / 24	168 / 44
Recovered from OWS (clear water)	5.4 / 1.4	2 / 0.6	4 / 1
NET RAW WATER REQUIREMENT	40 / 10.6	49 / 13	193 / 51

Notes:
[1]Based on two units at rated steam flow.
[2]"Average Annual" is based on 35 °C at 100 percent Load for 4,745 hours per year, reflector washing 250 days per year and ACC washing of all 50 cells, averaged over 8,760 hours.
[3]"Average Daily" is based on 13 hours per day operation, averaged over 24 hours.
[4]"Maximum Daily" is based on 13 hours per day, averaged over 13 hours, with ACC washing (10 cells over 10 hours).
[5]Based on one 20-second back flush every eight days at 64.35 liters per flush.
[6]Potable water includes water used for drinking, sanitation, and laboratory.

Average annual raw water consumption is estimated to be 17.2 AFY for the CESF; therefore, based upon evaluation of past water demand in the CESF vicinity, the Project's water demand is not anticipated to cause any adverse water supply issues for the groundwater basin, particularly in light that there is minimal existing groundwater use in the vicinity of the CESF, and that the Project will require less water than previous uses in the area (ARCO Site). In summary, it is anticipated that the existing onsite well will have sufficient capacity to meet the Project's water supply needs without adversely impacting existing groundwater quality or supply in the area. There are no known existing operational wells within one-half mile of the CESF that would be impacted by drawdown caused by the existing well. Additionally, because the existing well proposed for use with CESF is located near the center of the one square mile Project, drawdown of offsite groundwater levels will be minimized.

Onsite storage capability is sufficient for two days of full load operation to accommodate maintenance on any of the water delivery and treatment equipment. However, in the event the aquifer is temporarily unable to meet CESF supply requirements, water will be transported to the site from offsite supply sources from surrounding areas, such as San Luis Obispo, Paso Robles, or Bakersfield. During such an event, two tanker trucks per day would be sufficient to sustain operations assuming average daily usage of 18,500 gallons.

The entire Carrizo Plain area is served by septic tanks and other individual disposal systems. There are no wastewater treatment plants in the area and without wastewater treatment plants in the area, there is no source of tertiary treated water for use as raw water for CESF.

During the construction phase an estimated 5-acre-feet of water will be used for concrete. Due to the remote location of the site, it is anticipated concrete will be transported dry to the site in mixer trucks, where water will be added from the raw water well.

5.5.2.1.1 Water Distribution and Treatment

The existing well will be fitted with 56 kW (75hp) submersible electric pump capable of providing up to 113.6 m^3/hr (500 gpm) of water from the local aquifer (i.e., Carrizo Plain Groundwater Basin). Raw water will be forwarded to the raw water tank via a buried 6-inch line.

Two 100 percent forwarding pumps located in the power block will pump the water from storage in a 1,700 cubic meter (450,000 gallon) combination raw water/firewater storage tank to the water treatment system. All water for the Project will be treated as required onsite.

The Compact Linear Fresnel Reflector (CLFR) wash water, solar thermal system makeup, and potable water require onsite treatment. A combination water treatment system with softeners, demineralization and sanitizing equipment will be provided by a contract service. The water plant produces approximately 103 lpm (27 gpm) of treated water. Water quality is controlled by continuous analysis of the conductivity and periodic analysis of silica content.

Incoming water from the raw water storage tank is softened by a self contained water softener where most of the calcium carbonate ($CaCO_3$) and sodium carbonate ($NaCO_3$) will be removed prior to storage in a 568 cubic meter (150,000 gallon) service water tank. Softened water is used for dust and contaminant removal from the reflectors. The wash water is trucked to the line of reflectors to be used by a wash

crew. The reflector washing operation is similar to commercial window washing using wet applicators and squeegees.

Makeup water for the steam drums must meet stringent specifications for suspended and dissolved solids. Softened water is further treated by ion exchange in a cartridge type (bottle) mixed bed ion exchange system. The ion exchange system will be provided by a contract service; once spent, the ion exchange resin cartridges are exchanged with fresh resin cartridges and the spent cartridges taken offsite for regeneration by others. Typically, two or three exchanges per week are anticipated. Demineralized water is stored in a 151 cubic meter (40,000 gallon) de-ionized water tank.

Additional conditioning of the condensate and feedwater circulating in the steam field is provided by means of a single DEHA type compound (Corrotrol) corrosion inhibitor /oxygen scavenger. The system will consist of a 1 cubic meter (280 gallon) chemical tote and a small positive displacement-metering pump. This system will require two additional totes to be stored onsite during normal operation. Initial charge of the system will require (6.8 m^3) to be brought to the site during the startup and commissioning phase. The Corrotrol will be injected at the deaerator or the boiler feedpump suction and will be controlled by an automated online pH monitor.

Potable water for plant personnel use is supplied from the DI water tank to a potable water skid, which includes sanitizing equipment and pumps for distribution and pressurization.

5.5.2.2 Surface Water and Groundwater Quality

Rain falling in the power block area will be collected and directed to the surrounding solar field using a system of swales integrated with the site-grading plan. Rainfall from vehicle parking and paved areas in the power block will be collected and directed to an OWS prior to discharge to the raw water tank for recovery. The OWS is rated at 1.4 gpm. Rainwater collected from active areas (i.e., potentially contaminated by oil) is routed to an OWS. Water from the OWS is sent to the wastewater tank and then, following inspection, to the water treatment system for recovery.

Sources of process wastewater include:

- Steam turbine blow down
- Solar thermal system washdown
- Air cooled condenser washdown
- Oil/water separator clear well discharge

Process wastewater is recovered from solar thermal blow down and the oil/water separator clearwell and recycled back to the water treatment system. The wastewater streams are summarized in Table 5.5-4.

Wastewater will not be discharged to a municipal wastewater district or municipal separate storm drain system. A sanitary system will be constructed and consist of a buried 1000 gallon septic tank and leach field for all sanitary wastes including toilets, sinks and showers. The system will be designed in accordance with applicable San Luis Obispo County regulations and standards for septic systems to avoid any potential groundwater impacts.

Stormwater discharges from construction activities are subject to BMPs designed and implemented for construction activities. From a temporary construction perspective, groundwater is not expected to be encountered during construction; however, if necessary, appropriate construction phase BMPs will be used to minimize impacts to surface water and groundwater quality.

With the implementation of the CESF stormwater drainage design features identified in Section 3.0, Facility Description and Location, and summarized below in Section 5.5.2.3, the CESF will not create significant risk to water quality impacts to surface waters.

Table 5.5-4
Summary of Wastewater Streams and Estimated Quality

Stream Description	TDS, mg/L[1]	pH	Disposition
Solar Thermal System Blow Down	75	9.2	Water Treatment System
Oil/Water Separator Water Discharge (plant drains)	800	8.0	Wastewater Holding Tank/Water Treatment System
Solar Thermal Washdown	800	8.0	Evaporated
Air Cooled Condenser Washdown	800	8.0	Evaporated
Multi-Media Filter Backwash	790 (35,000 TSS)	8.0	Local Dust Control
Sanitary Wastewater	800	8.0	Leach Field

Notes:
[1]Assumes raw water makeup TDS = 790ppm; assumes one 20-second backwash every 8 days at 64.35 liters per backwash.
TDS = total dissolved solids.
TSS = total suspended solids.

5.5.2.3 Flooding Hazards

The CESF receives stormwater runoff from offsite. Rainfall from the one square mile solar field will continue to be drained by sheet flow. A series of interrupter swales will be used to both reduce the velocity of the runoff as well as allow the rainfall to be absorbed into the ground replenishing local groundwater levels. A stormwater drainage system designed to match existing drainage patterns and meet all local regulations, will collect and direct all rainwater from the 640-acre Project site, managed through the use of swales, ditches, culverts, and site grading, to locations away from the facility. In the power block area, a series of stormwater catch basins and graded swales are interconnected to a catch basin lift station. The water is then pumped from the sump basin to an existing stormwater basin. Final elevation and location of this sump basin will be determined during detailed engineering.

Stormwater run off for the CESF is directed from the paved (i.e. roads and parking lots) and non-paved areas to local collection ponds/swales and allowed to percolate and evaporate. Area grading and the use of swales guides the rain water into the stormwater collection swales.

The 50-year, 24-hour storm event produces a rainfall of 0.43 cm (0.17-in) per hour for a total rainfall of 10.16 cm (4-inches). Calculations for this storm event frequency would produce 213 AF of rainwater across the entire one square mile solar field. Given its desert nature and the very limited rainfall that

occurs on the Carrizo Plain, the majority of the water from this low intensity rainfall will be absorbed into the ground. A small series of detention basis, integrated with local swales, will be strategically located around the solar field to collect any excess rainwater that is not absorbed into the ground. Release of water from the detention basins will be to the established water courses in the area.

With the implementation of the CESF stormwater drainage design features identified in Section 3.0, Facility Description and Location, the CESF will not significantly increase the risk of flooding, erosion, or siltation. Although there will be minimal changes in absorption rates, drainage patterns, or the rate or amount of surface runoff due to the surface paving and the presence of new structures, surface water runoff will be conveyed, contained, and allowed to evaporate, percolate, or drain similar to existing conditions. The site is relatively flat so there is not a significant risk for accelerated erosion after implementation of construction and post-construction phase erosion and sediment control BMPs.

5.5.2.4 Jurisdictional Waters

Formal jurisdictional waters delineation for the Project was conducted by URS biologists to document the extent of jurisdictional waters on the CESF. An ordinary high water mark (OHWM) was observed along the entire length of the drainage channel located in the center of Section 33. This channel was identified as an Other Waters of the U.S./State (OWUS), under the jurisdiction of the Army Corps of Engineers (ACOE) and California Department of Fish and Game (CDFG). As shown in Section 3.0, Facility Description and Location, Figure 3.1-1, the access road on Section 33 will require two permanent road crossings over this OWUS, which will require a CWA Nationwide 404 permit from the ACOE, a 1602 Streambed Alteration Agreement from CDFG, and CWA 401 water quality certification from the RWQCB. For further discussion of jurisdictional waters, see Section 5.6, Biological Resources.

5.5.3 Cumulative Impacts

The CESF and other projects in the vicinity are not expected to result in significant cumulative impacts to environmental resource areas, including, but not limited to, air quality, land use, cultural resources, water resources, or traffic during the construction or operation phases. All existing and proposed projects can be characterized primarily as residential development (i.e., new single-family dwellings and mobile homes). Of the 41 projects with permit applications submitted since January 2000, only 6 projects proposed new residential construction (i.e., single-family dwellings). The remaining 35 projects include minor construction projects such as manufactured and mobile home permits, mobile home foundations, carport additions, roof replacements, deck additions, and residential renovations. Further, some of the listed projects have permits that have expired since their issuance and thus, can be dismissed from this cumulative impact analysis.

The closest permitted project is located approximately 0.5-mile to the west of the CESF site and includes the addition of a mobile home. In addition, all permitted projects within 2.0-miles of the CESF site include manufactured and mobile home permits and/or mobile home foundations. All other proposed projects are located over 2.0-miles from the Project site.

The CESF and the mobile home and single family dwelling projects are not expected to result in significant water resources related impacts such as flooding, surface water or groundwater quality degradation, or widespread groundwater level drawdown that would impact existing groundwater uses.

The projects are widely dispersed and have relatively low water use requirements, in comparison to a clustered residential development or typical agricultural uses. Therefore, it is not expected that the projects will cause a significant cumulative impact to groundwater supply or use. Thus, as mentioned above, no significant cumulative impacts have been identified as a result of the construction, operation, maintenance, or long-term presence of the CESF and other projects in the area. For further discussion of cumulative impacts, see Section 5.18, Cumulative Impacts.

5.5.4 Mitigation Measures

In relation to water resources, mitigation measures for the CESF would be applied in situations where the Project has or would have an unmitigated significant impact. 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 CESF 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 CESF will not have any significant effect on surface water or groundwater quality in the area. Thus, no mitigation, beyond compliance with applicable LORS (discussed below in Section 5.5.5), is required for water resources.

5.5.5 LORS Compliance

The construction and operation of the CESF will be in accordance with all federal, state, county, and local LORS applicable to water resources. Applicable LORS are discussed in this section and are summarized in Table 5.5-5.

5.5.5.1 Federal

5.5.5.1.1 Clean Water Act (CWA) of 1977 (including 1987 amendments) § 402; 33 U. S. Code (USC) § 1342; 40 Code of Federal Regulations (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 U.S.. This law and its regulations apply to stormwater and other discharges into waters of the U.S.. The CWA requires compliance with a general construction activities permit for the discharge of stormwater from construction sites disturbing one acre or more. This federal permit requirement is administered by the State Water Resources Control Board (SWRCB).

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

5.5.5.1.2 CWA Sections 401 and 404

Section 401 of the CWA requires that any activity that may result in a discharge into a water body must be certified by the SWRCB. Section 404 of the CWA authorizes the U.S. Army Corps of Engineers to

regulate the discharge of dredged or fill material to the waters of the U.S. and adjacent wetlands. The U.S. Army Corps of Engineers issues site-specific or general (nationwide) permits for such discharges. Required permit processes for the Project will be conducted to comply with the CWA.

5.5.5.1.3 CWA § 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 CESF will conform by proper management of oils and hazardous materials during both construction and operation. The administering agency is the Central Coast RWQCB and the California Department of Toxic Substances Control (DTSC). The Project will conform by proper management of oils and hazardous substances during both construction and operation. If an accidental release or unintended spill occurs it will promptly be reported. An industrial phase SWPPP will be prepared and implemented if required by the Central Coast RWQCB.

5.5.5.1.4 CFR, Title 40, Parts 124, 144 to 147

This portion of the federal code requires protection of underground water resources. Operations phase water treatment reject water will not be discharged to underground water resources. Mirror washing water; however, will be allowed to infiltrate into the ground. Appropriate measures will be taken to ensure that this water does not cause groundwater contamination or interfere with existing groundwater beneficial uses. Specific requirements for complying with applicable regulations will be supplied in the industrial phase SWPPP or RWQCB issued WDR.

5.5.5.2 State

5.5.5.2.1 Water Code Section 13552.6

This portion of the California Water Code (CWC) relates to the use of potable domestic water for cooling towers, air conditioning devices, and floor trap priming. Recycled water is not available in the vicinity of the Project site.

5.5.5.2.2 SWRCB, 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. The CESF proposes to use air cooled condensers for heat rejection from the steam cycle and not cooling towers.

5.5.5.2.3 California Porter-Cologne Water Quality Control Act 1998; CWC § 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

(RCRA) of 1976, 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 CESF will comply with the regulations set forth in this Act.

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

5.5.5.2.4 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 CESF satisfies this requirement in that it complies with the Central Coast Region Basin Plan's designated beneficial uses for local groundwater. The administering agency is the Central Coast RWQCB. The Project has investigated the technical and economic feasibility of using reclaimed water and determined that this resource is not available. There is no viable opportunity for use of reclaimed water for CESF construction or operation phases.

5.5.5.2.5 CWC, Section 5002

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 projected water extraction from the existing onsite well is expected to be less than 25 AFY so this requirement will not apply. The administering agency is the Central Coast RWQCB.

5.5.5.2.6 CWC, Section 13751

This is a requirement for a Report of Well Completion to be filed with the Central Coast RWQCB within 60 days of well completion. If at any time it is determined the CESF requires a new well, besides the existing well located near the center of Section 28, reports will be filed.

5.5.5.2.7 California Public Resources Code § 25523(a); 20 CCR §§ 1752, 1752.5, 2300 – 2309 and Chapter 2 Subchapter 5 Article 1, Appendix B, Part (1)

This 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.

5.5.5.2.8 CWC §§ 13271 – 13272; 23 CCR §§ 2250 – 2260

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 groundwater, a hazardous substance and its reportable quantities are those specified at 40 CFR § 116.5, pursuant to § 31 1(b)(2) of the CWA, 33 USC § 1321(b)(2). For

releases into or threatening groundwater, 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 CESF would comply with the reporting requirements.

The administering agencies for the above authority are the Central Coast RWQCB and the California Office of Emergency Services (OES).

5.5.5.2.9 CWC § 13260 – 13269; 23 CCR Chapter 9

The code requires the filing of a Report of Waste Discharge (ROWD) and provides for the issuance of WDR with respect to the discharge of any waste that can affect the quality of the waters of the state. The WDR will serve to enforce the relevant water quality protection objectives of the Central Coast Region Basin Plan and federal technology-based effluent standards applicable to the CESF. With respect to potential water pollution from construction activities, the WDR may incorporate requirements based on the CWA § 402(p) and implementing regulations at 40 CFR Parts 122 *et seq*., as administered by the Central Coast RWQCB. The administering agency for the above authority is the Central Coast RWQCB. The Project will apply for coverage under Order No. R3-2006-0063, WDR General Permit or issuance of site specific WDR prior to operation.

5.5.5.2.10 California Environmental Quality Act (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 that can be considered to cause significant unmitigated impacts to water resources. The CESF is not expected to cause significant impacts to water resources, as described in Section 5.5.2; however, the Project will comply with the requirements of the CEC to assure protection of water resources. The administering agency for the above authority is the CEC.

5.5.5.2.11 Title 27, CCR Division 2. §20375. SWRCB - Special Requirements for Surface Impoundments (C15: §2548)

This regulation governs the design requirements for surface impoundments. It is not currently anticipated that any proposed detention, infiltration, or evaporation ponds will be used for process wastewater disposal. Detention and infiltration basins will be provided for stormwater runoff and will be designed per SWRCB and local agency requirements.

5.5.5.2.12 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. The Project will conform to all state water quality standards, both qualitative and quantitative. Project will not discharge into any drinking water source.

5.5.5.2.13 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, the Project will reuse process wastewater as much as possible.

5.5.5.3 Local

5.5.5.3.1 San Luis Obispo County Code Title 19, Building and Construction Ordinance

The intent of this ordinance is to regulate the design and construction of buildings and structures through basic standards for site preparation, construction activities, quality of materials, occupancy classifications, the location and maintenance of buildings and structures, and certain equipment associated with buildings and structures. In relation to water resources, the requirements of Section 19.20.040 Grading; 19.20.090 Grading, Sediment and Erosion Control; and Section 19.20.220 Sewage Disposal Systems will be followed as applicable during design.

5.5.5.3.2 Title 22 of the San Luis Obispo County Code, Land Use Ordinance

These regulations were adopted to protect and promote the public health, safety and welfare, and more particularly: a) to implement the General Plan and to guide and manage the future growth of the County in compliance with the General Plan; b) to regulate land use in a manner that will encourage and support the orderly development and beneficial use of lands within the county; c) to minimize adverse effects on the public resulting from the inappropriate creation, location, use or design of building sites, buildings, land uses, parking areas, or other forms of land development by providing appropriate standards for development; d) to protect and enhance the significant natural, historic, archaeological and scenic resources within the county as identified by the County General Plan; and e) to assist the public in identifying and understanding regulations affecting the development and use of land. Specific sections of Title 22 refer to drainage, flood control, and water quality regulations. In relation to water resources, the requirements of Section 22.32.020, 22.52, and 22.62 of this title will be evaluated and incorporated into the CESF, as applicable, during detailed CESF design.

Table 5.5-5
Summary of LORS

Jurisdiction	LORS	Requirements	Conformance Section	Administering Agency
Federal				
	CWA § 402; 33 USC § 1342; 40 CFR Parts 110, 112, 116	Requires NPDES permits for construction and industrial stormwater discharges. Requires preparation of a SWPPP and monitoring program.	5.5.5.1.1	SWRCB and RWQCB
	CWA § 311; 33 USC § 1342; 40 CFR Parts 122-136	Requires reporting of any prohibited discharge of oil or hazardous substance.	5.5.5.1.3	RWQCB and DTSC
	CWA Section 401	Section 401 of the CWA requires that any activity that may result in a discharge into a water body must be certified by the SWRCB/RWQCB.	5.5.5.1.1, 5.6	RWQCB
	CWA Section 404	Section 404 of the CWA authorizes the U.S. Army Corps of Engineers to regulate the discharge of dredged or fill material to the waters of the U.S. and adjacent wetlands. The U.S. Army Corps of Engineers issues site-specific or general (nationwide) permits for such discharges.	5.5.5.1.1, 5.6	U.S. Army Corps of Engineers
	CFR, Title 40, Parts 124, 144 to 147	Requires protection of underground water resources.	5.5.1.4	Environmental Protection Agency (EPA)
State				
	CWC Section 13552.6	Use of potable domestic water for cooling towers and air conditioning is unreasonable use if suitable recycled water is available.	5.5.2.1	SWRCB/RWQCB
	California Constitution Article 10 § 2	Avoid the waste or unreasonable uses of water. Regulates methods of use and diversion of water.	5.5.2.4	SWRCB
	SWRCB, 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.	5.5.2.2	SWRCB

Table 5.5-5
Summary of LORS
(Continued)

Jurisdiction	LORS	Requirements	Conformance Section	Administering Agency
	Porter-Cologne Water Quality Act of 1972; CWC § 13000-14957, Division 7, Water Quality	Requires SWRCB and RWQCB to adopt water quality initiatives to protect state waters. Those criteria include identification of beneficial uses, narrative, and numerical water quality standards.	5.5.2.3	SWRCB and Central Coast RWQCB
	Title 22, CCR	Addresses the use of recycled water for cooling equipment.	5.5.5.2.4	California Department of Health Services
	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.	5.5.5.2.12	California Environmental Protection Agency, Department of Toxic Substances Control
	CWC Section 461	Encourages the conservation of water resources and the maximum reuse of wastewater, particularly in areas where water is in short supply.	5.5.5.2.13	SWRCB/RWQCB
	CWC Section 5002	Requires a "Notice of Extraction and Diversion of Water" to be filed with the SWRCB on or before March 1st of the succeeding year.	5.5.5.2.5	SWRCB/RWQCB
	CWC Section 13751	Requires a report of completion to be filed with the SWRCB within 60 days of well construction.	5.5.2.6	SWRCB
	California Public Resources Code § 5523(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.	5.5.5.2.7	CEC and Central Coast RWQCB
	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.	5.5.5.2.8	Central Coast RWQCB

Table 5.5-5
Summary of LORS
(Continued)

Jurisdiction	LORS	Requirements	Conformance Section	Administering Agency
	CWC §13260 – 13269; 23 CCR Chapter 9	Requires the filing of a ROWD and provides for the issuance of WDR with respect to the discharge of any waste that can affect the quality of the waters of the state.	5.5.5.2.9	Central Coast RWQCB
	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.	5.5.5.2.10	CEC
	Title 27, CCR Division 2. §20375. SWRCB - Special Requirements for Surface Impoundments. (C15: §2548)	Governs the design requirements for surface impoundments.	5.5.5.2.11	SWRCB and Central Coast RWQCB
Local				
	Title 19 of San Luis Obispo County Code, Building, and Construction Ordinance	Drainage plan approval is required where any portion of the proposed site is located within a flood hazard combining designation, in addition to all other permits required by this title, state and federal law.	5.5.5.3.1	San Luis Obispo County
	Title 22 of San Luis Obispo County Code, Land Use Ordinance, and Article 9 of Title 22 - Shandon-Carrizo Planning Area Standards	Drainage plan approval is required where any portion of the proposed site is located within a flood hazard combining designation, in addition to all other permits required by this title, state, and federal law.	5.5.5.3.2	San Luis Obispo County

5.5.5.4 Agencies and Agency Contacts

Agencies with jurisdiction to issue applicable permits and/or enforce LORS related to water resources are shown in Table 5.5-6.

Table 5.5-6
Agency Contact List for LORS

Agency	Contact	Telephone
California Regional Water Quality Control Board, Central Coast Region	Corey Walsh	(805) 549-3147
California Department of Water Resources - Division of Planning and Local Assistance, Southern Division	Tim Ross	(818) 500-1645
San Luis Obispo, Department of Public Works, Water Resources Unit	Sylas Cranor	(805) 781-5260
United States Army Corps of Engineers, USACOE Regulatory Branch, San Francisco	Mark D'Avignon, Bob Smith	(415) 503-6773, (415) 503-6792

5.5.5.5 Permits Required and Permitting Schedule

Table 5.5-7 lists all applicable permits for the CESF in the area of water resources.

Table 5.5-7
Applicable Permits

Responsible Agency	Permit/Approval	Schedule
U.S. Army Corps of Engineers	Corps issues a Section 404 permit, including a nationwide permit or an individual permit for actions that result in a fill or discharge to federal jurisdictional Waters of the U.S.	Agency approval to be obtained before construction.
Central Coast RWQCB	RWQCB issues a 401 Water Quality Certification or Waiver.	Agency consultation and permit approval or waiver before construction.
SWRCB and Central Coast RWQCB	NPDES Industrial Permit - Prepare an Industrial SWPPP.	Complete initial Industrial SWPPP and file Notice of Intent (NOI) with SWRCB 60 days prior to operation. Submit copy of Industrial SWPPP and NOI to CEC 30 days prior to operation (or letter from RWQCB exempting the Project from NPDES Industrial Permit requirements).

Table 5.5-7
Applicable Permits
(Continued)

Responsible Agency	Permit/Approval	Schedule
Central Coast RWQCB	Application for coverage under Order No. R3-2006-0063, Waste Discharge Requirements General Permit for Discharges with Low Threat to Water Quality or issuance of site specific WDR.	Apply for WDR coverage with RWQCB during improvement plan preparation process prior to start of construction.
San Luis Obispo County	Drainage Report and Sedimentation and Erosion Control Plan.	These reports/plans are submitted, processed, and approved with the grading plan permit approval package through the County.

5.5.6 References

California Department of Water Resources, 2003. California's Groundwater Bulletin 118. Last viewed on 24 August 2007 at http://www.groundwater.water.ca.gov/bulletin118/prev_b118_rpts/ index.cfm.

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5.6 BIOLOGICAL RESOURCES

This section analyzes potential impacts that the Carrizo Energy Solar Farm (CESF or Project) may have on biological resources located within the Project area. The existing biological resources within the Project area and within a 1-mile radius around the Project are discussed in this section. In addition, the potential impacts to biological resources as a result of the proposed Project are assessed. Figure 5.6-1 displays the general topography of the Project study area and the vicinity.

5.6.1 Affected Environment

The Project area comprises a total of approximately 1,020 acres and is located in the Carrizo Plain area of the South Coast Ranges, within the eastern corner of San Luis Obispo County. More specifically, the Project area is located entirely within Sections 28 and 33 of Township 29 South, Range 18 East of the California Valley and La Panza NE United States Geological Survey (USGS) 7.5-minute series quadrangle maps. The Project area lies within the San Joaquin Valley Bioregion, near the eastern boundary of the Central Coast Bioregion, which is characterized by vernal pools, valley sink scrub and saltbush, freshwater marsh, grasslands, arid plains, agricultural uses including grazing and cultivation of crops, and oak savannah. The CESF site consists primarily of disturbed ranchland with abandoned farm structures in Sections 28 and 33. The site is generally flat, sloping gently to the southwest with elevations ranging from approximately 2064 feet to 2014 feet above mean sea level (MSL).

The CESF Project consists of the following components:

Proposed CESF Site: The site will be situated on approximately 640 acres within Section 28 of Township 29 South, Range 18 East of the California Valley and La Panza NE USGS 7.5-minute series quadrangle maps. The CESF includes the construction and operation of a solar power generating facility and its ancillary systems and will consist of approximately one hundred ninety-five Compact Linear Fresnel Reflector (CLFR) solar lines, and associated steam drums, steam turbine generators (STGs), air cooled condensers, and infrastructure, producing up to a nominal 177 megawatts (MW) net. The entire CESF site will be fenced. The CESF site is located north of California State Route 58 (SR-58)/Carrisa Highway, approximately 26 miles west of Interstate 5, and approximately 39 miles east of Highway 101.

Access Road: The CESF site will utilize Tracy Lane, an existing dirt road, as an access road. Tracy Lane is located south of Section 27 and north of Section 34. Access to the proposed CESF site will be provided by one new gate located at the northeastern corner of Section 28.

Construction Laydown Area: The CESF site will utilize a construction laydown area of approximately 380 acres within the northern half of Section 33 of Township 29 South, Range 18 East of the California Valley USGS 7.5-minute series quadrangle map. The entire construction laydown area will be fenced.

Linear Facility Route: The Project site is adjacent to an existing 230 kilovolt (kV) transmission line operated by Pacific Gas & Electric (PG&E). The CESF transmission system will require construction of approximately 850 feet of 230 kV transmission line. As depicted in Section 3.0, Facility Description and Location (see Figure 3.4-4), the CESF transmission line extends from the Project site switchyard to a point along PG&E's Morro Bay–Midway right-of-way (ROW). The overhead line begins at the dead-end structure in the switchyard and continues east along the northern edge of Section 28 for approximately

700 feet, then north for 150 feet to interconnect with the existing PG&E Morro Bay–Midway 230 kV transmission line (Line 1). The transmission line is within the Project site boundary except for a 90-foot long segment that connects to the PG&E tower. The existing transmission lines traverse east-west along the northern boundary of Section 28 of Township 29 South, Range 18 East of the La Panza NE USGS 7.5-minute series quadrangle maps.

Workers Parking: The CESF site will utilize a workers construction parking area within the construction laydown area. However, the majority of craft labor will be bused between the surrounding areas (e.g., Paso Robles, San Luis Obispo, and Bakersfield) and the Project each day.

5.6.1.1 Survey Methods

Biological field surveys were conducted by URS Corporation Americas (URS) and Live Oak Associates (LOA) biologists between April and September, 2007, according to California Energy Commission (CEC) regulations (CEC, 2000, revised 2007), California Department of Fish and Game (CDFG) and United States Fish and Wildlife Service (USFWS) protocols for surveys of special-status species. The Project area is defined as the area that could potentially be directly or indirectly impacted during Project construction and operation, and includes the solar plant site, construction laydown and parking areas, access road construction, and transmission line connection. The Project survey area includes the Project area and an assessment buffer of a one-mile radius surrounding the CESF and 90-foot transmission line segment where field surveys were conducted for botanical and wildlife resources.

Prior to conducting field surveys, a review of literature was performed, including a query of the California Native Plant Society (CNPS), Inventory of Rare Plants Database, and the CDFG California Natural Diversity Database (CNDDB) to identify special-status species previously documented within the Project survey area and vicinity. The CNDDB was queried for records of special-status species in the California Valley and La Panza NE USGS 7.5-minute quadrangles, and the species list for the County of San Luis Obispo was obtained from the Ventura USFWS office website (USFWS, 2007). The results of the query and the USFWS List are provided in Appendix L-1, Biological Resources. The species with potential to occur in the Project study area are discussed below and in Table 5.6-1. In addition, the USFWS recovery Plan for Upland Species of the San Joaquin Valley (USFWS, 1998) was reviewed.

Table 5.6-1
Special-Status Species Potentially Occurring at the CESF Site and Vicinity

Common Name	Scientific Name	Status[1]	Potential for Occurrence CESF Site
Wildlife			
Blunt-nosed leopard lizard	*Gambelia sila*	FE, SE, CDFG Fully Protected	Habitat is marginal; closest record is greater than 9 miles away. None found during adult and juvenile protocol surveys in 2007.
Burrowing owl	*Athene cunicularia*	CSC	Present on CESF Project site.

Table 5.6-1
Special-Status Species Potentially Occurring at the CESF Site and Vicinity
(Continued)

Common Name	Scientific Name	Status[1]	Potential for Occurrence CESF Site
California condor	*Gymnogyps californianus*	FE, SE	Not likely; no roosting habitat is present in CESF Project survey area and vicinity. Cattle on the CESF Project site may provide foraging opportunity for California Condor and other raptor species.
Giant kangaroo rat	*Dipodomys ingens*	FE, SE	Habitat is marginal; no sign or presence found during intensive transect surveys of both Sections 28 and 33.
Horned lark	*Eremophila alpestris*	CSC	Present in CESF Project survey area and vicinity.
Northern harrier	*Circus cyaneus*	CSC	Present in vicinity of CESF Project area; may forage over Sections 28 and 33.
Pallid bat	*Antrozous pallidus*	CSC	No habitat present on CESF site, including the houses and outbuildings present on the CESF Project site.
San Joaquin kit fox	*Vulpes macrotis mutica*	FE, ST	Present in CESF Project study area and vicinity.
San Joaquin antelope squirrel	*Ammospermophilius nelsoni*	ST, FSC	Not likely; no sign found during intensive transect surveys. California ground squirrel were the only diurnal rodent detected.
Tipton kangaroo rat	*Dipodomys nitratoides nitratoides*	FE, SE	Not likely; habitat is marginal. No sign found during intensive transect surveys.
Tulare grasshopper mouse	*Onychomys torridus tularensis*	CSC	Not likely; habitat is marginal, and no sign found during intensive transect surveys.
Vernal pool fairy shrimp	*Branchinecta lynchi*	FT	No habitat present on CESF site.
Western spadefoot	*Scaphiopus hammondii*	CSC	No habitat present on CESF site.
Plants			
Coulter's goldfields	*Lasthenia glabrata ssp. coulteri*	1B.1	Not present; habitat is highly disturbed with chronic agricultural use including disking.
Diamond-petaled California poppy	Eschscholzia rhombipetala	1B.1	Not present; habitat is highly disturbed with chronic agricultural use including disking.
Dwarf calycadenia	*Calycadenia villosa*	FSC, 1B.1	Not present; habitat is highly disturbed with chronic agricultural use including disking.

Table 5.6-1
Special-Status Species Potentially Occurring at the CESF Site and Vicinity
(Continued)

Common Name	Scientific Name	Status[1]	Potential for Occurrence CESF Site
Hall's tarplant	*Deinandra halliana*	1B.1	Not present; habitat is highly disturbed with chronic agricultural use including disking.
Heartscale	*Atriplex cordulata*	1B.2	Not present; habitat is highly disturbed with chronic agricultural use including disking.
Indian Valley spineflower	*Aristocapsa insignis*	1B.2	Not present; habitat is highly disturbed with chronic agricultural use including disking.
Jared's pepper-grass	*Lepidium jaredi* ssp. *jaredi*	1B.2	Not present; habitat is highly disturbed with chronic agricultural use including disking.
Lemmon's jewelflower	*Caulanthus coulteri var. lemmonii*	1B.2	Not present; habitat is highly disturbed with chronic agricultural use including disking.
Lost Hills crownscale	*Atriplex vallicola*	1B.2	Not present; habitat is highly disturbed with chronic agricultural use including disking.
Munz's tidy-tips	*Layia munzii*	1B.2	Not present; habitat is highly disturbed with chronic agricultural use including disking.
Pale yellow layia	*Layia heterotricha*	1B.1	Not present; habitat is highly disturbed with chronic agricultural use including disking.
Parish's checkerbloom	*Sidalcea hickmanii* ssp. *parishii*	Federal Candidate; State Rare; CNPS - 1B.2	Not present; habitat is highly disturbed with chronic agricultural use including disking.
Recurved larkspur	*Delphinium recurvatum*	1B.2	Not present; habitat is highly disturbed with chronic agricultural use including disking.
Round-leaved filaree	*Erodium macrophyllum*	2.1	Not present; habitat is highly disturbed with chronic agricultural use including disking.
San Luis Obispo mariposa lily	*Calochortus simulans*	1B.3	Not present; habitat is highly disturbed with chronic agricultural use including disking.

Table 5.6-1
Special-Status Species Potentially Occurring at the CESF Site and Vicinity
(Continued)

Common Name	Scientific Name	Status[1]	Potential for Occurrence CESF Site
Showy madia	*Madia radiate*	1B.1	Not present; habitat is highly disturbed with chronic agricultural use including disking.

Notes:
[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).
CDFG = California Department of Fish and Game (State).
SE = Endangered (in danger of becoming extinct 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).
ST = 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).

The habitat assessment field surveys were reconnaissance-level surveys conducted by URS biologists on April 23 and 24, 2007, and by LOA biologists on April 24, 2007. Habitat types, including those within one mile of the Project study area, were delineated onto the aerial map in the field, and then later digitized into a Geographical Information System (GIS). During all surveys, the CESF study area was surveyed on foot, and all areas were visible from the survey routes. Animals were identified using scat, tracks, burrows, recognition of vocalizations, or direct visual observations with the aid of an 8 x 42 power binoculars. All botanical and wildlife species observed were documented and sensitive resources were mapped in the field with the aid of handheld Global Positioning System (GPS) units (5 meter accuracy), then plotted on a rectified 2005 aerial photograph using GIS. Survey results are discussed in Sections 5.6.1.2.1, 5.6.1.2.2, and 5.6.1.2.3.

Based on the assessment that the habitat within the CESF Project study area was marginal and highly disturbed, and discussions with regional blunt-nosed leopard lizard (*Gambelia sila,* BNLL) species expert Dr. David Germano, modified CDFG protocol surveys were conducted for the BNLL. Two survey periods are outlined in the protocol, and include an adult survey period between April 15 and July 31, and juvenile surveys between August 15 and September 15. During the adult survey period, a total of eight transect surveys were completed on Section 28 and five transect surveys were completed on Section 33 between June 15 and July 13, 2007. During the juvenile survey period, a total of five surveys of each section were completed between August 20 and September 6, 2007. During the surveys, a team of 6 to 13 biologists walked the section in transects spaced 30 meters apart, searching for sign of or direct observation of BNLL and other lizards. A total of 660 man hours of surveys for BNLL were completed by a combination of Level I and Level II surveyors from URS and LOA (including staff from Quad-Knopff Environmental).

Surveys were conducted for general wildlife and raptors concurrent with the BNLL surveys. Because of the CESF location within the Carrizo Plain and recent sightings documented in the vicinity, it was assumed that San Joaquin kit fox (*Vulpes macrotis mutica*) and burrowing owl (*Athene cunicularia)* utilize the Project study area, and that protocol surveys for these species would not be necessary. During the intensive blunt-nosed leopard lizard surveys, biologists searched for kit fox dens and burrowing owl sign or burrows to document general usage of the CESF Project study area by these species. Sign of San Joaquin antelope squirrel (*Ammospermophilius nelsoni)*, giant kangaroo rat (*Dipodomys ingens)* precincts, and other special-status species with a potential to be present in the Project vicinity were included in the search during the several weeks of surveys. Survey dates, personnel, and weather data for each survey are listed in Table 5.6-2.

Table 5.6-2
Biological Survey Dates and Survey Staff

Survey Date	Survey Type	Start Time	End Time	Start Temp. (ºF)	End Temp. (ºF)	Survey Staff
4/23/2007	Habitat Assessment	10:45am	2:00pm	61	68	URS - TM, CD, KM, DP, DB, SSh
4/24/2007	Habitat Assessment	8:00am	3:00pm	62	73	URS - TM, CD, KM, DP, DB, SSh and LOA - WR, JJ
6/12/2007	BNLL Survey - Adult	9:15 AM	11:45 AM	77	92	URS - LB, KM, DP, MW, WV, RB, BL, TM and LOA - WR, NH, MR, CU,
6/15/2007	BNLL Survey - Adult	8:22 AM	12:45 PM	80.4	97	URS - WV, KM, JL, MW, ABo, JD and LOA - WR, BP, ABr, WL, JJ
6/18/2007	BNLL Survey - Adult	8:25 AM	12:10 PM	77	96	URS - WV, KM, JL, MW, ABo, JD, PM and LOA - WR, BP, ABr, WL, JJ
6/18/07	Delineation of Jurisdictional Waters in Section 33 of Project	8:30AM	11:30AM	77	92	TM, PM
6/20/2007	BNLL Survey - Adult	8:45 AM	12:15 PM	77	95	URS - WV, KM, JL, MW, ABo, JD and LOA - WR, BP, ABr, WL, JJ
6/21/2007	BNLL Survey - Adult	8:50 AM	11:40 AM	77	95	URS - KM, JL, MW, ABo and LOA - BP, ABr, WL
6/22/2007	BNLL Survey - Adult	8:55 AM	1:15 PM	78	95	URS - LB, KM, MW, ABo, JL and LOA - BP, WL
6/26/2007	BNLL Survey - Adult	9:15 AM	12:15 PM	75	96.5	URS - ABo, CT, KM, CD and LOA - ABr, WL, WR
6/27/2007	BNLL Survey - Adult	9:29 AM	12:16 PM	77.1	93.8	URS - CT, WL, SSe, TM, CD, KM, CS, ABo and LOA - KD
6/28/2007	BNLL Survey - Adult	9:50 AM	12:25 PM	77	92	URS - CT, KM, CS, SSe and LOA - ABr, WL, WR, MR

Table 5.6-2
Biological Survey Dates and Survey Staff
(Continued)

Survey Date	Survey Type	Start Time	End Time	Start Temp. (ºF)	End Temp. (ºF)	Survey Staff
6/29/2007	BNLL Survey - Adult	9:40 AM	11:20 AM		91	URS - CT, KM, CS, SSe and LOA - ABr, WL, WR, MR
7/2/2007	BNLL Survey - Adult	9:30 AM	12:10 PM	77	90	URS - LB and LOA - WL, WR, CU, MR
7/3/2007	BNLL Survey - Adult	8:50 AM	11:25 AM	77	93	URS - LB and LOA - WL, WR, CU, MR
7/5/2007	BNLL Survey - Adult					URS - LB and LOA - WL, WR, CU, MR
7/9/2007	BNLL Survey - Adult	7:20 AM	11:50 AM	77	92	URS - ABo, KM, MW, GK, SSh, LR, DP and LOA - WR, ABr, MR, CC
7/10/2007	BNLL Survey - Adult	9:04 AM	11:10 AM	77	89	URS - ABo, WV, KM, DP, MW, GK, SSh, JK and LOA - WR, MR, ABr, BP
7/11/2007	BNLL Survey - Adult	10:11 AM	12:10 PM	77	82.3	URS - GK, MW, WV, DP, KM, SSh and LOA - ABr, MR, NH, WL
7/13/2007	BNLL Survey - Adult	9:05 AM	11:45 AM	77	92	URS - KM, MW, WV, DP, GK, LR, TM and LOA - WR, WL, MR, NH, CC
8/20/2007	BNLL Survey - Juvenile	9:30 AM	12:30 PM	77	92	URS - ABo, WV, DB, GK, CD and LOA - WR
8/21/2007	BNLL Survey - Juvenile	9:24 AM	11:25 AM	76	91	URS - DB, GK, WV, CD, DP, KM, MW, ABo and LOA - WR, BP, ABr,
8/22/2007	BNLL Survey - Juvenile	8:55 AM	11:15 AM	77.2	93	URS - WV, DB, GK, CD, DP, KM, MW, ABo and LOA - WR, ABr, BP
8/23/2007	BNLL Survey - Juvenile	8:14 AM	11:15 AM	77	89	URS - MW, WV, KM, ABo, DP and LOA - WR, MR, BP, ABr, MP
8/24/2007	BNLL Survey - Juvenile	9:15 AM	11:20 AM	77	89	URS - KM, MW, DP, WV, ABo and LOA - WR, ABr, BP, MP, MR
8/27/2007	BNLL Survey - Juvenile	9:25 AM	11:34 AM	78	95	URS - KM, MW and LOA - MR, ABr, BP, WL, MP
8/28/2007	BNLL Survey - Juvenile	8:48 AM	11:14 AM	84	96	URS - MW, KM, CD, GK and LOA - BP, ABr, MR, WL, MP
8/29/2007	BNLL Survey - Juvenile	8:24 AM	10:42 AM	77.5	96.3	URS - MW, KM, CD, GK and LOA - BP, ABr, MR, WL, MP
8/30/2007	BNLL Survey -	8:25 AM	10:45 AM	78.4	94.2	URS - MW, KM, CD, GK and LOA -

Table 5.6-2
Biological Survey Dates and Survey Staff
(Continued)

Survey Date	Survey Type	Start Time	End Time	Start Temp. (ºF)	End Temp. (ºF)	Survey Staff
	Juvenile					BP, ABr, MR, WL, MP
8/31/2007	BNLL Survey - Juvenile	8:28 AM	9:40 AM	84	94	LOA - ABr, MR, MP, BP, WL
9/4/2007	BNLL Survey - Juvenile	9:29 AM	11:49 AM	78	88	URS - DP, MW and LOA - MP, ABr, WL
9/5/2007	BNLL Survey - Juvenile	9:19 AM	10:23 AM	77	81	URS - DP, MW, ABo and LOA - MP, MR, WL

Notes:
LOA Staff: ABr - Alex Brown, BP - Belen Perez, CT - Chariss Tweedy, CU - Curt Uptain, JJ - Jim Jones, KD - Kimberley Duncan, MP - Matt Perry, MR - Marie Ryan, NH - Nathan Hale, WL - Waring Laurendine, WR - Wes Rhodehamel.
URS Staff: ABo - Alyssa Boinay, BL - Brian Lohstroh, CC - Corey Chan, CD - Cheryl Delekto, CS - Claudis Solorzano, DB - Darren Burton, DP - Dallas Pugh, GH - Greg Hoisington, GK - Glen Kinoshita, JD - John Davis, JK - Joanna Kisner, JL - Julie Love, KM - Kevin McDonald, LB - Lori Bono, LR - Loren Rizzo, MW - Matt Wartian, PM - Patrick Mock, RB - Rick Bailey, SSe - Stephanie Seay, SSh - Shanti Santuli, TM - Theresa Miller, WV - Wayne Vogler.

5.6.1.2 Existing Conditions

The Project area is characterized by ranching activities for cattle (e.g., grazing, rangeland) and the cultivation of agricultural products such as wheat. All of the Project study area and surrounding landscape has been chronically disturbed by extensive dry-land agricultural practices, including seasonal plowing and disking, and the landscape/topography does not generally resemble a natural condition. Both sections within the Project study area have extensive fencing to control movement of cattle and to control public access to the properties.

5.6.1.2.1 Plant Communities

The observed habitats in the Project study area are disturbed in nature and include developed, disturbed and agriculture vegetation communities as defined by Holland. The plant species on the Project site are primarily non-native annuals such as low-growing redstem filaree (*Erodium cicutarium*), popcorn flower (*Plagiobothrys* sp.), mustards (*Hirschfeldia* sp., *Brassica* sp.), and chess (*Bromus* sp.) species present throughout the Project study area except where it is bare due to recent plowing activities. Few native individuals such as needlegrass (*Nasella cernua*) and California poppy (*Eschscholzia californica*) are interspersed with the disturbance-adapted non-native species on the CESF site. Figure 5.6-2 displays the vegetation communities in the Project study area, and Appendix L-2, Biological Resources, lists the plant species identified on the CESF Project study area during the 2007 biological surveys. Plant nomenclature follows Hickman (1993), and vegetation community identification follows Holland (1995).

5.6.1.2.1.1 Developed (Holland Code 12000)

Developed areas include roads, built structures, and associated infrastructure and bare ground. The areas on the Project site that are developed include the ranch on Section 28, and a small portion of Section 33 that supported farming uses and an old ranch. A total of 27.4 acres of developed lands are present on the Project site.

5.6.1.2.1.2 Disturbed Vegetation (Holland Code 11000)

Disturbed vegetation typically develops on sites with heavily compacted soils following intense levels of disturbance such as grading and is typically dominated by non-native, broad-leaf herbaceous species. The Project study area contains approximately 661.0 acres of disturbed/ruderal habitat that was apparently disked or plowed in portions at one time and is now comprised of such dominant species as mustards (*Brassica* spp*., Hirschfeldia incana*), redstem filaree (*Erodium cicutarium),* chess (*Bromus* sp.), thistles (*Centaurea* spp.), and a low percent cover (< 10% cover) of non-native grasses.

5.6.1.2.1.3 Grazing/Agricultural Lands (Holland Code 18000)

Agricultural areas include actively cultivated lands, lands used to graze cattle, or lands that support nursery operations. The level of soil disturbance is such that only the species under cultivation and the most ruderal plant species would be expected to occur in this vegetative community. The majority of the Project site is, or has been, actively cultivated in the recent past, and includes recently fallowed agricultural fields and actively disked and plowed fields. Cattle grazing and disking occurs on Section 33. Section 28 is comprised mainly of disturbed, non-native grasslands in recently fallowed fields. A total of 386.4 acres of agricultural lands are present on the CESF project site.

5.6.1.2.2 Wildlife Resources

The CESF project study area provides limited habitat to support wildlife species as a result of the chronic disturbance caused by the historical and current extensive dry-land agricultural and grazing activities. Within the 1,020 acres of the CESF site study area, nineteen species of birds, four reptile species and six mammal species were observed or their sign was detected. Typical bird species observed included house finch (*Carpodacus mexicanus*), western kingbird (*Tyrannus verticalis*), western meadowlark (*Stunella neglecta),* red-tailed hawk (*Buteo jamaicensis*), common raven (*Corvus corax*), turkey vulture (*Cathartes aura*), and American kestrel (*Falco sparverius*). Coyote (*Canis latrans*), California groundsquirrel (*Spermophilous beecheyi*), cottontail rabbit (*Sylvilagus audubonii*), and American badger (*Taxidea taxus*) were common mammals observed or detected throughout the CESF site. Cattle (*Bos taurus*) were grazing on Section 33 during the survey period. Small burrows were observed that appeared to be excavated by gophers or other small mammal species such as mice. Pronghorn (*Antilocapra americana*) are common in the vicinity and were observed in the southern portion of Section 33. A red-tailed hawk nest was observed in a cottonwood tree (*Populus fremontii)* along the drainage located in Section 33 near the highway. Common raven nests were observed on the power line towers along the northern boundary of Section 28, and barn owls were observed and most likely nesting in an abandoned structure in Section 28. Wildlife species identified on the Project survey area and the vicinity are identified in Appendix L-3, Biological Resources.

5.6.1.2.3 Sensitive Habitats and Special-status Species

Sensitive habitats are those that support sensitive plant or animal species, or unique vegetation communities considered rare within the region. No sensitive habitats are present within the Project study area.

5.6.1.2.3.1 Special-status Plants

Plant species of special management concern are considered rare, threatened, or endangered by the USFWS, CDFG, and/or CNPS. No rare, threatened, or endangered plants were detected onsite. A CNDDB query listed 16 special-status plant species that historically occur or have potential to occur in the Project study area and vicinity. Suitable habitat is not present for any of the special-status plants in the CESF project survey area, as the majority of the plant species have been recorded to the north or southeast in alkaki soils, chenopod scrub, chaparral, saltbush scrub, or vernal pools/salt marshes and are not found in disturbed habitat such as agricultural land uses. Special-status plant species that have been previously recorded within 10 miles of the CESF are listed in Table 5.6-3. No plant species of special management concern were detected during the 2007 survey effort.

5.6.1.2.3.2 Special-status Wildlife

Special-status wildlife species are those considered rare, threatened, or endangered by the USFWS or CDFG. The CNDDB query listed fourteen special-status wildlife species as historically present and potentially occurring in the overall Project vicinity. Most of these special-status species records are located south of the CESF Project study area within the undisturbed areas of the Carrizo Plain, and are not expected to occur in the Project study area due to lack of suitable habitat. Only a few special-status wildlife species such as San Joaquin kit fox, San Joaquin antelope squirrel, giant kangaroo rat, San Joaquin pocket mouse, California horned lark, and blunt-nosed leopard lizard have been recorded within agricultural areas in the Project vicinity and thus have a low to moderate potential to occur in the Project study area.

A total of six special-status wildlife species were detected during the 2007 field surveys that include: burrowing owl, golden eagle (*Aquila chrysaetos, SSC*), prairie falcon (*Falco mexicanus, SSC*), northern harrier (*Circus cyaneus, SSC*), horned lark (*Eremophila alpestris, SSC*), and the carcass of a San Joaquin kit fox. Wildlife species observed during the surveys within the Project survey area are listed in Appendix L-3, Biological Resources. Figure 5.6-3 displays the historic CNDDB special-status species locations as well as locations of special-status species observed during the 2007 surveys. Figure 5.6-4 depicts locations of special-status species observed on the CESF project site during the 2007 surveys. All special-status species with potential to occur or that were observed in the Project study area and vicinity are discussed in further detail below.

Many special-status 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 (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.

American Badger (Taxidea taxus berlandieri)

State Status: Species of Special Concern
Federal Status: None

This large terrestrial mammal has a flattish body, more width than height, with short bowed legs, a shaggy coat from grizzled gray to brown, and a short, bushy, yellowish tail. In California, badgers occupy a diversity of habitats. The principal requirements seem to be sufficient food, friable soils, and relatively open, uncultivated ground. Grasslands, savannas, and mountain meadows near timberline are preferred. Badgers prey primarily on burrowing rodents such as gophers (*Thomomys* spp.), ground squirrels (*Spermophilus* spp., *Ammospermophilus* spp.), marmots (*Marmota* spp.), and kangaroo rats (*Dipodomys* spp.). They are predatory specialists on these rodents, although they will eat a variety of other animals, including mice, woodrats, reptiles, birds and their eggs, bees, and other insects. The male is larger than the female. Mating usually occurs between July to August with implantation delayed until February. A litter of 1 to 5 young is born typically between March to April. Dens have one entrance, with a pile of dirt just outside that may serve as a latrine area. This powerful burrower is basically nocturnal but is often active by day. Its home range varies from about 590 to 4,200 acres (240 to 1,700 hectares). The home range of the male is larger and encompasses the ranges of several females. American badgers occur from northern Alberta southward to central Mexico, and range from the Pacific Coast eastward through Ohio. They are absent from the humid coastal forests and from other regions with dense forests. In California, badgers ranged throughout the state except for the humid coastal forests of northwestern California in Del Norte County and the northwestern portion of Humboldt County. Badger populations have declined drastically in California within the last century, and have been extirpated from many areas in southern California. Deliberate killing probably has been a major factor in the decline of badger populations. Most people regard badgers as detrimental to their interests and attempt to kill them. Land conversion for agricultural production is adverse to badgers, as they do not survive on cultivated land. Agricultural and urban developments have been the primary causes of decline and extirpation of populations of badgers in California. Rodent and predator poisoning pose double threats through direct and secondary poisoning of badgers and elimination of the food badgers are dependent upon. This species, as well as many American badger dens, were observed in Section 28 of the CESF survey area.

Blunt-nosed Leopard Lizard (Gambelia sila)

State Status: Endangered
Federal Status: Endangered

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. Blunt-nosed 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 was reported in 1987 over 9 miles southeast of the Project area in the Carrizo Plain. The habitat on the Project site is marginal but suitable. Surveys for this species were negative during intensive adult and juvenile transect surveys in 2007.

Burrowing Owl (Athene cunicularia)

State Status: Species of Special Concern
Federal Status: None (except USFWS Bird of Conservation concern and Bureau of Land Management (BLM) sensitive designations)

This owl is a small ground-dwelling bird with a round head and no ear tufts. They have white eyebrows, yellow eyes, and long legs. The owl is sandy colored on the head, back, and upperparts of the wings, and white-to-cream with barring on the breast and belly, and a prominent white chin stripe. Burrowing owls are typically found in open, dry grasslands, agricultural and range lands, and desert habitats often associated with burrowing animals, particularly prairie dogs, ground squirrels, and badgers. Burrowing owls are comparatively easy to see because they are often active in daylight, and are surprisingly bold, approachable, and generally active at dusk and dawn, but sometimes also at night. They are highly terrestrial, and are often seen perched on a mound of dirt, telegraph or fence post, frequently on one foot. They bob up and down when excited. Burrowing owls feed on a wide variety of prey, changing food habits as location and time of year determine availability. Large arthropods, mainly beetles, crickets and grasshoppers, comprise a large portion of their diet. Small mammals, especially mice, rats, gophers, and ground squirrels, are also important food items. Other prey animals include reptiles and amphibians, scorpions, young cottontail rabbits, bats, and birds, such as sparrows and horned larks. During the nesting season, adult males forage over a home range of 2 to 3 square kilometers. Burrowing owls are able to live for at least 9 years in the wild and over 10 years in captivity. The nesting season begins in late March or April. Burrowing owls are usually monogamous but occasionally a male will have two mates. Burrowing owls nest underground in abandoned burrows dug by mammals or, if soil conditions allow, they will dig their own burrows. Adults usually return to the same burrow or a nearby area each year. One or more “satellite” burrows can usually be found near the nest burrow, and are used by adult males during the nesting period and by juvenile owls for a few weeks after they emerge from the nest. It is this ground nesting that makes the owl vulnerable to injury and mortality by human-caused activities such as vehicle and equipment operation, farming practices, road building, etc. They are often killed by vehicles when crossing roads, and have many natural enemies, including larger owls, hawks, falcons, badgers, skunks, snakes, cats, and dogs. This species was formerly a common, even locally abundant, permanent resident throughout much of California, but a decline noticeable by the 1940s has continued through to the present time. The reasons for the decline include conversion of grasslands and pasturelands to agriculture and destruction of ground squirrel colonies. Assimilation of poisons applied to ground squirrel colonies has probably also taken a toll. Burrowing owls were detected in both Sections 28 and 33 of the CESF during the 2007 surveys.

California Condor (Gymnogyps californianus)

State Status: Endangered
Federal Status: Endangered

The California condor is the largest bird in North America, with an adult weighing up to 25 pounds and a wing span of up to 9 1/2 feet. California condors are found in the arid foothills and mountain ranges of southern and central California. They roost in rocky cliffs or in trees, from the late afternoon until the next mid-morning. As the temperature rises they take flight and catch thermals (updrafts of heated air), which carry them over foothills, grasslands and oak woodlands in search of food. Normally, condors breed once every two years, producing only one egg. The male and female take turns incubating the egg and feeding the offspring until it learns to find its own food for up to a year. Condors roost in large groups and communicate with a combination of hisses, growls, and grunts as well as a system of body language.

Ten thousand years ago, California condors lived on both coasts of North America, from British Columbia to Baja California in the West, and New York to Florida in the East. By about 1900, the condor population plummeted and was limited to southern California, due to many factors including loss of habitat, a low reproductive rate, poisoning, and shooting. The California condor was listed as endangered in 1967. The last nine wild condors were captured in 1987 and brought into captivity. Successful captive breeding programs have been ongoing at the Los Angeles Zoo and San Diego Wild Animal Park, and condors have been re-released into sanctuaries and other release sites throughout the Los Padres National Forest in southern California since 1992. At this time, their numbers have increased to approximately 200. The population status of the condor is stable and growing at this time because of captive breeding, but the species is not secure yet. California condors are not expected to occur in the Project area, primarily due to the lack of suitable roosting and foraging habitat.

Giant Kangaroo Rat (Dipodomys ingens)

State Status: Endangered
Federal Status: Endangered

The giant kangaroo rat is the largest of all kangaroo rats, with a weight between 4.6 to 6.4 ounces, and a total length around 12 to 13 inches, including a six to eight-inch tail. Giant kangaroo rats occur in native annual grassland and shrub-land habitats with sparse vegetative cover and soils that are well drained and subsist almost entirely on the seeds of annual plants such as brome grasses and filaree, which they harvest, stack, and dry near the entrance of their burrows. Giant kangaroo rats are territorial with precincts that average 20 feet in diameter with a shallow burrow system. Each kangaroo rat maintains and defends an individual territory in a colony that may consist of two to thousands of precincts (CDFG, 2006). Historically, this species extended from Merced County south to Kern County and west to eastern San Luis Obispo and northern Santa Barbara counties. Currently, very little undisturbed suitable habitat remains due to the conversion of up to 98 percent of habitat in its range to agricultural land. Plowing practices, including shallow disking of native or fallow lands that contain kangaroo rats would likely destroy the majority or all of the burrow systems of this species (Germano and Rhodehamel, 1995). Several population assessment studies have confirmed that the giant kangaroo rat population is declining dramatically along with that of many other kangaroo rats in the southern San Joaquin Valley. In certain

areas such as the Elkhorn Plain in eastern San Luis Obispo County, the declines were not as severe and have even begun to increase at the Elkhorn Plain study area (CDFG, 2006).

The habitat on the Project site is highly disturbed with chronic agricultural use including disking, and is not suitable for giant kangaroo rat. This species was not detected during intensive transect surveys in 2007, and is not expected to be present on the CESF.

Horned Lark (Eremophila alpestris)

State Status: Species of Special Concern
Federal Status: None

The horned lark is a bird of short grass prairies, seashores, agricultural fields, sparse brush lands, 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 special concern due to widespread, long-term population declines in the state (http://www.mbr-pwrc.usgs.gov/bbs/grass/a4740.htm). Horned lark were observed several times in the Project study area.

Northern Harrier (Circus cyaneus)

State Status: Species of Special Concern
Federal Status: None

Northern harriers are a medium sized, long-winged, long-tailed hawk, with a flat face with an owl-like facial disk, dark bars on the tail, and a white rump. Habitats include grasslands, steppes, wetlands, meadows, cultivated areas, and tundra. Northern harriers prey on small mammals, birds, reptiles, insects, and carrion, and hunt using a low, slow flight over the ground, then plunge onto their prey. Harriers roost and nest on the ground, often in groups in a traditional location. Northern harriers nest on the ground in thick grass, shrubbery, or other vegetation. The nest is a pile of sticks and grass. The female lays 3 - 6 eggs depending on the abundance of small rodents. This species used to be a common resident in the southern coastal area. At present, nesting localities are still scattered throughout the state, but numbers are much reduced, particularly in the southern coastal area, around San Francisco Bay, and in the Mono Lake area. The bulk of the breeding population is concentrated in ungrazed portions of state and federal wildlife refuges (CDFG, 2007). Northern harrier were observed in the vicinity of the Project study area in 2007 and potentially use the CESF Project site for foraging.

Pallid Bat (Antrozous pallidus)

State Status: Species of Special Concern
Federal Status: None

The pallid bat is a large-eared, light colored bat of western North America. This species roosts colonially in caves, mines, crevices, and abandoned buildings. The pallid bat is usually found in rocky,

mountainous areas, and near water. They are also found over more open, sparsely vegetated grasslands, and they seem to prefer to forage in the open. They rarely catch flying insects; instead, they usually capture their prey on foliage or the ground. The pallid bat has three different roosts. The day roost is usually in a warm, horizontal opening such as in attics or rock cracks; the night roost is usually in the open, near foliage; and the hibernation roost, which is often in buildings, caves, or cracks in rocks (Miller, 2002). This species was not detected in the CESF project survey area.

San Joaquin Kit Fox (Vulpes macrotis mutica)

State Status: Endangered
Federal Status: Endangered

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, predators, pest control programs, and accidents caused by proximity to humans such as electrocution, roadkill, 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 less than 1 mile west of the Project area. A road-killed kit fox was observed within Section 33 near the highway in August 2007. Kit fox apparently move through the Project vicinity; however, no known kit fox dens were observed in the Project study area during the 2007 surveys. California ground squirrel are present on the CESF project site and are most likely important forage for kit fox.

San Joaquin (Nelson's) Antelope Squirrel (Ammospermophilus nelsoni)

State Status: Threatened
Federal Status: None

The San Joaquin antelope squirrel is one of five species of antelope squirrels. The species is omnivorous with a diet consisting primarily of grass, seeds, and insects. Antelope squirrels are fossorial animals that occur in grasslands with moderate shrub cover where they use burrows that they or other animals have dug. They require widely scattered shrubs, forbs, and grasses in broken terrain with gullies and washes and loam soils (CNDDB, 2007). This species is most active during spring and summer months when air temperatures are between 68 to 86 degrees Fahrenheit (ºF). Historically, San Joaquin antelope squirrels ranged from western Merced County to the southern end of western San Joaquin Valley, and occupied the valley floor in Kern County and along the eastern edge northward to Tipton, Tulare County. The current range of this species is restricted to marginal habitats of the low foothills and mountains of the western

edge of the San Joaquin Valley, and populations of significant size only exist in western Kern County at Elk Hills and on portions of the Carrizo and Elkhorn plains. Conversion of native habitat to intensive forms of agricultural development is the greatest threat to this species (CDFG, 2007).

The Project site is considered marginal habitat for San Joaquin antelope squirrel. This species was not detected and scat typical of this species were not observed during the 2007 surveys; this species is not expected to be present on the CESF Project site.

Tipton Kangaroo Rat (Dipodomys nitratoides nitratoides)

State Status: Endangered
Federal Status: Endangered

The Tipton kangaroo rat is a subspecies of the Fresno kangaroo rat distinguished from other species by its small size and occurrence of only four toes on each hind foot. This subspecies originally occupied a range that included the Tulare Lake Basin in portions of Fresno, Kings, Tulare, and Kern counties, but is currently limited to arid land communities of the valley floor in the Tulare Basin between 200 and 300 feet elevation. Habitat requirements for this species include sparsely scattered woody shrubs such as spiny saltbush, iodine bush, and mesquite with scant to moderate ground cover of grasses and forbs. Soils are typically fine-textured and alkaline. Major threats to this species include the conversion of native habitat to agricultural, residential, commercial developments, and flooding. During wet years, kangaroo rat species may suffer from diseases precipitated by low food stores and moldy seeds (CDFG, 2007). Tipton kangaroo rat is likely present in the vicinity of the Project site, but is not expected to be present in the Project study area.

Tulare Grasshopper Mouse (Onychomys torridus tularensis)

State Status: Species of Special Concern
Federal Status: None

The Tulare grasshopper mouse lives in arid grasslands, shrub lands, and alkali sink habitats in the San Joaquin Valley. This species is carnivorous, feeding on scorpions, beetles, grasshoppers, pocket mice, western harvest mice, lizards, and frogs with some seeds taken when no other food sources are available. Young are born in the late spring to early summer and both parents care for them. Grasshopper mice are territorial and males will produce a sharp call to mark their territory. Predators of this species include badgers, San Joaquin kit fox, coyote, and barn owls. Primary threats include habitat destruction and fragmentation and the use of pesticides. This species is currently considered a California species of special concern (CDFG, 2007). Tulare grasshopper mouse is not expected to be present in the Project study area.

Vernal Pool Fairy Shrimp (Branchinecta lynchi)

State Status: None
Federal Status: Threatened

The vernal pool fairy shrimp is a widely distributed, yet rare, invertebrate that occurs in California. This species inhabits vernal pools and swales with a grassy or muddy bottom in unplowed grasslands. Water in these pools must be 4.3 to 23ºC with low to moderate salinity and alkalinity for eggs to hatch. The shrimp develop quickly and can subsist in pools lasting only six to seven weeks (Eriksen and Belk, 1999). The primary threats to this species are urban and agricultural development of its habitat. No vernal pools or swales are present in the CESF study area; therefore, vernal pool fairy shrimp are not expected to be present.

Western Spadefoot Toad (Scaphiopus hammondi)

State Status: Species of Special Concern
Federal Status: None

The western spadefoot toad is a small pelobatid toad that occurs in the Central Valley of California and west of the coastal ranges from Point Conception to northern Baja California (CDFG, 1988). This species spends much of the year in burrows, emerging at night during the early spring rains to breed in temporary ponds, vernal pools, and backwaters of slow flowing creeks. The remainder of the year is spent in upland habitats such as grasslands and coastal sage scrub where burrows are constructed. Tadpoles grow at an accelerated rate and transform in as little as three weeks in short lasting pools; longer in deeper pools. The western spadefoot is best surveyed at night, preferably after a warm rain and tadpoles are readily identifiable at later developmental stages. This species was documented in the California Valley quad in 1995 in a drainage channel pool. This species is not expected in the Project survey area.

5.6.1.2.4 Wildlife Corridors

A wildlife corridor is defined as a linear landscape feature that allows animal movement between two patches of habitat or between occupied habitat and geographically discrete resources (e.g., water). To function effectively, a corridor must accomplish two basic functions. First, it must effectively link two or more large patches of habitat. The corridor must conduct animals through the landscape to areas of suitable habitat without excessive risk of directing them to unsuitable areas where risk of mortality may be very high. Second, the corridor must be suitable to the focal target species so that they will use the corridor frequently enough to achieve the desired demographic and genetic exchange between populations.

Animals have a natural aversion to situations or physical settings they perceive to be dangerous and will often shy away from situations in which they are exposed without cover or escape routes. The presence of disturbance outside of the animal's normal experience is also a situation that is often avoided by animals. Focal species are those species that naturally occur in low densities and that may be unwilling or unable to cross extensive areas of development or otherwise unfavorable habitat. In central coastal California, potential focal species for wildlife movement assessment in the Carrizo Plain could include

mountain lion (*Felis concolor*), coyote, tule elk, pronghorn, deer, bobcat, San Joaquin kit fox, and American badger.

The CESF study area is in the northern portion of the Carrizo Plain, which is a 15-mile wide valley that conducts wildlife between the Caliente Range and the Temblor Range. The CESF study area is also within the most disturbed portion of the Carrizo Plain where agriculture is the dominant land use; however, four of the major mammalian predators in central California were found in the CESF study area, indicating that the Project vicinity is a functional wildlife corridor. The Project study vicinity also functions as foraging habitat for raptors such as golden eagle, prairie falcon, northern harrier, American kestrel, and red-tailed hawk, and it is used as foraging habitat for pronghorn. Pronghorn were often seen in the lower half of Section 33, associated with a cattle watering station.

5.6.1.3 Jurisdictional Waters

A formal jurisdictional waters delineation per Army Corps of Engineers (ACOE) protocols was conducted as part of this assessment. Waters of the United States (U.S.), including wetlands, subject to jurisdiction pursuant to Section 404 of the Clean Water Act (CWA) were identified using methods describe by the ACOE (1987). Non-wetland waters of the U.S. were delineated based on the presence of an ordinary high water mark (OHWM) as defined at 33 CFR 328.3(e). The OHWM is defined as:

> "The term 'ordinary high water mark' means that line on the shore established by the fluctuations of water and indicated by physical characteristics such as clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas."

Wetland delineations were conducted to determine if areas subject to jurisdiction, pursuant to Section 1600 of the California Fish and Game Code, occur within the subject property. Section 1601(a) describes areas subject to its jurisdiction as:

> "Except as provided in this section, general plans sufficient to indicate the nature of a project for earth moving by, or on behalf of, any state or local governmental agency or any public utility shall be submitted to the department if the project will (1) divert, obstruct, or change the natural flow or the bed, channel, or bank of any river, stream, or lake designated by the department in which there is at any time an existing fish or wildlife resource <u>or</u> from which these resources derive benefit, (2) use material from the streambeds designated by the department, or (3) result in the disposal or deposition of debris, waste, or other material containing crumbled, flaked, or ground pavement where it can pass into any river, stream, or lake designated by the department."

Section 1601(a) is based on Title 14 California Code of Regulations (CCR) 720, which designates waters of the state to be:

> "For the purpose of implementing Sections 1601 and 1603 of the Fish and Game Code which requires submission to the department of general plans sufficient to indicate the nature of a project for construction by or on behalf of any person, governmental agency, state or local, and

> any public utility, of any project which will divert, obstruct, or change the natural flow or bed of any river, stream, or lake designated by the department, or will use material from the streambeds designated by the department, all rivers, streams, lakes, and streambeds in the State of California, including all rivers, streams and streambeds which may have intermittent flows of water, are hereby designated for such purpose."

Streams, including creeks and rivers, are defined at Title 14 CCR 1.72 as:

> "A stream is a body of water that flows at least periodically or intermittently through a bed or channel having banks and supports fish or other aquatic life. This includes watercourses having a surface or subsurface flow that supports or has supported riparian vegetation."

5.6.1.3.1 Methodology

Formal jurisdictional waters delineation for the Project was conducted by URS biologists Dr. Patrick Mock and Ms. Theresa Miller on June 18, 2007, to document the extent of jurisdictional waters on the CESF. Hydrological and vegetation conditions were evaluated along the length of an identified drainage channel (indicated as a "blue-line stream" on the USGS topographic map), in Section 33 of the Project study area. Width measurements were taken at periodic points within the channel, drawn onto an aerial map, and recorded using a handheld GPS unit. Channel measurements were also taken at the specific locations of the proposed road-crossings.

5.6.1.3.2 Jurisdictional Delineation Results

An OHWM was observed along the entire length of the drainage channel located in the center of Section 33, as depicted on Figure 5.6-4. This channel has a well-defined streambed and banks with an approximate average width of 20 feet, (range: 3 feet to 24 feet wide). In addition, the channel is located within the FEMA 100-year floodplain (Figure 5.6-4). Two channel crossings are proposed. The width of the OHWM of the crossing on the southern boundary of the Project site in Section 33 is 5 feet wide with banks that are 18 feet across and 15 inches deep. This portion of the channel is more distinct than the other crossing located on the western boundary of Section 33. The width of the OHWM on the western side is 2 feet, with a bank-to-bank width of 14 feet and 16 inches depth. It is apparent that the entire channel has been disturbed by the agricultural practices of disking, plowing, and seeding over the decades; however the channel path is apparent throughout its length and maintains a distinct OHWM through Section 33 of the Project area. There are distinct areas along the channel that show evidence of scour, pooling, and high flow during large storm events, as well as deposition of alluvial soils and debris from these heavy flows. This channel does not support wetland vegetation as defined by the ACOE or CDFG, nor does it support wetland characteristics (i.e., hydric soils are absent) at any point within or adjacent to the OHWM. Photographs of this Other Waters of the U.S./State (OWUS) are provided in Appendix L-2, Biological Resources.

This channel was identified as an OWUS, under the jurisdiction of the ACOE and CDFG. The drainage eventually feeds into Soda Lake, which collects runoff from all the drainages associated within the Carrizo Plain. The access road on Section 33 will require two permanent road crossings over this OWUS, which will require a CWA Nationwide 404 permit from the ACOE, a 1602 Streambed Alteration

Agreement from CDFG, and CWA 401 water quality certification from the Regional Water Quality Control Board (RWQCB).

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 special-status 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, 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 (HCP).

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 operations of the CESF facility are discussed below.

5.6.2.1 CESF Site

The proposed Project would result in significant impacts to special-status biological resources because it would:

- 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.

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 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 HCP.

Significant and less-than-significant impacts associated with the proposed Project construction and operations are discussed further below.

5.6.2.1.1 Site Preparation and Construction Impacts

The CESF includes the construction and operation of a solar power generating facility and its ancillary systems and will consist of approximately one hundred ninety-five CLFR solar lines, and associated steam drums, steam turbine generators (STGs), air cooled condensers, and associated infrastructure, producing up to a nominal 177 MW net. The entire CESF site will be fenced. A transmission line will be connected to the existing adjacent 230 kV transmission line within the Project site, and will also extend 90 feet from the site to connect to the existing PG&E tower to the east (Section 3.0, Facility Description and Location; Figure 3.4-4).

Construction of the facilities, including site grading, is not expected to impact special-status plant species because none were detected during the 2007 surveys. As stated, the site has been previously disturbed by agricultural and grazing/ranching activities, and the existing vegetation is comprised of non-native herbs and grasses with few individuals of native species.

Construction of the solar farm will permanently remove 640 acres of foraging and potential nesting habitat for wildlife species; however, the site is a small part of a larger landscape, and the adjacent habitat is similar to the Project site and can be utilized by species in the same manner. Ground disturbance associated with the 90-foot extension of the power line outside of the CESF project site will be minimal, if any.

Air Emissions: No impacts on air emissions (Section 5.2, Air Quality) are expected because CESF is a solar power plant that does not produce air emissions.

Noise: Increase in noise (Section 5.12, Noise) as a result of the construction of the proposed Project is not expected to cause significant impacts to wildlife. The Project survey area provides limited habitat for wildlife due to adjacent existing agricultural use. Most of the wildlife species observed in the vicinity of the site are species that are often found in disturbed or developed areas and are expected to adapt to the new noise levels.

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 noise and collision hazards. These potential impacts are discussed further below.

Noise: Operational noise from the CESF would generate a greater level of noise than currently exists in the Project area. Based on the noise contours for the CESF Project, the maximum noise increase (60dBA L_{eq}) remains within Section 28 of the CESF project site. Only a nominal amount of habitat outside of the Project site receives noise levels in the 60dBA contour. Because most of the wildlife species observed in the vicinity of the site are species that are often found in disturbed or developed areas, they are expected to adapt to the new noise levels. Therefore, the potential impacts to wildlife from noise are considered less than significant. Mitigation for construction noise levels as they relate to wildlife impacts are included as Best Management Practices in the Mitigation section of this section.

Collision Hazards: The 56-foot tall receivers that are associated with the reflector bays may be used as perching sites for songbirds and raptors, but are not expected to present a substantial collision hazard. The 90-foot extension of the power line outside of the CESF project site will not pose a collision hazards.

5.6.2.1.3 Impacts to Special-status Species

San Joaquin kit fox, horned lark, golden eagle, prairie falcon, and burrowing owl (including active burrows) were observed in the CESF study area. Other raptors from the Project area and vicinity include red-tailed hawk, golden eagle, American kestrel, and northern harrier. These species most likely use the entire CESF study area and overall vicinity for foraging. Since the CESF is part of the much larger Carrizo Plain landscape, and similar habitat surrounds the Project study area, temporary impacts to 380 acres of habitat that supports special-status species in Section 33, and permanent loss of 640 acres of foraging habitat for special-status species in Section 28 would not be considered a significant impact for common raptors; however, the loss of habitat for San Joaquin kit fox is considered significant and would be mitigated per the USFWS and San Luis Obispo County guidelines. Loss of breeding habitat for burrowing owl is considered significant and would be mitigated per CDFG guidelines.

5.6.2.2 Impacts to Wildlife Corridors

The CESF is located within the Carrizo Plain, which is a significant wildlife use area south of the Project study area. The Project study area and vicinity is dominated by existing agricultural lands, and it is surrounded by open agricultural lands that currently provide sufficient opportunities for wildlife movement that will not be constrained by the proposed Project. Kit fox and other large mammals, such as pronghorn, likely use the Project vicinity as a travel corridor, but the opportunities for wildlife movement would not be unduly constrained by the proposed Project due to the extensive open landscape in the vicinity. Implementation of the Project would cause less-than-significant impacts to wildlife movement.

5.6.2.3 Construction Laydown, Parking Area, and Access Road

The proposed construction laydown area, parking area, and access road will result in 380 acres of temporary impacts. Impacts associated with parking and laydown areas are expected to be the same as those discussed for the rest of the proposed Project; however, they will be temporary in nature, limited to the construction phase of the Project. The temporary loss of San Joaquin kit fox, raptor foraging, and burrowing owl habitat is considered less than significant.

Approximately 0.003 acres of permanent impacts to jurisdictional waters of the U.S/state will occur as a result of the access road and culvert placement within the OWUS in Section 33.

5.6.3 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 CESF.
- Determine if impacts of CESF 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 Application for Certification (AFC) overlaps another existing or planned AFC.
- Identify any potentially significant cumulative impacts.

The CESF and other projects in the vicinity are not expected to result in significant cumulative impacts to environmental resource areas, including, but not limited to, air quality, land use, cultural resources, water resources, or traffic during the construction or operation phases. All existing and proposed projects can be characterized primarily as residential development (i.e., new single-family dwellings and mobile homes). Of the 41 projects with permit applications submitted since January 2000, only 6 projects proposed new residential construction (i.e., single-family dwellings). The remaining 35 projects include minor construction projects such as manufactured and mobile home permits, mobile home foundations, carport additions, roof replacements, deck additions, and residential renovations. Further, some of the listed projects have permits that have expired since their issuance and thus, can be dismissed from this cumulative impact analysis.

The closest permitted project is located approximately 0.5-mile to the west of the CESF site and includes the addition of a mobile home. In addition, all permitted projects within 2.0-miles of the CESF site include manufactured and mobile home permits and/or mobile home foundations. All other proposed projects are located over 2.0-miles from the Project site. Thus, as mentioned above, no significant cumulative impacts have been identified as a result of the construction, operation, maintenance, or long-term presence of the CESF and other projects in the area. For further discussion of cumulative impacts, see Section 5.18, Cumulative Impacts.

Potential cumulative impacts to biological resources caused by the construction of one solar power plant in the area will include loss of habitat. Because the surrounding area is either disturbed grassland habitat or existing agricultural use, no disruptions to wildlife movement are expected to occur. In addition, because the CESF is located within a large area of disturbed habitat, cumulative impacts to special-status species including San Joaquin kit fox, burrowing owl, prairie falcon, golden eagle, and horned lark would not be considered significant.

5.6.4 Mitigation Measures

Mitigation measures are identified and described in this section for the species-specific impacts identified in this section. In addition, several general mitigation measures and best management practices are also provided that address means to mitigate potential indirect impacts that could affect the biological resources of the site.

5.6.4.1.1 Species-Specific Mitigation Measures

5.6.4.1.1.1 Burrowing Owl

BIO-1: The following mitigation measures are recommended to reduce or eliminate impacts to burrowing owl during the construction phase of the Project. The Project will implement one or more of the following suggested courses of action to minimize potential affects to burrowing owls:

- Monitor owl activity at the Project site; establish a 500-foot set-back from active burrows offsite but adjacent to construction activities, and implement construction activities to occur outside the breeding season (February 1 through August 30) within burrowing owl territories. During the non-breeding season, if an owl burrow is found during the construction phase, a qualified biologist should passively relocate the burrowing owl by following the procedures outlined in the Burrowing Owl Survey Protocol and Mitigation Guidelines (California Burrowing Owl Consortium, 1993).

5.6.4.1.1.2 Raptor Nest Sites and Migratory Bird Treaty Act

BIO-2: The following mitigation measures are recommended to reduce or eliminate impacts to the burrowing owl and other raptors during the construction phase of the Project. The Project will implement the following suggested courses of action to minimize affects to burrowing owls and nesting raptors.

Permanent impacts to three breeding owl territories in and adjacent to Section 28 will be mitigated concurrently with mitigation for loss of kit fox habitat (described below). The guidance on burrowing owl mitigation states 6.5 acres per territory or pair lost; therefore, the kit fox mitigation requirements will constitute a more than adequate level of mitigation for burrowing owl.

In addition to offsite habitat mitigation, the following BMP measures to minimize impacts to burrowing owl shall be followed during construction:

- Complete a preconstruction survey for burrowing owls on the Project site 30 days prior to the start of initial ground disturbance activities;
- Establish a 500-foot set-back from active burrows that are offsite but adjacent to construction activities;
- Implement construction activities to occur outside the breeding season (February 1 through August 30) within those established areas; and
- All construction activities within 100 feet of an active burrow should be monitored by a qualified biologist at weekly intervals.

5.6.4.1.1.3 San Joaquin Kit Fox

BIO-3: The following mitigation measures are recommended to reduce or eliminate impacts to San Joaquin kit fox:

- The mitigation ratio for loss of habitat for this species will be determined by the USFWS based on calculations from the kit fox habitat evaluation form. Since the site is comprised of active

agricultural lands lacking any breeding dens, a 1:1 mitigation ratio, which would amount to approximately 640 acres, is recommended.

In addition to offsite habitat mitigation, CDFG, USFWS, and County of San Luis Obispo require the Project proponent to follow BMP measures during construction. These conditions are outlined below and must be printed on grading and building plans. When implemented the measures will minimize take and reduce impacts to kit fox habitat to an insignificant level.

- Mitigate for loss of kit fox habitat either by:
  - Establishing a conservation easement onsite or offsite in a suitable San Luis Obispo County location and provide a non-wasting endowment for management and monitoring of the property in perpetuity;
  - Deposit funds into an approved in-lieu fee program;
  - Purchase credits in an approved conservation bank in San Luis Obispo County; or
  - Enter into a mitigation agreement with CDFG and provide a non-wasting endowment for management and monitoring of the terms of the agreement for perpetuity.
- Retain a qualified biologist to conduct a pre-construction survey of the Project site and conduct a pre-construction briefing for construction workers on kit fox biology and protection measures to be implemented.
- Include kit fox protection measures on Project plans.
- Require a maximum 25 mph speed limit at the Project site during construction.
- Grading and major construction activities shall be prohibited after dusk.
- Cover excavations deeper than 2 feet at the end of each working day or provide escape ramps for kit fox.
- Pipes, culverts, or similar structures with a diameter of four inches or greater, stored overnight at the Project site shall be thoroughly inspected for trapped San Joaquin kit foxes before the subject pipe is subsequently buried, capped, or otherwise used or moved in any way. If during the construction phase a kit fox is discovered inside a pipe, that section of pipe will not be moved, or if necessary, will be moved only once to remove it from the path of activity, until the kit fox has escaped.
- All food-related trash items such as wrappers, cans, bottles, and food scraps generated shall be disposed of in closed containers only and regularly removed from the site.
- If pesticides or herbicides are used, they must be used according to local, state, and federal regulations to prevent secondary poisoning of kit foxes.
- If a kit fox is discovered at any time in the Project area, all construction must stop and the CDFG and USFWS must be contacted.

5.6.4.1.2 General Mitigation Measures

5.6.4.1.2.1 Construction Monitoring, Vegetation Clearing

BIO-4: Provide mitigation construction monitoring by a qualified biologist. The biologist will be given authority to execute the following functions:

- Conduct pre-construction surveys for sensitive species in impact areas.
- Establish construction exclusion zones and make recommendations for implementing erosion control measures in the temporary impact areas.
- Provide worker environmental awareness training for all construction personnel that identifies sensitive biological resources and measures required to minimize Project impacts during construction.
- Prepare construction monitoring and compliance reports that analyze the effectiveness of the mitigation measures.
- Vegetation clearing shall occur during the non-breeding bird season (September 1 to March 1).

5.6.5 LORS Compliance

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

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 proposed CESF project will include full mitigation for impacts to federally-listed threatened or endangered species or their designated critical habitats, and therefore, would not violate the Endangered Species Act. Section 7 consultation in association with the 404 permitting process would be conducted.

5.6.5.1.2 NEPA: 42 USC Section 4321 *et seq*.

The NEPA requires an evaluation of the environmental impacts of projects taking place on federal lands or receiving federal funding. USFWS or ACOE are the administering agencies for the above authority. Evaluation determined that there would be no significant impacts to biological resources, and that mitigation would reduce impacts to special status biological resources to a less than significant level. Impacts to the drainage crossing in the construction laydown area of Section 33 will be minimized through a Nationwide Permit with the ACOE. As a result, the CESF is in compliance with NEPA via the ACOE Nationwide Permit Program.

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 taking that is not in accordance with federal regulations. The USFWS is responsible for administering this Act. Since the Project will not result in the deaths of birds or the destruction of any active nests, the CESF 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. Since the USFWS will be a coordinating with other federal agencies during the permitting phase, the Project will be incompliance with this law.

5.6.5.1.5 CWA of 1977: 33 USC Section 1251 – 1376; 30 CFR Section 330.5(a)(26)

The CWA protects wetlands, regulates discharges of pollutants, sets water quality standards for individual pollutants, and provides a framework for permitted pollutant discharge from a point source. The administering agencies for the CWA are the Environmental Protection Agency (EPA), ACOE, and RWQCB. Required permit processes for the Project will be conducted to comply with the CWA.

5.6.5.2 State

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 impacts to any species listed under this Act would be mitigated with Project implementation, the CESF will in compliance with this Act.

5.6.5.2.2 California Fish and Game Code Section 1600-1609

Section 1600-1609 of the Fish and Game Code requires any person who proposes a project that will substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake or use materials from a streambed to notify the Department before beginning the project. This requires a Streambed Alteration Agreement (SAA) with the CDFG per Section 1602, and review in accordance with the California Environmental Quality Act (CEQA) (Public Resources Code, §21000 et seq.). Because CESF will obtain a SAA prior to work beginning on the Project, the CESF will be in compliance with this regulation.

5.6.5.2.3 California Fish and Game Code Section 3503/3505.5

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, and any substantial vegetation clearing will be limited to the bird non-breeding season, the CESF will be in compliance with this regulation.

5.6.5.2.4 California Fish and Game Code Sections 3511, 4700, 5050, 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 construction and maintenance of CESF will not impact the fully-protected blunt-nose leopard lizard, the CESF will be in compliance with this regulation.

5.6.5.2.5 CEQA, Public Resources Code Section 21000 *et seq*.

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 CEC. Because impacts to natural resources on this Project will be minimized or fully mitigated, CESF is in compliance with the CEQA.

5.6.5.2.6 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)

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 impacts to rare or endangered species at the Project site will be fully mitigated, CESF will be in compliance with these code sections.

5.6.5.3 Local

These policies require the County of San Luis Obispo to protect environmental quality and the overall sustainability of the ecosystems, natural processes and biological diversity while permitting development projects in the county.

Table 5.6-3
LORS for Biological Resources

Applicable Law	Administering Agency	Requirements/Compliance
Federal		
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).
National Environmental Policy Act (NEPA); 42 United States Code (USC) 4321 *et seq*.	USFWS	Consultation Requirement: Section 7 Endangered Species Act consultation with USFWS.
Migratory Bird Treaty Act; 16 USC 703-711; 50 CFR Subchapter B; Migratory Birds (Fish and Game Code, section 3513).	USFWS; CDFG	Analysis of impacts to breeding migratory birds.
Clean Water Act (CWA) CWA of 1977: 33 USC Section 1251 – 1376; 30 CFR Section 330.5(a)(26).	EPA, ACOE, and RWQCB	Nationwide 404 permit from the ACOE and CWA 401 water quality certification from the Regional Water Quality Control Board (RWQCB) for compliance with CWA.

Table 5.6-3
LORS for Biological Resources
(Continued)

Applicable Law	Administering Agency	Requirements/Compliance
Fish and Wildlife Coordination Act; 16 USC 661-666.	USFWS	Conservation of fish and wildlife and protection of wetlands.
State		
California Endangered Species Act of 1984; California Fish and Game Code 2050-2098.	CDFG	Consultation requirement; protects California's rare, threatened, and endangered species.
California Fish and Game Code 3511, 4700, 5050, 5515.	CDFG	No taking of fish, reptiles, mammals, and birds listed as fully protected.
California Fish and Game Code 3503, 3503.5.	CDFG	No taking of birds, nests, or eggs of birds.
CCR (Title 14, Sections 670.2 and 670.5).	CDFG	Lists the plants and animals that are classified as rare, threatened, or endangered in California.
CEQA: California Public Resources Code 21000 *et seq*.	CEC	Disclosure of environmental impacts.
California Fish and Game Code 1600-1609.	CDFG	Lake/Streambed Alteration Agreement for alteration of streambed channel.
Local		
San Luis Obispo County General Plan, Policies AP25, 26, 28 and OSG1, 13, 15, 17 and 18.	San Luis Obispo County	Requires that proposed development projects are compatible with policies set forth in the natural resources section, which provide for the protection, enhancement, and sustainability of fish and wildlife species, wildlife corridors, riparian and wetland habitats, and native vegetation resources.

5.6.5.4 Agencies and Agency Contacts

Agencies with jurisdiction to issue applicable permits and/or enforce LORS related to biological resources are shown in Table 5.6-4.

Table 5.6-4
Agency Contact List for LORS

	Agency	Contact	Address	Telephone
1	CDFG	Deb Hillyard	Habitat Conservation Planning Branch 1416 Ninth Street Sacramento, CA 95814	(916) 653-4875
2	USFWS	Susan Jones	2800 Cottage Way, Room W-2605 Sacramento, CA 95825-1846	(916) 414-6600
3	ACOE	Mark D'Avignon, Bob Smith	USACOE Regulatory Branch 1455 Market Street San Francisco, CA 94103	(415) 503-6773, (415) 503-6792

5.6.5.5 Permits Required and Permitting Schedule

Table 5.6-5 lists applicable permits for the CESF in the area of biological resources.

Table 5.6-5
Applicable Permits

Responsible Agency	Permit/Approval	Schedule
USFWS Endangered Species Act of 1973 and implementing regulations, Title 16 USC §1531 *et seq.* (16 USC 1531 *et seq.*), Title 50 CFR §17.1 *et seq*. (50 CFR 17.1 *et seq*.).	Through the Section 7 process, issues biological opinion with conditions or approval after review of Project impacts and mitigation measures.	Agency approval to be obtained before construction. Implement BIO-3 measure.
USFWS Migratory Bird Treaty Act (MBTA) 16 USC §§703-711.	Prohibits the take of migratory birds, as specified at 50 CFR Part 10. Will avoid take of active nests.	Implement BIO -1 and BIO-2 measures.
CDFG Fish and Game Fully Protected Species Includes: §3511: Fully Protected birds; §4700: Fully CDFG Protected mammals; §5050: Fully Protected reptiles and amphibians; §5515: Fully Protected fishes.	Issues guidance after Project impact assessment (CEQA) review. Note: there is no legal means whereby take of California Fully Protected species may be authorized by CDFG.	Implement BIO-4 measure.
CDFG California Endangered Species Act of 1984, Fish and Game Code, §2050 through §2098.	Issues guidance after Project impact assessment (CEQA) review.	Agency concurrence to USFWS biological opinion before construction.
ACOE Section 404 of CWA of 1977 (33 USC 1251 *et seq*., 33 CFR §§320 and 323).	ACOE issues a Section 404 permit, including a nationwide permit or an individual permit for actions that result in a fill or discharge to federal jurisdictional waters of the U.S.	Agency permit to be obtained before construction.

Table 5.6-5
Applicable Permits
(Continued)

Responsible Agency	Permit/Approval	Schedule
CDFG Fish & Game Code 1602.	Streambed alteration agreement.	Execute an agreement after CEC certification and prior to construction.
RWQCB Section 401 of CWA of 1977 (33 USC 1251 *et seq*., 33 CFR §§320 and 323).	RWQCB issues a Section 401 WQ certification.	Provide certification prior to issuance of 404 permit.

5.6.6 References

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5.7 CULTURAL RESOURCES

This section analyzes the potential impacts the Carrizo Energy Solar Farm (CESF or Project) may have on known or previously unrecorded cultural resources located within the Areas of Potential Effect (APEs). Cultural resources include prehistoric resources; historic buildings, structures, objects, districts, and sites; and sites and resources of concern to Native American and other ethnic groups.

The cultural resources assessment prepared for the Project includes: a description of the Project area and affected environment; existing site conditions; a summary of the ethnography, prehistory, history of the region; a review of site records for previously completed cultural resource investigations and recorded sites in the APEs and within a 1-mile study area; results of the archaeological and historic architecture pedestrian surveys of the APEs; and Native American consultation. Complete documentation of the cultural resources assessment is appended in the archaeological survey report (Confidential Appendix M, Cultural Resources).

The results of this study indicate that the Project will not have any adverse effects to cultural resources eligible for the California Register of Historic Resources (CRHR) within the APEs. In the event of the discovery of CRHR eligible cultural resources within the APEs during construction phase of this Project, appropriate mitigation measures (as set forth in this section) will be employed to ensure site avoidance and/or proper treatment of cultural resources.

All cultural resources work for the Project were 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 Professional Qualification Standards (36 Code of Federal Regulations (CFR) Part 61, Appendix A).

The cultural resources investigation was done in accordance with the Warren-Alquist State Energy Resources Conservation and Development Act, Public Resources Code (PRC), Section 25000 *et seq.*; Instructions to the California Energy Commission (CEC) Staff for the Review of and Information Requirements for an Application for Certification (CEC 1992); Regulations Pertaining to the Rules of Practice and Procedure and Power Plant Site Certification (CEC 2007); and Rules of Practice and Procedure and Power Plant Site Regulations Revisions (CEC 2007). Additionally, this study was done in accordance with the California Environmental Quality Act (CEQA), PRC Section 21000 *et seq.*, and the California Code of Regulations (CCR) Title 14, Chapter 3, Section 15000.

5.7.1 Affected Environment

5.7.1.1 Project Area

The proposed Project will consist of approximately one hundred and ninety-five Compact Linear Fresnel Reflector (CLFR) solar concentrating lines, and associated steam drums, steam turbine generators (STGs), air cooled condensers (ACCs), and infrastructure, producing up to a nominal 177 megawatts (MW) net. The proposed Project will be owned and operated by Ausra CA II, LLC (dba Carrizo Energy, LLC) (also referred to as Applicant). The CESF includes the solar farm site, construction laydown area, and offsite transmission system connections. The CESF site will encompass approximately 640 acres of fenced area on Section 28 adjacent to California State Route 58 (SR-58)/Carrisa Highway. The 380-acre

construction laydown area would be located entirely on Section 33, directly south of the Project site across SR-58. The CESF transmission system will require construction of approximately 850 feet of 230 kV transmission line. As depicted in Section 3.0, Facility Description and Location (see Figure 3.4-4), the CESF transmission line extends from the Project site switchyard to a point along PG&E's Morro Bay–Midway right-of-way (ROW). The overhead line begins at the dead-end structure in the switchyard and continues east along the northern edge of Section 28 for approximately 700 feet, then north for 150 feet to interconnect with the existing PG&E Morro Bay–Midway 230 kV transmission line (Line 1). The transmission line is within the Project site boundary except for a 90-foot long segment that connects to the PG&E tower.

The Project is located in the Carrizo Plain area of eastern San Luis Obispo County. More specifically, the Project area is located entirely within Section 28 and the northern half of Section 33, Township 29 South, and Range 18 East of the California Valley and La Panza NE United States Geological Survey (USGS) 7.5-minute series quadrangle maps. Figure 5.7-1 is a regional map of the Project.

5.7.1.2 Site Description

The CESF project description is provided in Section 3.0, Facility Description and Location. Figure 5.7-2 details the site description in relation to the Project area.

5.7.1.3 Areas of Potential Effects

There were two APEs for the CESF: an archaeological and historic architecture APE. The archaeological APE included the Project area, and an additional 200 feet around the Project area. The historic architecture APE included the Project area and an additional half-mile around the Project area. The delineation of both the archaeological and historic architecture APEs were done in accordance with the CEC Rules of Practice and Procedure and Power Plant Site Regulations Revisions, Appendix B (g)(2)(C) (CEC, 2007). Figure 5.7-3 is a map of the APEs.

5.7.1.4 Physiography

The Project area is located in the Carrizo Plain area of the South Coast Ranges within the eastern corner of San Luis Obispo County. The South Coast Ranges is a region of the Coast Ranges physiographic province (California Department of Conservation, 2002).

The Carrizo Plain is an enclosed structural basin and valley with an elevation of approximately 2,000 feet. It originates at the drainage divide of the Caliente and La Panza Ranges to the west and continues to the crest of the Temblor Range to the east. Caliente Peak of the Caliente Range is the highest point in San Luis Obispo County with a summit of 5,106 feet. The width of the valley's floor averages ten miles and the longitudinal distance averages 45 miles (however, it is roughly 60 miles to the drainage divides at each end of the plain). The San Andreas Fault, which is a 600-mile right-lateral strike-slip fault, runs northwest/southeast along the eastern margin of the plain (Eichel, 1971). The strongest (recorded) earthquake to affect the Carrizo Plain was the 1857 Fort Tejon Earthquake.

The Carrizo Plain was formed by the down-cutting action of a major stream that once flowed northwestward from the surrounding hills (Eichel, 1971: 2-4). The down-cutting caused the northern area

to transform from a valley to basin. Consequently, a large "playa" lake formed on the floor of the plain, and presently Soda Lake (located eight miles southeast of the Project area) is a remnant of this large lake. Water running down the Temblor Range and the Caliente Range fill the lake bed. The water cannot escape and evaporates, leaving salt deposits in the lake bed (Fisher, n.d.: 6).

The Carrizo Plain is an area of Steppe climate (BSh in the Koppen Classification), which means the plain experiences hot days and cool nights with cool wind chill, night and day, in the summer (Eichel, 1971). The closest water source to the Project area is an unnamed tributary that crosses the Project area within Section 33, Township 29 South, and Range 18 East of the California Valley USGS 7.5-minute series quadrangle map. The major watersheds for San Luis Obispo County include the Salinas and Cuyama Rivers, which are located west of the Project area.

California's diverse environment is separated into ten different bioregions. The Project area lies within the San Joaquin Valley Bioregion, near the eastern boundary of the central coast bioregion. The San Joaquin Valley Bioregion is characterized by vernal pools, valley sink scrub and saltbush, freshwater marsh, grasslands, arid plains, orchards, and oak savannah. Rare plants in the bioregion include Mason's lilaeopsis, San Joaquin woolly threads, and California hibiscus (Ceres, n.d.). The central coast bioregion is characterized by a mild, seasonally moist, and sometimes foggy climate that favors rich farmland and vineyards. The bioregion has coastal mountain ranges (including the San Lucia and Santa Ynez) and coastal sand dunes. Vegetation in the central coast bioregion includes chaparral, mixed hardwood, and redwood forests in the bioregion's northern coastal area and oak woodlands. Los Padres National Forest covers much of the southern portion of the central coast bioregion.

5.7.1.5 Soils and Geology

Please refer to the Section 5.3, Geological Hazards and Resources and Section 5.4, Soils, respectively, for detailed descriptions of regional geology and soil conditions.

5.7.1.6 Existing Conditions

The Project area is distinctively rural in nature, and the landscape is characterized by ranching activities for sheep and cattle (e.g., grazing, rangeland) and the cultivation of agricultural products (e.g., wheat). Much of the landscape has been affected and disturbed by extensive dry-land agricultural practices (e.g., seasonal plowing) and the landscape/topography does not generally resemble its natural environment. Most buildings and structures are either older or recently constructed single-family homes, modular homes, deteriorated farmhouses and barns, storage tanks and silos, storage facilities, transmission line corridors, and power generation facilities (e.g., PG&E Carrizo Plain Substation), or public buildings (e.g., Carrisa Plains School).

The Project area is near the northern public entrance to the Carrizo Plains National Monument (on Soda Lake Road). To the east of the Project area are the Temblor Range and the San Andreas Fault, to the west of the Project area is the La Panza and Caliente Range, and south of the Project area is a portion of Los Padres National Forest. Segments of SR-58 transect the Project area. Other roads within the Project area include Branch Mountain Road, Soda Lake Road, Tracy Lane, and several unnamed unimproved and graded dirt and gravel roads. Nearby communities include the small communities of California Valley and Simmler.

5.7.1.7 Site Disturbance within the Project Area and APEs

The primary sources of the previous surface and subsurface disturbance in and adjacent to the Project area are related to:

- Agricultural activity including grazing, plowing, and planting.
- Public and private buildings and structures construction.
- Road construction.

5.7.1.8 Prehistoric Context

5.7.1.8.1 Paleo-Indian Period (12,000 to 10,000 B.P.)

The Paleo-Indian Period was an era of environmental transition between the late Pleistocene and early Holocene. The beginning of the Paleo-Indian Period was characterized by increased rainfall and cooler temperatures, which formed deep lakes and marshes, even in the interior desert regions of California. As temperatures warmed at the start of the Holocene, glaciers slowly retreated, sea levels rose, and the interior lakes and marshes gradually evaporated over the millennia (Moratto, 1984:78). During this period, two distinct traditions have been identified: the Fluted Point Tradition (FPT) and the Western Pluvial Lakes Tradition (WPLT) (Moratto, 1984:93). Although the traditions have overlapping periods, the FTP arose earlier, and is estimated to range between 12,000 and 11,000 before present (B.P). The FTP extended across much of the North American continent. The WPLT, perhaps having evolved from the FPT, ranged roughly between 11,000 and 10,000 B.P. The WPLT occurred in the western Great Basin (Moratto, 1984:90).

The FPT, as indicated by its name, is characterized primarily by large, fluted projectile points, of which the only variety seen in California has been the Clovis point (Moratto, 1984:80). This type of point is linked to the practice of hunting big game, such as mammoth, bison, horse, camelids, and sloth (Moratto, 1984:79); however, many other subsistence options were also available at this time and utilized. FPT sites were frequently located near former marshes, lakes, and streams, which would have provided much in terms of fish, shellfish, edible plants, fowl and their eggs, and small mammals (Moratto, 1984:88). With such an abundance of resources, it is unlikely that human populations were completely dependant on big game. Near the Project area, evidence of FPT sites has been found near the old shorelines of Tulare Lake (Moratto, 1984: 81).

These subsistence resources were increasingly relied upon as the environment gradually changed. Mass extinctions of animals limited the amount of big game available for hunting. It is unknown if these extinctions were due to warming temperatures, introduction of new diseases, overkill by human populations, or a mixture of these factors (Moratto, 1984:89); however, the shift to WPLT is notably marked by a decrease in big game hunting. The WPLT developed a more refined flake stone industry distinguished by percussion-flaked foliate knives and points, which replaced the large fluted Clovis points (Moratto, 1984:93). A wider variety of stone tools were developed, including an assortment of chipped-stone crescents, scrapers, choppers, scraper-planes, hammerstones, drills, and gravers (Moratto, 1984:93). Still, millingstones are conspicuously absent from these sites, implying that hard seeds, which would require grinding, were not included in the diet (Moratto, 1984:93).

Even with decreasing availability of big game, the abundance of food sources, provided by the wetlands, was sufficient to increase human populations and may even have been plentiful enough to support people year-round. Near the Project area, evidence of a deeply buried WPLT site was found in the lower components of CA-KER-116 near Buena Vista Lake (Moratto, 1984: 99).

5.7.1.8.2 The Early Period (10,000 to 7,000 B.P.)

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 artifact assemblages associated with the Early Period are characterized by the presence of stemmed projectile points. These 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.

5.7.1.8.3 The Middle Period (7,000 to 2,500 B.P.)

The Middle Period 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 upper levels of CA-KER-116, the Witt site, the Skyrocket sites, and the Clark's Flat site. Although traditional hunting and gathering techniques were still important, a new resource, hard seeds, began to comprise a large part of the diet. Such seeds, generally taken from wild grasses in this area, required grinding before they could be digested, and milling stones characterize archaeological sites of this period (Fagan, 2003:27; Moratto, 1984:124). By 4,500 B.P., processing acorns was commonly practiced, and acorn meal became a dietary staple. Acorn processing was a labor-intensive procedure involving grinding the acorns into a fine meal and then repeatedly running boiling water through this meal to leach out the natural tannins in the acorns (Fagan, 2003:27).

5.7.1.8.4 The Late Period (2,500 B.P. to European Contact)

The Late Period refers to the time 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 type of material culture than 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.

5.7.1.9 Ethnography

The Project area is located in a boundary zone between the territories of the southern Valley Yokuts, and the Emigdio and Cuyac branches of the Interior Chumash. The two ethnic groups engaged in trade and at various times probably coexisted along the southernmost margins of the San Joaquin Valley. Within the Carrizo Plain, there were apparently no permanent settlements (Kroeber, 1925). Rather, the area had been seasonally occupied by the Chumash with varying degrees by the other groups (Eichel, 1971: 4; Bureau of Land Management (BLM) 1988). Discussions presented below are primarily drawn from Wallace (1978: 448-461) and Grant (1978: 505-508 and 530-534).

5.7.1.9.1 Yokuts

Yokuts is a term applied to the indigenous peoples inhabiting the San Joaquin Valley and Sierra Nevada foothills of central California. The southern Yokuts tribes inhabited the southern or lower end of the San Joaquin Valley, from the lower Kings River to the Tehachapi Mountains, and formed the nucleus of a culture that differed in significant respects from that of the northern and foothill Yokuts tribes. The Southern Yokuts homeland included Tulare, Buena Vista and Kern lakes, their connecting sloughs, and the lower portions of the Kings, Kaweah, Tule, and Kern Rivers (Wallace, 1978:448). Ethnohistoric Yokuts tribes occupying the Buena Vista Lake area were known as the Tulamni, while the Chuxoxi inhabited the channels and slough areas of the Kern River delta.

The Southern Valley Yokuts were encountered by the Spaniards soon after they settled in California. In the fall of 1772, Pedro Fages led a small band of soldiers through Tejon Pass and down into the southernmost part of the San Joaquin Valley. He visited a native village on the shores of Buena Vista Lake before continuing his westward journey to San Luis Obispo. After a visit by the Friar-explorer, Francisco Garces in 1776, there was infrequent contact between the Spanish and the Yokuts for some three decades.

A new series of Spanish expeditions into the interior began in 1806. No ranchos were established in the lake country and the Mexican influence on the tribes appears to have been slight; however, in 1833 an epidemic (possibly malaria) of unusual severity devastated the native population, with an estimated mortality rate of 75 percent.

The influx of Europeans shortly after the 1848 annexation of California by the United States rapidly led to cultural breakdown and the near-total disappearance of Yokuts from the lower San Joaquin valley. Settlers seeking farm and ranch lands soon occupied the countryside and either drove out or suppressed the remaining Yokuts. Survivors went to the Tejon reservation, established at the base of the Tehachapi Range, or to the Fresno Reservation near Madera. Tejon Rancheria was abandoned in 1859 and the Indians were taken to Tule River. In 1873, this reservation was specifically set apart for them. By 1905, the reservation population, mostly members of the Southern Valley Yokuts tribes with a few foothill natives, numbered only 154.

5.7.1.9.2 Interior Chumash

The Interior Chumash were divided ethnographically into three subgroups: the Cuyama, of the region between the Coast and Temblor ranges (including the Project area); the Emigdiano, of the San Emigdio

Range; and the Castaic, of the Tejon area. Evidence of cultural interchange and joint land use with the Southern Valley Yokuts, suggests that the Chumash probably frequented the Project area.

The Interior Chumash of the northern territory are virtually unknown, since there were no missions in this area, and few ethnohistoric contacts. Ten small villages were noted in the Cuyama area during several Spanish expeditions, and there is evidence that neophytes may have gone to the Santa Barbara Mission from these villages before 1806. This area may also have served as a first refuge for neophytes fleeing the mission after a revolt in 1824. The fact that some of these people were subsequently apprehended at a Yokuts village at Buena Vista Lake is suggestive of on-going Chumash cultural ties with the southern San Joaquin Valley.

Chumashan artistry is evident in crafts such as shell beads and ornaments, perforated disks, and limpet rings. One of the greatest indicators of the Interior Chumash culture within the Carrizo Plain area was its petroglyph and pictograph examples. Painted Rock or La Piedra Pintada (SLO-79), a ceremonial site located approximately 14 miles southeast of the Project Area, strongly indicates Chumash presence in the area. The pictographs were composed of polychrome abstract designs on the sandstone outcrop, and were similar to abstract petroglyphs of the desert Numic speakers, Yokuts, and inhabitants of the Kern River. In fact, the Interior Chumash acquired the rock-painting tradition from the Yokuts (Grant, 1978). Other researchers have stated that Painted Rock's "stylistic elements indicate a joint use of the Carrizo Plain" by different Native American groups. The area has been as interpreted as an interface between Native American groups, and that Painted Rock was a "cultural crossroads" where people used the site sequentially or together (BLM, 1988).

Although no Spanish Missions were established in the Project area, the Interior Chumash experienced the same indirect effects of missionization as their Yokuts neighbors. Soldiers and missionaries in pursuit of runaways and of new converts passed through the area in increasing numbers in the first decades of the 19th century. Indirect effects of introduced diseases, as well as the direct effects of cultural intrusions and possibly military activity, were undoubtedly realized. The revolt of Indian neophytes in 1824 may have had repercussions among the Interior Chumash, through whose territory coastal people seeking a refuge, and the soldiers pursuing them, would have had to pass. Disease continued to decimate the Chumash throughout the 1830s and 1840s.

The intention of the secularization of the missions in 1834 was to transform the missions into Pueblos, wherein the Indians would be full Mexican citizens. During this period, many Chumash fled the missions, some refused to work for the rancheros, and others were enslaved. Few Chumash ever received any of the mission lands as property, and those who did held it for only a short time.

In 1855, a 120-acre parcel was set aside near the coastal Santa Inez Mission and 109 Chumash were settled there. Other remnant Chumash may have settled inland, even perhaps at the Yokuts' Tule River Reservation. In 1972, about 40 mixed-blood Chumash resided at Santa Inez.

5.7.1.10 Historic Period

5.7.1.10.1 Spanish Period (1540 to 1821)

The first Europeans to enter present-day San Luis Obispo County were part of Gasper de Portola's expedition in 1769. Portola, governor of the Spanish territory Las Californias, led an expedition north from the Mission San Diego de Alcala to find the port of Monterey (Engstrand, 1993). Portola missed Monterey, but instead found San Francisco Bay. During this expedition, Portola's party came through San Luis Obispo County, and a member of the expedition referred to the area as "La Cañada de los Osos" (Valley of the Bears).

In 1772, the Spanish established the Mission San Luis Obispo de Tolosa (from which derives the county's name San Luis Obispo), which is located approximately 36-miles west of the Project area. It was established along the El Camino Real, which was the main north-south route between the Alta California missions. The missions were a means for the Spaniards to convert the Indians to Christianity. For example, in 1805, Mission San Luis Obispo de Tolosa had 961 Indian "neophytes" (Phillips, 1927).

In 1787, the Spanish also established Santa Margarita de Cortona Asistencia, which was a "sub-mission" to the Mission San Luis Obispo de Tolosa. It was located 30 miles west of the Project area and was intended to minister the Chumash in the area.

The Carrizo Plain, and specifically the Project area, was not an area of great exploration and settlement during the Spanish period. Settlement, in the form of land grants and pueblos, occurred west of the Salinas River Valley and El Camino Real in San Luis Obispo County. Although anecdotes exist of California Valley once being part of the old Spanish land grant El Chicote Rancho, this could not be confirmed. A review of the California State Archives, United States Surveyor General for California: Spanish and Mexican Land Grant Maps, 1855-1875 (found at http://www.sos.ca.gov/archives/level3_ussg3.html) has no listing for this rancho.

5.7.1.10.2 Mexican Period (1821 to 1848)

By 1810, an independence movement began as many rancheros sought to split Mexico (and California) from Spain. In 1821, this desire came to fruition as New Spain (Mexico) became independent. Following Mexico's independence, the Alta and Baja California missions received less financial support from Spain and Mexico. This caused many soldiers to feel distraught and agitated. In 1823, a frustrated soldier from the Mission Santa Inés struck a Chumash boy, which ignited a Chumash revolt (Phillips, 1927). The Mission Santa Inés Indians sought help from other Chumash at the Mission La Purísima Concepción and Mission Santa Barbara. In February 1824, the Chumash took control of the Mission La Purísima Concepción for one month (Rolle, 2003). They built fortifications and defended the mission from the soldiers with firearms and bows. However, the arrival of more soldiers from Monterey under Lt. Jose Mariano Estrada ended the Indians' revolt. Following their loss, many Chumash never returned to the missions (Phillips, 1927). Though the Indians were defeated, they were successful in showing the Mexican government their growing discontent with the mission system. Accordingly, in mid-1825, Governor Luis Antonio Arguello reported on the Indians miserable state, "calling attention to the injustice" of keeping them "any longer in virtual slavery" (Rolle, 2003).

Ultimately, independence from Spain was a catalyst for Mexico to secularize the Alta and Baja California missions. Secularization would free vast amounts of land under mission control and the land would become civilian pueblos or large land grants rewarded to Mexican, American, or European settlers. On January 6, 1831, Governor Jose Maria Echeandia announced the secularization of a number of missions, and by 1834, all the missions were secularized (Rolle, 2003). By 1841, both the Mission San Luis Obispo de Tolosa and Santa Margarita de Cortona Asistencia were suffering from neglect and were abandoned. Santa Margarita de Cortona Asistencia was granted to Joaquin Estrada and in 1841, it was the site of a strategy meeting between General Pio Pico and General Jose Castro during the American takeover of Monterey. In 1845, Mexico Governor Pio Pico declared the Mission San Luis Obispo de Tolosa for sale for $510. The padres at the mission eventually rented rooms out as the mission fell into great disrepair. It eventually became a jail and courthouse for San Luis Obispo County (Phillips, 1927).

San Luis Obispo County had 36 Mexican land grants. The nearest land grant to the Project area could not be identified.

5.7.1.10.3 American Period (1848 to Present)

5.7.1.10.3.1 Early Uses and Land Speculation of the Carrizo Plain

"Manifest Destiny," was one of the likely causes for the Mexican-American War, 1846 to 1848. Jacksonian Democrats coined the phrase "Manifest Destiny" in the 1840s as a political philosophy whereby the United States would control all of the land between the Atlantic and Pacific Ocean. The focus was primarily on the northwest coast, in Oregon territory, and on the Texas territory. In 1845, during the Presidency of James K. Polk, the United States annexed Texas and in 1846 invaded Mexico. President Polk, in 1846, also enlisted the aid of Mormon volunteers to form a battalion and advance on the Mexican Army in California. The Mormons already had a large population in the West, particularly in Salt Lake City, Utah. In 1848, the United States, victorious over the Mexican Army, signed the Treaty of Guadalupe Hidalgo; thereby, acquiring all Mexican territory north and west of the Rio Grande and Gila Rivers, which included Texas, New Mexico territory, and Alta California. Additionally, the discovery of gold in 1848 and the Gold Rush, which ensued the following year, brought numerous settlers to California. In 1850, California became a state. San Luis Obispo County was one of the original counties created as California was admitted into the United States.

The Carrizo Plain was not immediately settled during the American period. Settlers emigrating and migrating to the region predominately followed settlement patterns seen in the Spanish and Mexican periods. Populations concentrated along the coast, El Camino Real, and the Salinas River Valley. The Carrizo Plain was isolated from the mid-19th century north-south and east-west settlement and circulation routes. The rugged mountains in east San Luis Obispo County (presently comprising a portion of the Los Padres National Forest) deterred settlers from the area. The San Joaquin Valley, located east of the Carrizo Plain, was slow to develop as well, and the Temblor Range was a barrier between the Carrizo Plain and the valley (Eichel, 1971).

The poor drainage of the low annual rainfall and the salt-covered playa were not attractive features to farmers. In 1850, an early landowner in the plain was J. Garcia. Garcia may have received the land as a Mexican land grant or may have purchased the land from a man known as George Bill (BLM, 1988). Garcia's ranch, named El Saucito, was located south of Soda Lake, and was named after a type of willow.

Garcia was described as a "prosperous Californio" who lived in a large ranch house and had "many Indian servants and vaqueros" who tended the "immense herds of sheep and cattle" (BLM, 1988).

The first land survey of the Carrizo Plain occurred in 1855-1856, but it appeared on a Pacific Railroad Surveying Expedition map as the "Llano Estero" (Salt Marsh Plain). (By 1874, the area appears as Carisa Plain on a survey map. Throughout the region's history, many variations of its spelling exist including Carrisa, Carisa, and Carrissa. The name derives from the carrizo grass that grew in the nearby springs and hills (Harris, 1874). Following the survey's completion, San Francisco speculators purchased vast quantities of land in the plain and the land largely remain unused. Much of the north part of the plain, including the Project area, was deeded to James M. McDonald, who was described in the 1871 San Francisco Directory as a "capitalist" (Eichel, 1971). By 1883, James M. and Richard H. McDonald owned 50,000 acres in the Carrizo Plain (Angel, 1883). The closest land owned by the McDonalds to the Project area was approximately one mile northeast of the site within Section 23, Township 29 South, Range 18 East of the La Panza NE USGS 7.5-minute series quadrangle maps. With speculators holding the majority of land, the Carrizo Plain remained isolated from its environs.

The General Land Office's decision against the Atlantic and Pacific Railroad in July 1885 ultimately opened settlement of the Carrizo Plain. Prior to that, the railroad prevented homesteading and title ownership in the Carrizo Plain by claiming right-of-way grants on land not held by speculators. The railroad's claim was based on an 1875 map filed for a rail line from Los Angeles to San Francisco through San Luis Obispo County. Acting on a civil lawsuit initially filed in 1878, the General Land Office decided the Carrizo Plain was outside of the railroad's north-south right-of-way and opened the area officially for homesteading and preemption (Eichel, 1971).

5.7.1.10.3.2 Early Settlers

In 1869, Chester Brumley, an employee of the McDonald interests, was sent to the plain to supervise grazing leases (Eichel, 1972). Ranchers from the southern San Joaquin Valley and the Tulare area would bring grazing cattle and sheep seasonally into the Carrizo Plain. Brumley became the first permanent settler when he established a cattle ranch in the southwest part of the plains (Eichel, 1971). Brumley's ranch was approximately ten miles southeast of the Project area, near Painted Rock (SLO-79). Brumley grew wheat and barley for hay, but he lacked sufficient means to transport his crops to any of the nearby markets in San Luis Obispo, Paso Robles, and Santa Margarita. "There was no road, only a trail linking the plain to the gold mining settlement and ranch at La Panza" to the west (Eichel, 1971; *San Luis Obispo Tribune*, 25 December 1884).

In the 1880s, *San Luis Obispo Tribune* and *The Daily Republic* editor Myron Angel helped promote settlement of the area through a series of articles and travelogues. Angel described the area as the "most attractive section of country, and under cultivation would support a large population" (*San Luis Obispo Tribune*, 16 November 1882). Angel praised Brumley's efforts and his success growing grapes, figs, pears, apples, and berries (*The Daily Republic*, 10 January 1888). Angel anticipated the sale of the land by speculators, and encouraged the division and sale of the Carrizo Plain (*The Daily Republic*, 25 March 1887).

Despite Angel's publicity, settlement within the Carrizo Plain during the 1880s through the 1900s was slow and occurred primarily along the northeast and southwest perimeters. Seven devastating drought

years during the 1890s deterred settlers from the dry Carrizo Plain. Many homesteaders who relied on the sale of their crops sought credit from wealthy San Luis Obispo merchant Ben Shinsheimer during the droughts. When they could not repay Shinsheimer, many settlers abandoned their properties. For example, Shinsheimer is listed in the San Luis Obispo County Plat Maps as partially owning Section 26 and 36, Township 29 South, Range 18 East of the California Valley and Simmler USGS 7.5-minute series quadrangle maps.

There were several notable settlers near the Project area during the late 19th and early 20th century, which helped define the community's early growth and development. These settlers included John B. King, Aristarchus F. Hubbard, Frederick W. Cavanaugh, Henry Wreden, and Nels Beck.

Approximately three to seven miles from the Project area, near the community of Simmler, John B. King established a ranch in 1884. King also worked as the area blacksmith, deputy sheriff, and postmaster for Simmler. He held the postmaster position from 1904 until 1927. King operated other ranch properties in the northern Temblor Range areas. According to the BLM Land Patent Details, King acquired 160 acres of land from the BLM in 1891 nearly seven miles northeast of the Project area. The area is currently known as the Las Yeguas Ranch. Descendants of John B. King continued to live in the Carrizo Plain, and his son Walter William King owned property in the southeastern quarter of Section 28, Township 29 South, Range 18 East of the California Valley USGS 7.5-minute series quadrangle map in the 1930s (San Luis Obispo County Plat Maps; BLM Land Patent Details, 2007).

In 1890, Aristarchus F. Hubbard established the first flour mill in the Carrizo Plain. Hubbard moved his mill from San Luis Obispo's Estrada Gardens and converted the operation from water-powered to steam-powered. Hubbard also established a blacksmith shop in the mill. Hubbard's mill was located approximately seven miles east of the Project area (*San Luis Obispo Tribune*, 1 March 1890). In his first harvest on the Carrizo Plain, Hubbard produced over 4,176 sacks of fine grain and wheat. In 1895, Hubbard acquired 164.75 acres of land from the BLM located just north of the present day community of Simmler in the area referred to as Thomson Spring, and five miles east of the Project area. Additionally, Hubbard is recognized as an inventor interested in developing a "dirigible airship" (Jesperson, 1939). He also built several aluminum model planes, and he built a building on his property to house his planes. Hubbard passed away before ever flying (Home Demonstration Day, 1958; BLM Land Patent Details, 2007).

In 1898, Henry Wreden established the San Juan Ranch in the Carrizo Plain. Wreden held over a thousand acres 11 miles east of the Project area. Wreden became a successful cattleman and grew thousands of acres of Baart wheat, one of the highest protein-producing types of wheat. He passed in 1971. Descendants of Wreden continued to live in the area, and in 1925 owned property four miles northeast of the Project area (San Luis Obispo County Plat Maps).

Frederick W. Cavanaugh arrived in the Carrizo Plain approximately 1914, and initiated an extensive ranching operation with three generations of his family. Cavanaugh was one of the first to utilize mechanized farm equipment, and he established a partnership with another early Carrizo Plain pioneer, Nels Beck in 1917 (Jesperson, 1939). His main residence and ranch was located over seven miles east of the Project area. In the 1920s, descendants of Cavanaugh owned property within the southeastern quarter of Section 33, Township 29 South, Range 18 East of the California Valley USGS 7.5-minute series quadrangle map (San Luis Obispo County Plat Maps).

In approximately 1915, San Luis Obispo County native Nels Beck began ranching on the Carrizo Plain and created a partnership with Fred Cavanaugh from 1917-1921. Following the partnership, Beck established his own ranching business. In 1923, Beck moved his family to the former Hubbard site and he purchased the property in 1937. Beck had numerous land holdings in the Carrizo Plain in the 1920s and 1930s, including a portion of Sections 30, 31, and 32, Township 29 South, Range 18 East of the California Valley USGS 7.5-minute series quadrangle map (San Luis Obispo County Plat Maps).

In 1971, Geography Master of Arts candidate Marijean Eichel wrote a dissertation on the land uses of the Carrizo Plain. Her study described the use and spatial distribution of the early settlers' properties. They were described as "…located well back from the road, with a dirt or gravel lane leading into the farmyard. A substantial house shaded by trees, a well and pumphouse, storage sheds, gasoline tank and pump, machine repair shop, and one or more smaller houses or bunkhouses comprised the typical farmstead buildings" (Eichel, 1971).

5.7.1.10.3.3 Development of Agriculture, Ranching, and Other Industries

As noted earlier, the early settlers raised primarily grain products, such as wheat and barely, on farms that were as large as 6,000 acres. The settlers practiced dry farming and began planting a field every other year in order to increase their yield and conserve the moisture in the soil. Very little irrigation occurred in the Carrizo Plain due to the high cost associated with installation and maintenance. Settlers in the Carrizo Plain grew milling wheat, and Baart wheat was the most common variety grown. Milling wheat thrived in the region due to dry farming, good soil, and cold winters, but was periodically affected by late frosts and erratic rainfall. In 1933, more than 30,000 acres of wheat were planted in the Carrizo Plain. During World War II, over 60,000 acres were sown and harvested (Eichel, 1971; Fisher, n.d.).

At first, wheat was sacked, and taken to markets in three and four team wagons. The introduction of mechanized farm equipment to the Carrizo Plain and the establishment of the railroad in McKittrick (only 16 miles away) in 1908 helped the industry grow. When the government placed restrictions on wheat during the 1860s through the 1920s, some settlers turned their attention towards barley, potatoes, and alfalfa, as well. The early grain crops were also impacted by the growth of Russian thistle, which had to be removed through a pesticide or crop duster (Fisher, n.d.). In the 1920s, improvements in trucks made the transport of crops much easier, and grain was soon transported via bulk methods and not sacked (Fisher, n.d.; Eichel, 1971).

In addition to grain, the early settlers raised livestock and cattle, and accordingly grazing in the Carrizo Plain became prevalent (however, the raising of livestock and grazing seemed more common south of Soda Lake) (Eichel, 1971). Long-horned sheep were raised at first, and then followed by Texas longhorn. Following the arrival of cattle, the sheep were mostly used as "gleaners or to clean up the grain that harvesters have missed" (Fisher, n.d.). Famous California ranchers and former San Franciscan butchers, Henry Miller and Charles Lux rented lands belonging to the McDonalds and ran large herds of Texas longhorns through the Carrizo Plain. Miller and Lux operated a successful cattle business from 1858 through the 1920s. Miller could allegedly travel from one end of California to the other "without stepping off his own land," and it is rumored Miller visited the Carrizo Plain on a few occasions to inspect his holdings (Fisher, n.d.). At one time, the southeast part of the Carrizo Plain had a sunken well-named "Miller Well," which may have been named after him (Fisher, n.d.).

Besides grain and livestock, settlers in the Carrizo Plain tried to develop a mineral extraction and oil industry. Approximately 1890, the mining industry was centered near Soda Lake and focused on the exploitation of the sodium sulphate deposits form the lake bed. Between 1890 and 1898, Consolidated Chemical Company constructed a small plant near the southwest end of Soda Lake for evaporating the saline water and recovering the solid salt. Several large open tanks for solar evaporation and a windmill were in use by 1917, and several bunkhouses housed the men who worked the salt deposits. In 1923, the company constructed a narrow-gauge railroad across the southern neck of Soda Lake and then diagonally across the Carrizo Plain to McKittrick Road. This made transportation of the extracted resources far easier (Eichel, 1971; Fisher, n.d.).

In 1910, exploratory oil drilling occurred along the southeast part of the Carrizo Plain. The success of the McKittrick-Summit region had many people speculating that the nearby Carrizo Plain may have similar formations and deposits; however, the promise of commercial oil was illusory at first, and there was not much success from the 117 wells that were dug. In the 1940s, the Atlantic Richfield Company (ARCO) and Norris Oil Company discovered oil and had more success than the earlier efforts of the 1910s (Eichel, 1971). Norris Oil Company was producing 50 barrels in the southeast portion of the Carrizo Plain, and landowners were leasing their properties or offering the mineral rights to oil prospectors. The success of the 1940s oil industry enabled the local school district to partially relieve its tax burden (Fisher, n.d.).

5.7.1.10.3.4 Development of Infrastructure and Public Services

Throughout the 19th century, transportation within the plains continued to be difficult. The wagon trail to the markets of San Luis Obispo, Paso Robles, and Santa Margarita took two days to transverse. Most families traveled the road twice annually, in order to purchase a six-month supply of staple groceries. Prior to 1908, the nearest railroad station was in Santa Margarita and was not completed until 1889. While flour mills were constructed near the Santa Margarita station, poor roads and steep grades deterred the development of large-scale commercial grain farming in the Carrizo Plain, until the McKittrick station's founding in 1908 (Eichel, 1971; Fisher, n.d.).

The new settlements in east San Luis Obispo County ignited political pressure to develop a more accessible east/west route. The original route was a wagon-trail which ran from Santa Margarita to the placer mines through Pozo, La Panza, and McKittrick in San Luis Obispo and Kern Counties. Many of the settlers, still affected by the droughts of the 1890s, saw the construction of a new road as a means to improve their hardships (the road was then known as the La Panza-Bakersfield Road).

In 1890, the county board of supervisors approved a new route and the road followed an alignment that ran south of Sections 32, 33, and 34, Township 29 South, Range 18 East of the California Valley USGS 7.5-minute series quadrangle map through the Project area (Henderson 1890). Between 1897 and 1907, the road was realigned, graded, and received numerous improvements (according to County Deed and Bond Records). In 1933, the state legislature designated the road a state highway (SR-178). In May 1936, the Carrisa Highway was improved from gravel and dirt to pavement for the first time. Since 1941, the highway has followed its current alignment within the Project area, and is characterized by a sharp 90 degree angle at the convergence of Sections 27, 28, 33, and 34 (1942 USGS Maps; Krieger, 1992; Fisher, n.d.). By 1943, the highway was designated Highway 178. In 1954, the State legislature returned operation and maintenance of the Carrisa Highway back to San Luis Obispo County, and ten years later the highway was designated SR-58. Along SR-58, approximately three miles east of the Project area, is

the county of San Luis Obispo Engineering Department Road Maintenance Section 5. The county has occupied a small craftsman-style building (and several Quonset hut-style buildings) on the site since approximately 1954, and the site is a former "teacherage" (teachers' residence) associated with the former Simmler School District. The land was previously owned and donated by the McDonalds.

A rise in the number of settlers in the Carrizo Plain led to the need and establishment of services such as postal delivery and educational facilities. Many of the area's earliest settlers were directly responsible for establishing these services. For example, the original postmaster in the Carrizo Plain was one of the first permanent residents, Chester Brumley. The post office was known as the Painted Rock Post Office and the mail came from the La Panza Post Office, but delivery to Brumley was not consistent or regular (It was not until the 1950s that people on the Carrizo Plain received their mail more than twice a week). As the position of postmaster changed hands, so did the location of the post office. John B. King became postmaster in 1904, and the site moved to his ranch. King held the position for 26 years and his daughter, Abelina Freeborn, recalled that King moved the post office and community of Simmler with him twice when they moved closer to the Project area. Between 1916 and 1932, the Carrisa Plains Star Route initiated service as the local carrier. The carrier would also stay overnight in the Carrizo Plain when making his deliveries (Home Demonstration Day, 1958).

In addition to mail service, the early settlers on the Carrizo Plain ensured their children had educational opportunities. In 1891, the first school was located seven miles northeast of the Project area on land donated by Fredrick W. Cavanaugh. In 1907, the school was located in the upstairs bedroom of the King house, and there was only five pupils (which included four Kings and a neighbor) (Fisher, n.d.; Home Demonstration Day, 1958). Between 1907 and 1910, another school site operated seven miles east of the Project area, near the present-day Carrisa County Store (located at 10960 Carrisa Highway). In 1910, the school was moved to a craftsman-style building next to the present-day County of San Luis Obispo Engineering Department Road Maintenance Section 5 (which is housed in a former craftsman-style teacherage). Presently, the Carrisa Plains Farm Bureau Center leases the former school site (and the building serves as a community center and central meeting area for residents of the Carrizo Plain). In 1954, a new modern school building, known as Carrisa Plains School, was constructed (though the school officially opened two years later) by San Luis Obispo architect John Badgley and L.H. Neudeck Construction Company, and features two classrooms, an all-purpose room, kitchen, tennis court and playground, and an auditorium (which was an addition completed in 1962) (San Luis Obispo City-County Library Archives). The building is located within a half mile of the Project area and is located along Carrisa Highway. South of the school building is an original duplex constructed as a teacherage. The Carrisa Plains School, which serves kindergarten through eighth grade, is presently the only school within 20 miles of the Project area.

Electrical power was not provided to the Carrizo Plain until November 1949. That year, Pacific Gas and Electric (PG&E) completed the Carrizo Plain Substation (located within a half mile of the Project area in Section 27, Township 29 South, Range 18 East of the La Panza NE USGS). No longer were people forced to use generators and the substation used two-pole wood structures to carry the power to residents.

The first store on the plain did not open until August 1950. The store was known as the Carrisa Mercantile, and featured a small filling station. Prior to this, settlers on the Plain would occasionally

travel to a store owned by Dr. Thomas Chalmers and Martha Still in La Panza. The La Panza store opened in 1879 and primarily served the area's placer mines.

5.7.1.10.3.5 California Valley in the 1960s

In 1960, Richard Walker, an Arizona lawyer and former district attorney, led a group of investors to construct a subdivision just north of Soda Lake in the Carrizo Plain area of eastern San Luis Obispo County. Walker acquired the El Chicote Ranch, which possibly may have been an old Spanish land grant (the California State Archives List of Spanish and Mexican grants has no record of El Chicote), and named the area California Valley (Fairbanks, 1992). As with many farms in this region, the El Chicote Ranch, a cattle ranching operation, had become less profitable as access to water was becoming more restrictive (this was borne out when in 1970 Robert McChesney, San Luis Obispo County Farm Bureau President, stated that "the Carrisa Plains…is unfit for the high-yield crops necessary to make imported water profitable" (Five Cities Times-Press Recorder, 1970).

Walker's proposed development would comprise over 7,000 parcels of 2½-acre lots (Fairbanks, 1992). To issue titles to the property, Walker had incorporated the Security Title Insurance Company, which acted as trustee for the development, while the El Chicote Ranch Company was responsible for the development of California Valley. Prospective homeowner's would only have to put $10 down. To promote his community further, Walker planned a national advertising campaign, in which he would spend $250,000 in national publications including *Life*, *Saturday Evening Post*, and *Reader's Digest* in an effort to bring 9,000 people to the community, which would include a golf course, schools, shopping centers, parks, and swimming pools (California Valley, 1960).

By 1963, Walker had planned 380 miles of unimproved (dirt) roadways. The dirt roads ran "outward in a checkerboard pattern from the county," that bisected the development (California Valley, 1963). Although Walker had envisioned thousands of people flocking to his planned community (many by their own personal aircraft), less than ten people had moved to the development by 1963. James Barron, according to the California Valley newspaper, was the first resident of the community and became the "director of the California Valley Community services district." One of the main obstacles for the nascent community to overcome was the lack of a fresh water supply. Barron had to have a well dug on his property, and Walker envisioned tapping into a subterranean aquifer, although the quality and quantity of this aquifer was debated considering much of the surrounding groundwater was alkaline and not suitable for potable use. Walker also planned to have water transported, via pipeline, from the Feather River, some 35 miles from the community; however, this pipeline would not have been completed until 1980 (California Valley, 1963). Further yet, shopping centers and hospitals are located nearly 50 miles away, and the nearest telephone was four miles from town (California Valley, 1963).

In 1964, the El Chicote Ranch Company's proposed commercial expansion in California Valley was delayed since the development company never planned for the paving of the parking lots of the 28-lot commercial subdivision. Maurice Hall, a representative of the El Chicote Ranch Company, argued that the parking lots would be paved as businesses were built (California Valley, 1964). Many County officials were weary, since the development company previously did not construct the community's roads according to county standards. Instead, they transferred the roads to the community service district, which would give the roads to the county once they were brought up to county standards; however, the

cost of improving the roads would have been (according to a public works official) approximately $5,000 per mile (California Valley, 1963).

According to the 1992 *Telegram-Tribune* newspaper article, California Valley was described in the May 1967 issue of the California Traveler magazine as "a virtual oasis with a modern service station, fine new motel with heated swimming pool, a restaurant with cocktail lounge, a general store, post office, and a community center building." While California Valley may have been touted as a "virtual oasis," this was far from actuality. Even by 1968, eight years after planning, the community still had no direct access to electrical power. In an article written for the San Luis Obispo County's *Telegram-Tribune* in 1968, Elliot Curry celebrated Jim Barron's (the original occupant of California Valley) "little utopia," known as "Rancho Buena Vista." According to Curry, Barron's rancho consisted of "60 almond trees, seven peaches, five apples, as well as plums, cherries, prunes, apricots, thriving vegetable gardens, decorative shrubs, roses, peanuts, and others too numerous to list" (Curry, 1968); however, to generate the power needed for his property, Barron had to install his own power generation system, which would have been beyond the means of most people. PG&E, which had constructed an electric substation (Carrizo Plain Substation) in the area in 1949, viewed construction of a powerline impractical without a large enough population base to make the undertaking feasible.

Despite the community's low population in 1968, it boasted of an airport, fire station, and a county-branch library. The community then planned for and constructed an artificial lake and park, which drew "thousands of birds, some of them appearing very strange in this dry climate" (Curry, 1968).

California Valley, Inc. had also assumed management responsibilities by the late 1960s. Regardless of the property management, attracting people to this area with lack of electrical power, sustainable source of water, and distance to nearby communities was hard to overcome. This is illustrated by the fact that only 21 people actually lived in the California Valley by 1968, although 7,000 parcels had been sold. Presently, California Valley remains sparsely populated. Many of the roadways planned during the 1960s never materialized, and remain today as paper streets. Much of the infrastructure and community amenities promised in the 1960s never came to fruition and the area is characterized by its isolation and detachment from the incorporated areas of San Luis Obispo County.

5.7.1.10.3.6 ARCO Carrisa Plain Solar Project

During the 1979 energy crisis, ARCO attempted to diversify their energy holdings, and became a solar energy pioneer. ARCO began manufacturing the photovoltaic (also referred to as PV) arrays themselves, and established a subsidiary, ARCO Solar Power Production, Inc., to promote and construct solar arrays (The Center for Land Use Interpretation, 2007).

In the early 1980s, ARCO first built a 10 megawatt (MW) pilot operation (the Lugo plant), which consisted of flat-plate modules on large two-axis tracking pedestals, in San Bernardino County, California. Based on the information gathered from the pilot program, ARCO Solar, Inc., in 1983, built a generating station in the Carrizo Plain area, within Section 27, Township 29 South, Range 18 East of the California Valley USGS 7.5-minute series quadrangle map. The Carrizo Plain facility had at its inception the potential to service 300 to 400 residential customers of the PG&E (*New York Times* Financial Desk, 1982).

By its peak operation point, in 1994, the Carrizo plant was producing anywhere from 5.2 to 6.5 MW of energy with over 100,000 one-foot by four-foot photovoltaic arrays (The Center for Land Use Interpretation, 2007; Wilson, 1990); however, the solar energy, not having been as highly subsidized as the oil and coal industry, was never able to compete with lower-priced fossil fuel-based sources of energy. In 1990, Carrizo Solar Corporation, a group of investors based in Albuquerque, New Mexico, acquired the two solar facilities, and in the late 1990s both plants were dismantled and the solar arrays resold throughout the world (Wilson, 1990).

5.7.1.10.3.7 Carrizo Plain National Monument

In a Presidential Proclamation in 2001, President Clinton declared the Carrizo Plains a National Monument based upon its unique biology, geology, and cultural history. Comprising roughly 205,000 acres with Soda Lake and the San Andreas Fault as its centerpiece, it has been relatively unmarred by development. The National Monument, whose protection was initiated by the Nature Conservancy in 1988 with the purchase of 82,000 acres, is located approximately 10 miles south of the Project area. This land was later transferred to the United States Fish and Game, and the BLM. The BLM, Fish and Game and the Nature Conservancy continue the management of the property.

5.7.1.10.3.8 Conclusions

Prior to European arrival in California, the Carrizo Plain was inhabited by the South Valley Yokuts and Chumash Indians, and their ancestors. Their occupation of the area is particularly evident in the Carrizo Plain National Monument where evidence of their presence remains as pictographs most remarkably at Painted Rock (SLO-79). During the Spanish and Mexican periods, the Carrizo Plain remained relatively isolated; there were few Spanish and Mexican land grants in the Carrizo Plain area. During the American period, the area was not ranched or farmed systemically until the mid-19th century. Even then, problems with drought, unreliable water sources, and poor transportation networks made even subsistence farming difficult. Modern development in the Carrizo Plain has been slow. The harvesting of grain and raising of livestock have remained the principle industries in the region for nearly 100 years. While there have been strides to modernize the area and end its isolation, various development plans during the second half of the 20th century failed due to the remote isolation, environmental conditions, and changing economic situation. The rural setting of the Carrizo Plain dominates the landscape today.

5.7.1.11 Key Personnel Qualifications

The key cultural resources personnel who conducted and/or supervised the field survey and prepared the technical report (Confidential Appendix M, Cultural Resources) and this Application for Certification section are:

- Reid Farmer, MA, RPA (URS Corporation Americas (URS) Principal Investigator for this Project)
- Brent Leftwich, MA (URS Archaeologist)
- Dustin Kay, BS (URS Archaeologist)
- Jeremy Hollins, MA (URS Architectural Historian)

Mr. Farmer meets the professional standards of the Secretary of Interior Standards and Guidelines for Archaeology and Historic Preservation, National Parks Service, 1983. Confidential Appendix M, Cultural Resources, contains resumes for key personnel.

5.7.1.12 Site Records and Literature Review

On April 30, 2007, Dustin Kay, URS Archaeologist, performed a records search at the Central Coast Information Center (CCIC) at the University of California, Santa Barbara through the California Historical Resource Information System (CHRIS) cultural resources database. Kay searched all relevant previously recorded cultural resources and previous investigations completed for the Project area and a 1-mile search radius (Confidential Appendix M, Cultural Resources). Information reviewed by Kay included location maps for all previously recorded trinomial and primary prehistoric and historic archaeological sites and isolates, site record forms and updates for all cultural resources previously identified; previous investigation boundaries; and National Archaeological Database (NADB) citations for associated reports, historic maps, and historic addresses. Copies of site records, maps depicting previously recorded sites and surveys, and technical reports for investigations within a quarter mile of the Project area are included in Confidential Appendix M, Cultural Resources.

The records search identified two cultural resources investigations conducted within one mile of the Project area. No cultural resources investigations were conducted within the Project area. In (approximately April) 1983, Col. W.B. Sawyer performed the most recent survey within the one-mile search radius. Sawyer performed an archaeological reconnaissance survey of 12 acres in Section 27, Township 29 South, and Range 18 East of the California Valley USGS 7.5-minute series quadrangle map (though the report title erroneously reads Range 17 East). Sawyer did not locate or record any cultural resources during the reconnaissance survey. In March 1983, Jeffrey B. Serena performed a phase 1 archaeological survey of Section 27, Township 29 South, and Range 18 East of the California Valley and La Panza NE USGS 7.5-minute series quadrangle maps. Serena identified and recorded two prehistoric isolates (ISO-55, ISO-56) during the phase 1 survey. The isolates were a small Temblor Range chart flake and a fragment of an obsidian biface, and were determined not to be significant archaeological resources.

Besides the two isolates recorded by Serena, there have been no other previously recorded cultural resources within the one-mile search radius. Tables 5.7-1 and 5.7-2 summarize the results of the records search.

Table 5.7-1
Previously Conducted Cultural Resources Investigations within One Mile of the Project Area

Survey No.	Author/ Company	Date	Report Title	Quadrangle	Acres	Investigation Type
E-1546	Sawyer, Col. W. B	1983	Archaeological Reconnaissance of 12 Acres of Section 27, Township 29 South, Range 17 East, San Luis Obispo County, California	California Valley	12 acres	Negative Archaeological Reconnaissance
E-648	Serena, J., Office of Public Archaeology, Social Process Research Institute, University of California, Santa Barbara	1983	Cultural Resources Survey of Section 27, Township 29 S., Range 18E., San Luis Obispo County, CA	California Valley and La Panza NE	640 acres	Positive Phase 1 Archaeological Survey

Table 5.7-2
Previously Recorded Cultural Resources within One Mile of the Project Area

Other Identifiers	Cultural Resource Type	Cultural Resource Description	Quadrangle	Evaluation	Recorded by	Date Recorded
ISO-55	Prehistoric	Small flake of blue-gray Temblor Range chert.	La Panza NE	Not Significant	Serena, Jeffery B.	1983
ISO-56	Prehistoric	Fragment of an obsidian biface, which appears to be the distal end of the tool.	La Panza NE	Not Significant	Serena, Jeffery B.	1983

5.7.1.13 Archaeological Survey

Due to site access availability, the archaeological survey was conducted in two different sessions. Survey for Section 28 was completed by a crew of seven under the direction of URS Archaeologist Brent Leftwich between June 25 and July 2, 2007. Survey of the northern portion of Section 33 was completed by a crew of three under Leftwich's supervision between August 13 and 17, 2007. This pedestrian survey for the archaeological APE covered the Project area, including a 90-foot transmission line segment, and extended an additional 200 feet around it (Confidential Appendix M, Cultural Resources). The principal survey method consisted of a systematic walk-over in parallel transect intervals at approximately 15 meter increments. The survey transects extended across the entire horizontal extent of the archaeological APE. Evidence of disturbances within and surrounding the APE include numerous rodent burrows, plowed fields, livestock trampling, and road and building construction. Overall visibility within the Project site

ranged from 60-100 percent, and averaged approximately 80 percent of the ground surface; however, areas with greater visibility were thoroughly inspected for cultural materials to ensure adequate coverage for resource discovery.

The URS archaeological team identified two archaeological sites: URS-ACP-1 (associated with the King Property) and URS- 2 (associated with the Cavanaugh Property), the standing structures associated with each of these properties are discussed below in the historic architecture survey. Historic artifacts identified at the URS-ACP-1 (King Property) site and URS-2 (Cavanaugh Property) are similar and comprise items associated with farming and ranching. These artifacts include scrap metal fragments, ceramic and glass fragments, barbed wire, concrete chunks, .22, .45ACP, .223, .306 and .38 cartridges, 12 and 20 gauge shot shells, wood fragments, tractor and car parts, farm equipment and tools, ceramic insulators, animal bones (mostly bovine), nails, kitchenware, etc. The two archaeological sites were recorded on the appropriate DPR 523 series forms found in the Confidential Appendix M, Cultural Resouces.

5.7.1.14 Historic Architecture Survey

On June 12, 2007, URS architectural historian Jeremy Hollins performed an intensive survey to account for the properties that appeared to be older than 45 years (1962 or earlier) within the historic architecture APE (which included the Project area and an additional half-mile around the Project area) (Confidential Appendix M, Cultural Resources). The guidelines set forth in CCR Section 15064.5(a), and the criteria outlined in PCR Section 5024.1 were used to evaluate properties that appeared to be older than 45 years within the historic APE. Hollins photographed and recorded the properties that appeared to be older than 45 years through the appropriate Department of Parks and Recreation (DPR) 523 series forms. Properties that did not appear to be older than 45 years or were known not to be older than 45 years were not photographed or recorded. The survey occurred from public vantage points. In areas were views of the property were obstructed (e.g., tree overgrowth), arrangements were made for access to the properties.

As part of the historic architecture survey, Hollins performed site-specific and general primary and secondary research at the San Luis Obispo City-County Library History Room; the San Luis Obispo County Assessor, Clerk-Recorder, and Planning and Building Department Offices; San Luis Obispo County Historical Society Archives; and California Polytechnic State University, Kennedy Library Government Documents and Map Department. The research provided insight into the historic contexts and themes of the area and specific information concerning the properties within the APE (e.g., date of construction, architect/builder, and historic landownership). As part of this research, Hollins reviewed historic maps and photographs (e.g., USGS, plat, USDA aerial survey), newspaper articles, government records, titles, deeds and chattels, journal articles, and other relevant data.

The architectural history survey identified and recorded eight properties. Four properties were identified within the Project area and four properties were identified within a half-mile from the Project area. Figure 5.7-4 shows the results of the historic architecture survey. Tables 5.7-3 and 5.7-4 summarize the properties recorded as a result of the intensive survey.

Table 5.7-3
Previously Unrecorded Properties
within the Project Area

Map Ref No.	Name	Year Constructed	Description of Resource	Locational Data	County	Office of Historic Preservation (OHP) Code
1	Cavanaugh Property	Approximately 1945	Rural Property	UTM 10 768548E 3916769N (NAD83/WSG84)	San Luis Obispo	6Z
2	King Property	Approximately 1935	Rural Property	UTM 10 768066E 3918150N (NAD83/WSG84)	San Luis Obispo	6Z
3	Carrisa Highway (SR-58)	Approximately 1941	Rural Highway	Between Sections 27, 28, 33, and 34	San Luis Obispo	6Z
4	Morro Bay-Midway Transmission Line Corridor	Approximately 1943-1952	Metal Lattice Towers and Transmission Line Corridor	Northern Boundary of Section 28	San Luis Obispo	6Z

Table 5.7-4
Previously Unrecorded Properties
within a Half-mile of the Project Area

Map Ref No.	Name	Year Constructed	Description of Resource	Locational Data	County	OHP Status Code
5	Carrizo Plain Substation	Approximately 1949	Power Substation	UTM 10 768900E 3919285N (NAD83/WSG84)	San Luis Obispo	6Z
6	Filos Property	Approximately 1952	Rural Property	UTM 10 768778E 3919392N (NAD83/WSG84)	San Luis Obispo	6Z
7	Carrisa Plains School	1954	Elementary School Complex	UTM 10 768968E 3916374N (NAD83/WSG84)	San Luis Obispo	6Z
8	Water Storage Tank	Approximately 1952	Metal Water Storage Tank	UTM 10 768890E 3916081N	San Luis Obispo	6Z

None of the properties identified and recorded as a result of the intensive survey were determined eligible for the CRHR or determined to be historic resources for purposes of CEQA. Additionally, none of the properties have retained a significant amount of their historic integrity. Historic integrity is the ability for a historic property to convey its significance and consists of seven aspects: location, design, setting, materials, workmanship, feeling, and association. The following is a summary of the historic-period

properties that have been recorded and evaluated on the appropriate DPR 523 series forms found in the Confidential Appendix M, Cultural Resources.

5.7.1.14.1 Previously Unrecorded Properties within the Project area

5.7.1.14.1.1 Cavanaugh Property

The Cavanaugh Property, which is located within the southeastern quarter of Section 33, Township 29 South, Range 18 East of the California Valley USGS 7.5-minute series quadrangle map, is a modest example of a rural historic landscape (which is defined in *National Register Bulletin 30* as a geographical area that historically has been used by people, or shaped or modified by human activity, occupancy, or intervention, and that possesses a significant concentration, linkage, or continuity of areas of land use, vegetation, buildings and structures, roads and waterways, and natural features). The Cavanaugh Property was historically owned by Joseph and Mary Etna Cavanaugh (per historic San Luis Obispo County Plat Maps) since December 1927 (San Luis Obispo County Grantor-Grantee Index). Between 1915 and 1917, Joseph Cavanaugh worked for early settler Nels Beck (Jesperson, 1939). The Cavanaughs may have been related to Fredrick W. Cavanaugh, who was one of the largest landholders in San Luis Obispo County, and one of the first to utilize mechanized farm equipment (Jesperson, 1939).

The property consists of three private residences, several cylindrical water storage tanks and silos, barns and sheds, and smaller related agricultural, ranching, and farming buildings and structures like chicken coops. All of the buildings and structures were part of an interrelated working rural property from the mid-20th century (the buildings and structures first appear on the 1952 La Panza NE USGS maps despite the Cavanaugh's ownership of the property in 1927). Two of the residences are one-story wood-framed modern ranches built approximately 1945. The ranches feature similar vernacular stylistic details, such as decorative stick-work porch columns, stepped bolsters, and wide prominent wood and door window dressings. The other residence is a one and a half-story wood-framed vernacular bungalow built approximately 1945 and is characterized by a full-length enclosed porch along the north and south elevations. Many of the water storage tanks, silos, barns, and sheds are constructed of corrugated metal sheets, and several are severely dilapidated or have collapsed. The buildings and structures on the property have generally been affected by non-historic period alterations, neglect, abandonment, and environmental effects. The Cavanaugh Property also lacks any distinguishing circulation networks, patterns of spatial organization, and vegetation and natural features related to historic land uses.

None of the buildings and structures within the Cavanaugh Property are associated with any distinctive or significant events, persons, design/construction, or have the potential to yield important information. Rather, the buildings and structures are representative of construction forms that have been well-documented in San Luis Obispo County and California. Additionally, the buildings and structures within the Cavanaugh Property have experienced losses to its integrity of design, setting, materials, workmanship, feeling, and association.

5.7.1.14.1.2 King Property

The King Property, which is located within the southeastern quarter of Section 28, Township 29 South, Range 18 East of the California Valley USGS 7.5-minute series quadrangle map, is a modest example of a rural historic landscape. The property was historically owned by Walter William and Lottie King,

whose family had been in the Carrizo Plain since the 1880s. Walter William King was born in 1900 in San Luis Obispo and he moved to the property in 1928 to start farming and ranching (Jesperson, 1939). In May 1930, Walter William and Lottie King received a Crop and Chattel Mortgage for the property, and the 1936 La Panza NE USGS quadrangle map shows a building in the southern portion of the section.

Presently, the property consists of a single private residence and several cylindrical water storage tanks and silos, sheds, a garage, non-historic trash piles, and foundations. All of the buildings and structures were part of an interrelated working rural property from the mid-20th century (buildings and structures first appear on the 1936 through 1966 USGS quadrangle maps). Additionally, the property features two earthen dikes/reservoirs. Historically, the dykes may have been constructed for soil erosion and sediment control (from flooding) or as a reservoir for irrigation and ranching purposes. The dikes first appear on the 1952 La Panza NE USGS quadrangle map. The private residence is a one-story wood-frame vernacular house built approximately 1935. It has wood lap siding, corner boards, and exposed eaves. South of the residence is a wood-framed two bay storage shed, which appears to be contemporaneous with the residence since they have similar materials and finishes. The King Property also features a historic-period corrugated metal barn and a wood-frame garage with a single bay and sliding garage door. Near the northern portion of the property, there are five silos constructed of corrugated metal and sheet metal with raked seams. All of the silos are in poor condition and are non-functional. Scattered throughout the property are several non-historic period trash piles and dilapidated farm equipment. The buildings and structures on the property have generally been affected by non-historic period alterations, neglect, abandonment, and environmental effects. The King Property also lacks any distinguishing circulation networks and patterns of spatial organization.

None of the buildings and structures within the King Property is associated with any distinctive or significant events, persons, design/construction, or have the potential to yield important information. Rather, the buildings and structures are representative of construction forms that have been well documented in San Luis Obispo County and California. Additionally, the buildings and structures within the King Property have experienced losses to its integrity of design, setting, materials, workmanship, feeling, and association.

5.7.1.14.1.3 Carrisa Highway (SR-58)

Carrisa Highway (SR-58) enters the Project area between Sections 28 and 33, and Sections 33 and 34, Township 29 South, Range 18 East of the California Valley USGS 7.5-minute series quadrangle map. Carrisa Highway is a two-lane rural road paved with asphalt. The highway was originally part of the 19th century wagon route from Santa Margarita to the placer mines through Pozo, La Panza, and McKittrick in San Luis Obispo and Kern Counties. Historically, the highway has had numerous names, including the La Panza-Bakersfield Road, County Road 178, and SR-58. In 1890, it followed an alignment that ran south of Sections 32, 33, and 34, Township 29 South, Range 18 East of the California Valley USGS Quadrangle (Henderson, 1890). In 1902, the San Luis Obispo County Board of Supervisors confirmed that the road was for public use, and the road was realigned, graded, and received numerous improvements between 1897 and 1907 (according to County Deed and Bond Records). In 1933, the state legislature designated the road a state highway (SR-178). In May 1936, Carrisa Highway was improved from gravel and dirt to pavement for the first time. Since 1941, the highway has followed its current alignment within the Project area, and is characterized by a sharp 90 degree angle at the convergence of

Sections 27, 28, 33, and 34 (1942 USGS Maps; Krieger, 1992; Fisher, n.d.). By 1943, the highway was designated SR-178. In 1954, the state legislature returned operation and maintenance of the Carrisa Highway back to San Luis Obispo County, and ten years later the highway was designated SR-58.

Though Carrisa Highway has played a significant part in the history of transportation in eastern San Luis Obispo County, the road has been heavily modified throughout the 20th century. No part of the original gravel and dirt road is evident within the Project area. As a result, the road lacks integrity of design, materials, feeling, and workmanship. Moreover, Carrisa Highway is a typical rural road, and examples of this type have been well documented elsewhere.

5.7.1.14.1.4 Morro Bay–Midway Transmission Line Corridor

Along the northern boundary of the Project area is a transmission line corridor which runs east-west. The corridor consists of galvanized steel lattice towers (or electricity pylons) that rise approximately 35 feet and are evenly spaced. The transmission line corridor was constructed between 1943 and 1952, and the corridor is first represented as a feature on the 1952 La Panza NE and the 1959 Simmler USGS 7.5-minute series quadrangle maps. The transmission line corridor brought power from the foothills of the Sierras to central and southern California (Fisher, n.d.).

The transmission line corridor is a modest example of a lattice tower transmission line corridor. It is not associated with any distinctive or significant events, persons, design/construction, or has the potential to yield important information about the past. Rather, the corridor is representative of typical lattice tower construction, which has been well-documented in California and the West. Additionally, the placement of barbed wire fences around the base of some of the towers have caused impacts to the property's integrity of design, feeling, setting, and materials.

5.7.1.14.2 Previously Unrecorded Properties within a Half-mile of the Project Area

5.7.1.14.2.1 PG&E Carrizo Plain Substation

The PG&E Carrizo Plain Substation is a small power substation (approximately 0.3 acres) located in the northwest corner of Section 27, Township 29 South, Range 18 East of the La Panza NE USGS 7.5-minute series quadrangle map. The property is located within the half-mile survey area around the Project area. The substation was completed in November 1949 by Pacific Gas and Electric (Fisher, n.d.), and first appears on the 1966 La Panza NE USGS 7.5-minute series quadrangle map. The substation consists of several wood t-poles with ceramic and metal insulators. Around the perimeter of the substation is a chain-link fence supported by wood posts and diagonals. Toward the corner of the substation are associated utility boxes.

The Carrizo Plain Substation is a modest example of a power generation station. Though it was the first one in the plains, it is not associated with any distinctive or significant events, persons, design/ construction, and does not have the potential to yield important information about the past. Rather, the substation is representative of mid-20th century substation construction, which has been well-documented in California and the West. Additionally, improvements and alterations to components like the utilities boxes and the insulators have caused impacts to the property's integrity of design, feeling, setting, and materials.

5.7.1.14.2.2 Filos Property

The Filos Property is located in the southeast corner of Section 21, Township 29 South, Range 18 East of the La Panza NE USGS 7.5-minute series quadrangle map, and is a modest cluster of three interrelated vernacular agricultural buildings and structures from the mid-20th century. The property was historically owned by Alfred and Dorothy Filos and Edwin Walter (San Luis Obispo County Plat Maps). Alfred and Dorothy Filos acquired the property from the Hon. John Hubbard Hollister. Hollister, who was a former County Supervisor and held over 2,000 speculative acres in the Plains, filed a petition and sued the Filos in March 1927 in order to have them "quit the title" (It appears the matter was settled outside of court) (San Luis Obispo County Grantor-Grantee Index).

At the east end of the property is a wood-frame large vernacular barn, which houses two cylindrical corrugated metal storage tanks. The barn was constructed of corrugated metal, has a steep-pitched gable roof, and sits on a three to four-foot poured concrete foundation. The concrete shows extensive evidence of staining. Approximately two feet below the eaves, the barn is missing its exterior cladding and has an exposed braced-frame structural arrangement. To the west of the barn are a 30-foot lift/elevator and another cylindrical storage tank which sits on a 15-foot trestle pier. The storage tank has poor structural integrity and has collapsed. To the west of the trestle pier is a Quonset hut-style storage barn. It has a barrel arch roof with three ventilators at the top and seven bays on each of the side elevations (east and west sides). The north and south elevations have large sliding doors and hayloft bays. Windows with metal muntins, mullions, and rails flank the sliding doors. The barn first appears on the 1952 La Panza NE USGS 7.5-minute series quadrangle map and the Quonset hut and storage tanks first appear on the 1966 La Panza NE USGS quadrangle (despite the Filos' association with the property since at least 1927).

The buildings and structures on the property have generally been affected by non-historic period alterations, neglect, abandonment, and environmental effects. None of the buildings and structures within the Filos Property is associated with any distinctive or significant events, persons, design/construction, or have the potential to yield important information. Rather, the buildings and structures are representative of construction forms that have been well documented in San Luis Obispo County and California. Additionally, the buildings and structures within the Filos Property have experienced losses to their integrity of design, setting, materials, workmanship, feeling, and association.

5.7.1.14.2.3 Carrisa Plains School

The Carrisa Plains School is located at 9640 Carrisa Highway in the southwest portion of Section 34, Township 29 South, Range 18 East of the California Valley USGS 7.5-minute series quadrangle map, and is a mid-20th century contemporary school complex. The one-story building was completed in 1954 (though the school officially opened two years later) by San Luis Obispo architect John Badgley and L.H. Neudeck Construction Company, and features two classrooms, an all-purpose room, kitchen, tennis court and playground, and an auditorium (which was an addition completed in 1962) (San Luis Obispo City, County Library Archives). South of the school building is an original duplex constructed as a teacherage. The school building is characterized by its irregular L-shaped form, low-pitched gable and shed roofs, angular design, sweeping iron and concrete portico, and factory-fabricated materials such as the windows).

While the Carrisa Plains School exhibits many of the functional and design practices associated with mid-century school construction, the building is not associated with any distinctive or significant events, persons, design/construction, or has the potential to yield important information about the past. There are numerous similarly designed and planned schools and public buildings throughout the United States, California, and San Luis Obispo County. Additionally, the 1962 addition has caused impacts to the integrity of materials, design, and feeling of the property.

5.7.1.14.2.4 Water Storage Tank

The Water Storage Tank is located in the southeast corner of Section 33, Township 29 South, Range 18 East of the California Valley USGS 7.5-minute series quadrangle map. The tank is constructed of corrugated metal, is approximately 12 feet tall, and sits on a pile of wood timbers. The tank has poor structural integrity and has partially collapsed along the base. The tank first appears on the 1952 La Panza NE USGS 7.5-minute series quadrangle map.

The tank is not associated with any distinctive or significant events, persons, design/construction, or have the potential to yield important information. Rather, the tank is a poor representative of a structural form that has been well documented. Additionally, the poor structural condition of the structure has impacted the integrity of design, feeling, materials, and workmanship.

All of the properties have been recorded and evaluated on the appropriate DPR 523 series forms found in the Confidential Appendix M, Cultural Resources.

5.7.1.15 Native American Consultation

The Native American Heritage Commission (NAHC) was contacted on June 20, 2007 to request a search of the Native American Sacred Lands File (SLF) to determine the presence of Native American sacred sites within the APE. A list of Native American Contacts that may have some knowledge of known cultural resources or sacred sites within the APE was also requested. The NAHC responded on June 28, 2007 and indicated a records search of the SLF failed to indicate the presence of Native American cultural resources in the immediate APE. In addition to the response letter, the NAHC also supplied a Native American Contact list. Each contact on the list was sent a notification of the proposed undertaking by mail on July 18, 2007 with a request that he or she respond with any known cultural resources or sacred sites within the APE. Subsequent letters were mailed on August 18, 2007.

To date, no responses have been received regarding the Project. Correspondence letters between URS, on behalf of Carrizo Energy, LLC and the NAHC, and a spreadsheet showing those Native American individuals contacted are included in Confidential Appendix M, Cultural Resources.

5.7.2 Environmental Consequences

5.7.2.1 Significance Criteria

The cultural resources investigations and reports for the Project were conducted in accordance with the CEQA, Public Resources Code, Section 21000 *et seq.*, and the CCR, Title 14, Chapter 3, Section 15000. Consideration of significance as an “historical resource” is measured by cultural resource provisions

considered under CCR Section 15064.5 and 15126.4. Generally, a historical resource (these include the historic built environment and historic and prehistoric archaeological resources) is considered significant if it meets the criteria for listing on the CRHR. These criteria are set forth in CCR Section 15064.5, and include resources 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 in our past;
- Embody the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or
- Have yielded, or may be likely to yield, information important in prehistory or history.

CCR Section 15064.5 and Section 21084.1 further states that a resource not listed in or determined to be eligible for listing in the CRHR, not included in a local register of historical resources (pursuant to PRC Section 5020.1(k), or identified in an historical resources survey can still be considered a historical resource (as defined in PRC Section 5020.1[j] and 5024.1) by a lead agency.

Under CCR Section 15064.5(b), a project potentially would have significant impacts if it would cause a substantial adverse change in the significance of an historical resource (i.e., a cultural resource eligible to CRHR, or archaeological resource defined as a unique archaeological resource which does not meet CRHR criteria), or would disturb human remains. The types of substantial adverse changes include physical demolition, destruction, relocation, or alteration of the resource.

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

Impacts to "unique archaeological 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.

In many cases, determination of a resource's eligibility to the National Register of Historic Places (NRHP) or CRHR (or its uniqueness) can be made only through extensive research. As such, the best alternative to preserve historic resources is the no action alternative; however, because this alternative is

not always feasible, any project should consider alternatives or mitigation measures to lessen the effects to these resources. Where possible, to the maximum extent possible, impacts to resources should be avoided. If, as the Project proceeds, it proves impossible to avoid cultural resources, formal eligibility evaluation will be undertaken. If the resource meets the criteria of eligibility to the CRHR, it will be formally addressed under CCR Section 15064.5 and 15126.4.

5.7.2.2 Direct and Indirect 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 architecture and archaeological resources. Indirect impacts are related to the primary consequences of the completed project and can cause a change in the character or use of the built environment by the introduction of undesirable auditory or visual intrusions. The construction, operation, and maintenance of the Project are not expected to result in direct or indirect impacts to historic architecture and archaeological resources.

5.7.3 Cumulative Impacts

The CESF and other projects in the vicinity are not expected to result in significant cumulative impacts to environmental resource areas, including, but not limited to, air quality, land use, cultural resources, water resources, or traffic during the construction or operation phases. All existing and proposed projects can be characterized primarily as residential development (i.e., new single-family dwellings and mobile homes). Of the 41 projects with permit applications submitted since January 2000, only 6 projects proposed new residential construction (i.e., single-family dwellings). The remaining 35 projects include minor construction projects such as manufactured and mobile home permits, mobile home foundations, carport additions, roof replacements, deck additions, and residential renovations. Further, some of the listed projects have permits that have expired since their issuance and thus, can be dismissed from this cumulative impact analysis.

The closest permitted project is located approximately 0.5-mile to the west of the CESF site and includes the addition of a mobile home. In addition, all permitted projects within 2.0-miles of the CESF site include manufactured and mobile home permits and/or mobile home foundations. All other proposed projects are located over 2.0-miles from the Project site. Thus, as mentioned above, no significant cumulative impacts have been identified as a result of the construction, operation, maintenance, or long-term presence of the CESF and other projects in the area. For further discussion of cumulative impacts, see Section 5.18, Cumulative Impacts.

The Project, when assessed with other projects, is not anticipated to have any foreseeable cumulative impacts to cultural resources. No significant or unique cultural resources were found in the APEs during the archaeological pedestrian survey and historic architecture survey. Cumulative impacts from the Project on local and regional cultural resources are limited because mitigation measures have been provided that would reduce potential impacts to a less than significant level in the event that an archaeological site is identified within the Project boundaries during construction. In the event that a significant buried archaeology site is encountered during construction, data recovery, and/or site avoidance would ensure that the information content of the site would be retained. These measures would limit the cumulative impacts the Project would have on cultural resources in the region.

5.7.4 Mitigation Measures

The CESF is not anticipated to impact CRHR eligible or unique cultural resources; however, mitigation measures have been provided that would reduce potential impacts to cultural resources to a less than significant level in the event that an archaeological site is identified within the Project boundaries during construction. As a result, archaeological monitoring must be conducted during all ground-disturbing activities within the Project site. Should a potentially significant cultural resource be encountered, evaluation of this resource to determine significance is required. The mitigation measures and procedures described below would apply to any cultural resources located within the identified Project APEs. With implementation of the mitigation measures listed below, no significant impacts to cultural resources are expected to occur.

All cultural resources monitoring and mitigation will be 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 (36 CFR Part 61, Appendix A), and will be consistent with the procedures for compliance with CCR Section 15064.5.

5.7.4.1 Avoidance

CUL-1: In the event cultural resources are encountered prior to or during construction activities, including subsurface excavation, construction activities in the immediate vicinity of the identified resource shall be halted and a qualified archaeologist shall identify the nature and boundary of the finds and assess whether the proposed activities will impinge upon a cultural resource. Routes of any access roads 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. In the event the resource is identified as a potentially significant cultural resource, planned construction activities shall be modified to avoid the resource if feasible. If it is not feasible to avoid the resource, the archaeologist shall identify the proper course of testing, excavation, recovery, and documentation to be undertaken in order to reduce Project related impacts to a less than significant level. In the event that archaeological resources are discovered during the course of construction, activities related to the proposed Project, grading, and/or excavation activities within 100 feet of the potentially significant resource should be monitored by a qualified archaeologist.

5.7.4.2 Physical Demarcation and Protection

CUL-2: In instances where a Project facility must be placed within 100 feet of a known cultural resource previously found eligible for inclusion on 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 directed to avoid entering the area. Where cultural resource boundaries are unknown, the protected 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 to ascertain whether the cultural resource can be avoided.

5.7.4.3 Preconstruction Assessment and Construction Training

CUL-3: A qualified professional archaeologist shall be retained to monitor all ground-disturbing activities associated with the Project. Ground disturbing activities include clearing, grubbing, grading, and trenching within the Project site and construction laydown area. The archaeological monitor shall visit the Project prior to commencement of construction activities to become familiar with site conditions. The archaeological monitor shall attend the pre-construction meeting and work with the County of San Luis Obispo, the client, and construction management staff to suspend or redirect construction activities if cultural materials are encountered. The archaeological monitor shall also provide training to appropriate construction personnel on the site to explain the importance of and legal basis for the protection of significant archaeological resources.

5.7.4.4 Archaeological Monitoring

CUL-4: The archaeological monitor shall be equipped with a cellular telephone to ensure rapid communication with URS senior cultural resources staff to promptly report any cultural finds or discuss any problems as they are encountered in the field. Archaeological monitors shall keep a daily monitoring log of construction activities, observations, types of equipment used, problems encountered, and any new archaeological discovery (including the cultural material observed and location). Photographs shall be taken as necessary to supplement the documentation. These logs shall be signed and dated by the archaeological monitor and included within the monitoring report.

The archaeological monitor shall monitor all ground-disturbing activities within the Project site and construction laydown area. The archaeological monitor will be authorized to temporarily halt ground-disturbing activities in the immediate vicinity of a discovery in the event that cultural resources are uncovered during construction. Similarly, if the construction staff or others identify cultural resources during construction activities, they shall halt construction in the immediate vicinity, and immediately notify the archaeological monitor and Project supervisor. The archaeological monitor shall then immediately notify URS senior cultural resources staff. The archaeological monitor shall use flagging tape to delineate the area of the find and protect the resources from construction activities. Construction activities shall not take place within the delineated discovery area until the archaeological monitor, in consultation with URS senior cultural resources staff and the CEC can inspect and evaluate the significance of the find and implement mitigation measures, if needed. During this time, construction activities may be redirected to other areas outside of the flagged area.

After all ground-disturbing activities are complete, a cultural resources compliance monitoring report shall be prepared by URS cultural resources staff. The report shall include the daily monitoring logs as an appendix. The report shall also include the level of effort involved in monitoring cultural resources, a description of activities monitored, and the number and types of new cultural resources discoveries, including assessment and treatment action.

5.7.4.5 Native American Monitoring

CUL-5: 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 testing and/or data

recovery for cultural resources that appear to have a prehistoric or ethnographic component. The monitor will be retained either directly by the Applicant or by the consultant conducting the actual fieldwork.

5.7.4.6 Resource Recordation and Evaluation

CUL-6: The archaeological monitor shall follow accepted professional standards in recording any discovery and shall submit applicable Department of Parks and Recreation forms to the CCIC. If the discovery is deemed not significant by URS senior cultural resources staff, construction activities may proceed. Should a potentially significant cultural resource be encountered during monitoring, evaluation of this resource to determine significance will be required. Significant cultural resources impacted by the Project would require additional mitigation, which may include data recovery. A recovery of a sample of the deposit from which the archaeologist can define scientific data to address archaeological research questions is considered an effective mitigation measure. A mitigation plan shall be prepared and carried out by URS cultural resources staff. The mitigation program shall be carried out as quickly as possible to avoid construction delays. Construction may resume onsite as soon as the field data collection phase of any data recovery program is completed.

5.7.4.7 Provision for Encountering Human Remains

CUL-7: Human remains are not anticipated within the Project given the absence of a prehistoric deposit. If human remains are encountered, construction activities shall be immediately halted in the immediate vicinity of the discovery. The Project supervisor shall immediately contact the county coroner, and the Applicant. If the remains are Native American, the NAHC shall be contacted. The NAHC is required to determine the most likely descendant, notify that person, and request that they inspect the burial and make recommendation for treatment and removal.

5.7.4.8 Laboratory Analysis and Curation

CUL-8: Cultural material removed during the course of monitoring or other mitigation measures shall be bagged and catalogued in the field, and analyzed in the laboratory. Cultural materials shall be analyzed in order to characterize the resource(s) and their association to existing regional chronologies. The materials, and the contexts from which they were sampled, shall also be evaluated with regard to the eligibility criteria for inclusion on the CRHR.

The objectives of laboratory processing and analysis are to determine to the extent possible the date, function, cultural affiliation and significance of the archaeological sites, and to prepare artifacts for permanent curation. Artifacts shall be processed (i.e., cleaned, catalogued, and analyzed) according to the Secretary of the Interior's Standards and Guidelines for curation (36 CFR 79). Artifacts shall be gently washed using tap water and a soft toothbrush. Delicate and/or unstable materials, such as decayed metal and organic material, shall be carefully dry-brushed with a soft toothbrush. After drying, artifacts shall be analyzed, catalogued, and rebagged according to provenience and type. Artifacts shall have acid-free paper labels with full provenience information, including the state site number, catalog number, shovel test pit or test unit number, stratum, and date. All artifact information shall be entered into a customized computer-based application.

Historic artifacts shall be cataloged according to group, material, and type, generally based on Stanley South's classifications (1977). South's artifact groups consist of:

- Architecture – construction material and decoratively functional (e.g., doorknobs or moldings) elements used in a building.
- Clothing – any part of clothing, from a whole garment to a fragment of cloth, a single bead, or a button, as well as sewing items such as a needle or thimble.
- Furniture – furniture hardware and other furniture parts.
- Kitchen – items used primarily in the kitchen, such as glass, ceramics, stove parts, and food remains.
- Personal – small items belonging to one person, such as coins, hygiene products, and jewelry.
- Arms – gun parts and ammunition.
- Tobacco – items used to smoke tobacco.
- Activities – items used to perform an act, such as hardware, toys, transportation, construction, and recreation.

All artifacts, monitoring logs, and photographs are the property of the client and shall be placed in appropriately labeled boxes for temporary storage at URS. As part of mitigation requirements, final curation shall be at the University of California, Santa Barbara Department of Anthropology and funded by the client.

5.7.5 LORS Compliance

The Project will be consistent with all applicable laws, ordinances, regulations, and standards (LORS). Any cultural resources potentially affected by the Project are subject to compliance with the provisions outlined in CEQA/CRHR. If a cultural resource is discovered during construction, and cannot be avoided, a program of site evaluation will be undertaken to ascertain site significance under CEQA/CRHR. All applicable LORS are summarized in Table 5.7-5.

5.7.5.1 Federal

The Project is not anticipated to have federal involvement; therefore, federal LORS pertaining to cultural resources are not applicable. If the Project is determined to have federal involvement, then cultural resources investigations will be consistent with Section 106 of the National Historic Preservation Act per 36 CFR Part 800, and any other applicable federal LORS.

5.7.5.2 State

Table 5.7-5 summarizes the cultural resources state-level LORS that may be applicable to the Project.

5.7.5.3 Local

The County of San Luis Obispo has specific LORS, which also determine the treatment of cultural resources identified and recorded in the County of San Luis Obispo. Table 5.7-5 summarizes the local-level LORS.

Table 5.7-5
Summary of LORS

Jurisdiction	LORS	Requirements	Conformance Section	Administering Agency	Agency Contact
Federal					
	Not Applicable (N/A)	N/A	N/A	N/A	N/A
State					
	The Warren-Alquist Act (1974, as amended)	Requires 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	CEC	Dorothy Torres
	CEQA of 1970, as amended	Applies to discretionary projects causing a significant effect on the environment and a substantial adverse change in the significance of an historical or archaeological resource.	5.7, 5.7.2.1, 5.7.2.2	CEC	Dorothy Torres
	California PRC Section 5020-5029.5	Establishes the California Register of Historical Resources, criterion, and creates the California Historic Landmarks Committee and authorizes the Department of Parks and Recreation to designate Registered Historical Landmarks and Registered Points of Historical Interest; establishes criteria for the protection and preservation of historic resources.	5.7.2.1	CEC; State Historic Preservation Office; Department of Parks and Recreation	Dorothy Torres; Milford Wayne Donaldson, FAIA
	Senate Bill 922 (Ducheny, 2005)	Exempts from California Public Records Act Native American graves, cemeteries, archaeological site information, and sacred places in the possession of the Native American Heritage Commission and other state or local agencies.	5.7.1.15	CEC; Native American Heritage Commission	Dorothy Torres; Katy Sanchez

Table 5.7-5
Summary of LORS
(Continued)

Jurisdiction	LORS	Requirements	Conformance Section	Administering Agency	Agency Contact
	Senate Bill 18 (Burton, 2004)	Protection and preservation of Native American Traditional Cultural Places during city and county general plan development.	N/A	CEC; County of San Luis Obispo; Native American Heritage Commission	Dorothy Torres; Victor Holanda; Katy Sanchez
	Senate Concurrent Resolution Number 87 (1994)	Provides for the identification and protection of traditional Native American resource gathering sites on state land.	N/A	CEC	Dorothy Torres
	Administrative Code, Title 14, Section 4307	No person shall remove, injure, deface, or destroy any object of paleontological, archaeological, or historical interest or value.	5.7.2.1, 5.7.2.2, 5.7.4.1, 5.7.4.2, 5.7.4.5	CEC	Dorothy Torres
	Government Code, Sections 6253, 6254, 6254.10	Disclosure of archaeological site information is not required for records that relate to archaeological site information maintained by the Department of Parks and Recreation, the State Historical Resources Commission, or the State Lands Commission.	5.7.1.12, 5.7.1.15, 5.7.4.1	CEC	Dorothy Torres
	Health and Safety Code, Section 7050.5	Requires construction or excavation stopped near human remains until a coroner determines whether the remains are Native American; requires the coroner to contact the NAHC if the remains are Native American.	5.7.4.7	CEC; County Coroner	Dorothy Torres
	Health and Safety Code, Section 7051	Establishes removal of human remains from internment, or from a place of storage while awaiting internment or cremation, with the intent to sell them or to dissect them with malice or wantonness as a public offense punishable by imprisonment in a state prison.	5.7.4.7	CEC; County Coroner	Dorothy Torres

Table 5.7-5
Summary of LORS
(Continued)

Jurisdiction	LORS	Requirements	Conformance Section	Administering Agency	Agency Contact
	Health and Safety Code, Section 7052	States that willing mutilation of, disinterment of, removal from a place of disinterment of, and sexual penetration of or sexual contact with any remains known to be human are felony offenses.	5.7.4.7	CEC; County Coroner	Dorothy Torres
	Penal Code, Title 14, Section 622.5	Misdemeanor offense for any person, other than the owner, who willfully damages or destroys archaeological or historic features on public or privately owned land.	5.7.2.1, 5.7.2.2, 5.7.4.1, 5.7.4.2	CEC	Dorothy Torres
	PRC 5097-5097.6	Provides guidance for state agencies in the management of archaeological, paleontological, and historical sites affected by major public works project on state land.	N/A	CEC	Dorothy Torres
	PRC 5097.9-5097.991	Establishes regulations for the protection of Native American religious places; establishes the Native American Heritage commission; California Native American Remains and Associated Grave artifacts shall be repatriated; notification of discovery of Native American human remains to a most likely descendent.	5.7.1.15	CEC; State Historic Preservation Office; Tribal Historic Preservation Office; Native American Heritage Commission	Dorothy Torres; Milford Wayne Donaldson, FAIA; Katy Sanchez
	CCR Section 1427	Recognizes that California's archaeological resources are endangered by urban development; the Legislature finds that these resources need preserving; it is a misdemeanor to alter any archaeological evidence found in any cave, or to remove any materials from a cave.	5.7.1.1, 5.7.2.1, 5.7.2.2, 5.7.4.1	CEC	Dorothy Torres

Table 5.7-5
Summary of LORS
(Continued)

Jurisdiction	LORS	Requirements	Conformance Section	Administering Agency	Agency Contact
	Senate Concurrent Resolution Number 43	Requires all state agencies to cooperate with programs of archaeological survey and excavation, and to preserve known archaeological resources whenever reasonable.	N/A	CEC	Dorothy Torres
	Penal Code, Title 14, Section 622.5	Misdemeanor offense for any person, other than the owner, who willfully damages or destroys archaeological or historic features on public or privately owned land.	5.7.2.1, 5.7.2.2	CEC	Dorothy Torres
Local					
	Land Use Ordinance, Title 22, Section 01.010	County of San Luis Obispo's plan for the protection and enhancement of the significant natural, historic, archaeological (defined as any Native American or pre-Colombian artifact or burial), and scenic resources within the county as identified by the county General Plan.	5.7	County of San Luis Obispo	Victor Holanda

Table 5.7-5
Summary of LORS
(Continued)

Jurisdiction	LORS	Requirements	Conformance Section	Administering Agency	Agency Contact
	Land Use Ordinance, Section 10.040	In the event archeological resources are unearthed or discovered during any construction activities, construction activities shall cease and the environmental coordinator and planning department shall be notified so that the extent and location of discovered materials may be recorded by a qualified archaeologist and disposition of artifacts may be accomplished in accordance with state and federal law. In the event human remains are found, the county coroner is to be notified in addition to the planning department and environmental coordinator so proper disposition may be accomplished.	5.7.4.2, 5.7.4.6, 5.7.4.7	County of San Luis Obispo	Victor Holanda
	Land Use Ordinance, Section 14.080	Outlines standards for protecting historic sites (defined as archaeological resources and historic structures and sites).	5.7.5.3	County of San Luis Obispo	Victor Holanda
	Shandon-Carrizo Plan, Open Space Plan, and the Parks and Recreation Plan of the County General Plan (1975-2007)	Defines historic facilities and resources; identifies the county of San Luis Obispo's goals and policies in protecting (known and previously unrecorded) cultural resources, and the outlines the procedures for establishing and protecting sensitive resource and historic resource areas through historic site easements, preserves, and open space.	5.7.5.3	County of San Luis Obispo	Victor Holanda

5.7.5.4 Agencies and Agency Contacts

Agencies with jurisdiction to enforce LORS related to cultural resources are shown in Table 5.7-6.

Table 5.7-6
Agency Contact List for LORS

	Agency	Contact	Address	Telephone
1	CEC	Dorothy Torres	1516 Ninth Street Sacramento, CA 95814	(916) 653-3992
2	County of San Luis Obispo Department of Planning and Building	Victor Holanda	976 Osos Street, Room 200 San Luis Obispo, CA 93408	(805) 781-5708
3	State Historic Preservation Office	Milford Wayne Donaldson, FAIA	1416 9th Street, Room 1442-7 Sacramento, CA 95814 P.O. Box 942896 Sacramento, CA 94296-0001	(916) 653-6624

5.7.5.5 Permits Required and Permitting Schedule

As shown in Table 5.7-7, no permits are required for the CESF in the area of cultural resources.

Table 5.7-7
Applicable Permits

Responsible Agency	Permit/Approval	Schedule
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A

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5.8 PALEONTOLOGICAL RESOURCES

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) 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 in which they were buried.

This section summarizes the potential environmental impacts on paleontological resources that could result from construction of the Carrizo Energy Solar Farm (CESF or Project). Section 5.8.1 describes the existing environment that could be affected by the proposed Project. Section 5.8.2 describes the potential impacts on paleontological resources resulting from construction and operation of the proposed Project. The potential cumulative impacts to paleontological resources are discussed in Section 5.8.3. Proposed mitigation measures to reduce potential adverse impacts to paleontological resources are discussed in Section 5.8.4. Section 5.8.5 lists the federal, state, and local laws, ordinances, regulations and standards (LORS) and the professional standards that protect paleontological resources. The involved agencies and agency contacts are provided in Section 5.8.5.4. Section 5.8.5.5 discusses the status of permits required and permit schedule. Finally, Section 5.8.6 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 (PG) and Senior Paleontologist, and by Stephen J. Blakely, Field Paleontologist, both with PaleoResource Consultants (PRC). It meets all requirements of the California Energy Commission (CEC, 2007) 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; see Appendices A and B in Fisk and Blakely, 2007). The complete Report (Fisk and Blakely, 2007) is included as Confidential Appendix N, Paleontological Resources, and contains Appendices A through C cited herein.

5.8.1 Affected Environment

5.8.1.1 Geographic Location

The proposed Project is located on the Carrizo Plain in central eastern San Luis Obispo County, California (Figures 5.8-1 and 5.8-2) within Township 29 South, Range 18 East. The center of the proposed Project is located approximately at latitude 35˚22'15"N and longitude 120˚03'00"W. The Project would impact Sections 28 and 33 on the California Valley United States Geological Survey (USGS) 7.5 minute quadrangle and Section 28 on the La Panza NE USGS 7.5 minute quadrangle. The topographic relief at the site is low, with elevations ranging from approximately 2000 to 2064 feet.

The Carrizo Plain is bounded by the San Andreas Fault and the Temblor Range to the northeast, and the La Panza and Caliente Ranges to the southwest (Figure 5.8-1). The Project site is near the southeastern extent of the northwest-oriented Coast Ranges Physiographic Province, which is between the Central Valley Physiographic Province and the Pacific Ocean. Accessible roads within and around the Project

area include the California State Route 58 (SR-58)/Carrisa Highway, Branch Mountain Road, Tracy Lane, and Soda Lake Road.

5.8.1.2 Regional Geologic Setting

The general geology of the Carrizo Plain area has been described in some detail by Fairbanks (1898), Dibblee (1962, 1973b), Christensen (1965), Galehouse (1967), Dohrenwend (1979), Bartow (1990), and Lewis (1991). Surficial geologic mapping in the Project vicinity has been provided at a scale of 1:750,000 by Jennings et al. (1977); at a scale of 1:500,000 by Jenkins (1938); at a scale of 1:250,000 by Jennings (1958); at a scale of 1:125,000 by Dibblee et al. (1999); and at a scale of 1:24,000 by Dibblee and Minch (2005, 2006a, 2006b, and 2006c). The information in these geologic maps and published and unpublished reports form the basis of the following discussion. Individual maps and publications are incorporated into this report and referenced where appropriate. 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 southern Coast Ranges Physiographic Province is a series of mountain ranges oriented such that their long axes are aligned generally northwest-southeast. Along the southwest margin of the Carrizo Plain are the La Panza and Caliente Ranges, which are mostly comprised of geologic formations of a Middle Tertiary sedimentary sequence (Dibblee, 1973a). Along the northeast margin of the Plain is the Temblor Range, which is mostly comprised of sedimentary sequences ranging from Late Mesozoic to Late Tertiary in age (Dibblee, 1973a).

The Carrizo Plain is a perched valley and closed basin with interior drainage. Soda Lake, located near the center of the Plain and southeast of the Project location (Figure 5.8-1), is the point of lowest elevation in the valley (1900 feet), and perhaps the remnant of a much larger lake that may have once covered more of the Carrizo Plain during wetter and colder times (Negrini et al., 2007). The margins of the valley floor are flanked by alluvial fans resulting from the erosion of the bounding mountain ranges. The fan apices form where mountain drainages leave local confines and enter the valley. The Project site is located towards the center of the valley, and is therefore upon the distal fan, where the slope is generally gentle, and deposited alluvium is generally fine grained. At the northeast margin of the Carrizo Plain, defined by the Temblor Range and the San Andreas Fault, geomorphic features are visibly altered by fault displacement, which can be seen in offsets in both drainages and alluvial fans and by fault scarps. The southwest margin of the Plain is defined by the Caliente and La Panza Ranges.

In the immediate vicinity of the proposed Project, several geologic structures are present which may influence the thickness of alluvial cover. To the northeast of the site, a series of folds have been identified (Dibblee and Minch, 2006a, 2006b). The axes of these folds trend generally northwest-southeast, paralleling the trace of the San Andreas and associated faults. To the southeast of the Project area lie a series of folds and thrust faults verging and striking, respectively, northwest-southeast (Dibblee et al., 1999). A large syncline at Syncline Hill is the structure closest to the CESF site on the west side of the valley. West of the Carrizo Plain, the Big Springs Thrust, and associated faults strike northwest and dip to the northeast. One of these fault traces extends towards the Project area and is covered by alluvium (Dibblee et al., 1999).

The CESF location is underlain by, or is adjacent to, several stratigraphic units, ranging in age from Miocene to Recent. Miocene formations outcrop from south to west of the site, and include the Caliente, Vaqueros, Branch Canyon Sandstone, Monterey, and Santa Margarita formations. The Pliocene Paso Robles Formation outcrops within, and from north to east of the proposed Project boundaries. The surficial geology underlying the CESF site has been previously mapped as Quaternary alluvium and Paso Robles Formation (Dibblee et al., 1999; Dibblee and Minch, 2006a, 2006b). The alluvium within the Project vicinity overlies the Paso Robles Formation, and ranges in thickness from less than one foot (~0.3 meters) up to several feet / meters (URS, 2007; personal observations).

5.8.1.3 Resource Inventory Methods

To develop a baseline paleontological resource inventory of the Project 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 (see below). These methods are consistent with California Energy Commission (CEC) 2007 and SVP 1995 guidelines for assessing the importance of paleontological resources in areas of potential environmental effect.

Geologic maps and reports covering the bedrock and surficial geology of the Project 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. Museum records searches were conducted at the University of California Museum of Paleontology (UCMP) at Berkeley and at the Los Angeles County Museum of Natural History (LACM) in order to determine whether any of the stratigraphic units found within the Project vicinity had previously yielded significant paleontological resources. In addition, aerial photographs of the area were examined to aid in determining the areal distribution of distinctive sediment and soil types. No subsurface exploration was conducted for this assessment.

A field survey, which included visual inspection of exposures of potentially fossiliferous strata in the Project area, was conducted to document the presence of sediments suitable for containing fossil remains and the presence of any previously unrecorded fossil sites. The field survey for this assessment was conducted on June 28-29, 2007 and on August 10, 2007. The June 28-29, 2007, portion of the survey was conducted by Dr. Lanny H. Fisk, Ph.D., P.G., Senior Paleontologist with PRC and Stephen J. Blakely, Field Paleontologist with PRC. The August 10, 2007, survey was conducted by Stephen J. Blakely and Dr. Joe D. Stewart, Ph.D., Principle Paleontologist with URS Corporation. During the field survey, stratigraphy was observed in road cuts, water storage ponds, irrigation ditch banks, and stream channels. Exposed sediments up to approximately six feet were observed in locations within and in the vicinity of the proposed Project location (Figure 5.8-3, Photograph 1).

5.8.1.4 Paleontological Resource Assessment Criteria

The SVP (1995), in common with other environmental disciplines such as archaeology and biology (specifically in regard to listed species), considers any fossil specimen significant unless demonstrated otherwise, and 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 (e.g., 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 allows for their geographic location. Fossils, on the other hand, are an integral component of the rock unit below the ground surface; therefore, they 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 the 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.

Since it is not possible to determine where fossils are located without actually disturbing a rock unit, monitoring of excavations by an experienced paleontologist during construction increases the probability that fossils will be discovered and preserved. Preconstruction mitigation measures such as surface prospecting and collecting will not prevent adverse impacts on fossils because many sites will be unknown in advance due to an absence of fossils at the surface.

The non-uniform distribution of fossils within a rock unit is essentially universal and many paleontological resource assessment and mitigation reports conducted in support of environmental impact documents and mitigation plan summary reports document similar findings (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 (i.e., 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 because the areal distribution of each rock unit can be delineated on a topographic or geologic map. The paleontological sensitivity of a stratigraphic unit reflects: (1) its potential paleontological productivity (and sensitivity), and (2) the scientific significance of the fossils it has produced. This method of paleontological resources assessment is the most appropriate because 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.

Under the California Environmental Quality Act (CEQA) Guidelines, Section 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. 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 relative 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 et al., 1971) and as sedentary organisms, are 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 was assessed based on previously recorded and newly documented fossil sites it contains at and/or near the Project site.
- The scientific importance of fossil remains recorded from a stratigraphic unit exposed at and/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.

5.8.1.4.1 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 (e.g., road cuts) and natural exposures (e.g., stream banks), and possible subsurface testing (e.g., augering or trenching), an experienced, professional paleontologist can often determine whether the stratigraphic unit should be categorized as having high or low sensitivity.

5.8.1.5 Resource Inventory Results

5.8.1.5.1 Stratigraphic Inventory

Regional geologic mapping in the vicinity of the proposed Project has been provided by Jennings et al. (1977; 1:750,000); Jenkins (1938; 1:500,000); and Jennings (1958; 1:250,000). Larger scale mapping of the Project site has been provided by Dibblee et al. (1999; 1:125,000); Vedder et al. (1986; 1:24,000); Dibblee and Minch (2005; 1:24,000); and Dibblee and Minch (2006a, 2006b, 2006c; 1:24,000).

5.8.1.5.2 Project Geology

Fairbanks (1898) provided one of the first descriptions of the stratigraphy in the area of the southern coast ranges which includes the proposed CESF location. He described the tertiary stratigraphy as a series of sedimentary terranes, and divided the sequence of strata into the Monterey series, the San Pablo

Formation, and the Paso Robles Formation (Fairbanks, 1898). Dibblee (1973b) inventoried the stratigraphy of the area, and adopted or corrected terminology previously used to describe the plutonic, metamorphic, and sedimentary units in the vicinity of the San Andreas Fault. In addition to other units described, the deposits on the Carrizo Plain were informally designated "valley deposits" which he divided into the Paso Robles Formation and alluvium (Dibblee, 1973b). The contact between the Paso Robles Formation and the alluvium was described as possibly conformable (Dibblee, 1973b). Bartow (1990) inventoried the sedimentary units of the region, in reference to the subsiding tectonic region which has accumulated several kilometers of sediments since the Oligocene Epoch. In his inventory, Bartow (1990) identified the primary stratigraphic units in the Carrizo Plain vicinity as the Simmler, Vaqueros, Monterey Shale, Santa Margarita, Morales, and Paso Robles Formations.

Based upon the available geologic literature, recent geologic maps, and field observations, only two of these stratigraphic units will be potentially impacted during Project construction activities. These units are the Pliocene Paso Robles Formation and the Quaternary alluvium, which are described below.

Paso Robles Formation. The Paso Robles Formation is primarily a non-marine fluvial unit composed of channel and floodplain deposits (Fairbanks, 1898; Galehouse, 1967; Addicott and Galehouse, 1973; Dibblee, 1973b). Fairbanks (1898) first named the formation for a characteristic exposure near the city of Paso Robles. In later work, additional occurrences of the Paso Robles Formation have been identified, and the formation name has been applied (Dibblee, 1973b). The southern extent of the unit occurs in the Carrizo Plain, although the Paso Robles Formation extends much further north into the Salinas Valley. Galehouse (1967) described the lithology, facies characteristics, and provenance of the Paso Robles Formation, as well as geographic changes in these characteristics. The unit is primarily composed of gravel and sand, with smaller percentages of silt, clay, and limestone. Where visible, outcrops are generally light brownish orange with massive bedding (Galehouse, 1967). In addition to the fluvial deposits, some lacustrine deposits have been identified, including the limestone and some of the clay deposits. The age of the Paso Robles Formation is Pliocene based on age diagnostic fossils including *Nettastomella rostrata* (bivalve) and *Ostrea vespertina* (oyster), and on marine mammal fossils (Galehouse, 1967; Addicott and Galehouse, 1973; Obradovich *in* Addicott and Galehouse, 1973).

Quaternary Alluvium. Quaternary alluvium is the most recent unit, overlies several older units, and conceals unit contacts. It is composed primarily of fluvial sands and gravels transported from the topographically high adjacent areas of the Temblor, Caliente, and La Panza Ranges. In the immediate vicinity of the Project site, the alluvium is composed of reworked material from Paso Robles Formation and older formations, with clast sizes ranging up to approximately five inches in diameter.

5.8.1.5.3 Paleontological Resource Inventory

An inventory of known paleontological resources previously discovered in the vicinity of the proposed Project is presented below and the paleontological importance of these resources is assessed. The literature review and UCMP and LACM archival search conducted for this inventory documented no previously recorded fossil sites within the actual Project site. However, sediments of both the Paso Robles Formation and the Quaternary alluvium have yielded fossilized remains of extinct species of continental vertebrates and other types of organisms at previously recorded fossil sites in the region

(Kellogg, 1921; Galehouse, 1967; Addicott and Galehouse, 1973; Jefferson et al., 1992; LACM records; UCMP records).

Paso Robles Formation. Few fossil remains have been reported from the Paso Robles Formation. Fairbanks (1898), in his initial assessment of the formation, indicated that there was a "*total absence of marine organisms, or organisms of any kind as far as observed.*" However, later researchers reported the presence of fossils within the formation, including various vertebrate remains. Kellogg (1921) described a marine pinniped from the formation near Santa Margarita. Galehouse (1967) reported discovering fossil remains at three sites, including vertebrate fossils. The Paso Robles Formation has also yielded fossil remains at several localities in the Salinas Valley and other locales in Monterey County, including a dentary fragment of a horse (UCMP records). Addicott and Galehouse (1973) also described a marine invertebrate assemblage from the lower Paso Robles Formation near Atascadero and Santa Margarita. In addition, during a field survey of prospective fossiliferous sediments in the Project vicinity, although very limited exposures of Paso Robles Formation sediments were discovered, a paleosol (fossil soil) was observed at the top of the Paso Robles Formation at several localities. Within this paleosol, ichnofossils (burrow and root casts and molds) were observed (Figure 5.8-4, Photograph 2).

Since fossil vertebrates have been previously reported from the Paso Robles Formation, since depositional conditions observed in exposures in the vicinity of the Project appear to be favorable for the preservation of fossils, and based on SVP (1995) criteria outlined above, the Paso Robles Formation is judged to have high sensitivity. There is a high probability of adverse impacts on paleontological resources resulting from Project excavations in sediments of the Paso Robles Formation.

Quaternary Alluvium. No fossil localities have previously been reported from the Quaternary alluvium on the Project site; however, one fossil locality located less than one mile from the Project has produced vertebrate fossils of *Mammuthus* sp. (mammoth), *Mammut americanum* (mastodon), *Camelops hesternus* (camel), and *Bison latifrons* (giant bison) (Jefferson et al., 1992; LACM records). There have also been fossils reported from Quaternary alluvium from several other localities within San Luis Obispo County, including a camel, Camelidae (UCMP records). During the field survey for this Project, two fossils were identified in clasts contained within the alluvium. These included molds of fossil plant material (Figure 5.8-5, Photograph 4) and a fossil fish scale (Figure 5.8-5, Photograph 5). In addition, in the calcareous sediments at the base of the Quaternary alluvium unidentified insect eggs of pupae cases (cocoons) were found (Figure 5.8-4, Photograph 3).

Since fossil vertebrates have been previously reported from Quaternary alluvium within San Luis Obispo County, vertebrate fossils have been reported within one mile of the site, and depositional conditions observed in exposures in the vicinity of the Project appear to be favorable for the preservation of fossils, the Quaternary alluvium is also judged to have high sensitivity based on SVP (1995) criteria. There is a high probability of adverse impacts on paleontological resources resulting from Project excavations in Quaternary alluvium.

5.8.1.5.4 Summary

Although no fossils are known to directly underlie the proposed Project, the presence of fossil sites in sediments of the Paso Robles Formation and Quaternary alluvium elsewhere suggests that there is a potential for additional similar fossil remains to be uncovered by excavations in these formations during

Project construction. Under SVP (1995) criteria, both these formations have a high sensitivity for producing additional paleontological resources.

Identifiable fossil remains salvaged from these formations during Project construction could be scientifically important and significant. Identifiable fossil remains discovered during Project construction could represent new taxa or new fossil records for the area, for the State of California, or for a formation. They could also represent geographic or temporal range extensions. Moreover, discovered fossil remains could make it possible to more accurately determine the age, paleo-climate, and depositional environment of the sediments from which they are salvaged. Finally, fossil remains salvaged during Project construction could provide a more comprehensive documentation of the diversity of animal and plant life that once existed in San Luis Obispo County and could result in a more accurate reconstruction of the geologic and paleo-biologic history of the Southern Coast Ranges and the Carrizo Plain.

5.8.2 Environmental Consequences

Potential impacts on paleontological resources resulting from construction of the proposed CESF 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, including an undetermined number of fossil remains and unrecorded fossil sites; associated specimen data and corresponding geologic and geographic site data; and the fossil-bearing strata, could be adversely affected by (i.e., would be sensitive to) ground disturbance and earth moving associated with construction of the Project. Direct impacts would result from vegetation clearing, grading of roads and the generating facility site, trenching, augering for foundations for electrical towers or poles, and any other earth-moving activity that disturbed or buried previously undisturbed fossiliferous sediments, making those sediments and their paleontologic resources unavailable for future scientific investigation. The potential environmental effects from construction and operation of the project on paleontological resources are presented in the following subsections.

5.8.2.1 Potential Impacts from Project Construction

Potential impacts on paleontological resources resulting from construction of the proposed Project primarily involve terrain modification (excavations and drainage diversion measures) and excavations for structure foundations. Paleontologic resources that could be adversely impacted by ground disturbance and earth moving include an undetermined number of fossil remains and unrecorded fossil sites, associated specimen data and corresponding geologic and geographic site data, and the fossil-bearing strata. Direct impacts could result from vegetation clearing, grading, excavations or trenching for structures, and any other earth-moving activities that disturb or bury previously undisturbed fossiliferous sediments, making those sediments and their paleontological resources unavailable for future scientific investigation.

Clearing, grading, and deeper excavations at the Project site could result in significant adverse impacts to paleontological resources. In addition, the construction of supporting facilities, such as temporary construction offices, laydown areas, and parking areas, have potential to cause adverse impacts to significant paleontological resources, as they also will involve extensive new ground disturbance. Thus, any Project-related ground disturbance could have adverse impacts on significant paleontological

resources. However, with a properly designed and implemented mitigation program, these impacts could be reduced to less than significant.

5.8.2.2 Potential Impacts from Project Operation

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

5.8.3 Cumulative Impacts

If paleontological finds were to be encountered as a result of 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 5.8.4 would effectively preserve the value to science of any significant fossils uncovered during Project-related excavations.

5.8.4 Mitigation Measures

This section describes proposed mitigation measures that would be implemented to reduce potential adverse impacts to significant paleontological resources resulting from Project construction. Mitigation measures are necessary because of potential adverse impacts of Project construction on significant paleontological resources within the Quaternary alluvium and Paso Robles Formation. The proposed paleontological resource impact mitigation program would reduce to an insignificant level the direct, indirect, and cumulative adverse environmental impacts on paleontological resources that could result from Project construction. The mitigation measures proposed below are consistent with SVP standard guidelines for mitigating adverse construction-related impacts on paleontological resources (SVP, 1995, 1996).

PALEO-1: Prior to construction, a qualified paleontologist should be retained to both design a monitoring and mitigation program and implement the program during all Project-related ground disturbance. The paleontological resource monitoring and mitigation program should include:

- Preconstruction coordination.
- Construction monitoring.
- Emergency discovery procedures.
- Sampling and data recovery, if needed.
- Preparation, identification, and analysis of the significance of fossil specimens salvaged, if any.
- Museum storage of any specimens and data recovered.
- Reporting.

PALEO-2: Prior to the start of construction, the paleontologist should conduct a field survey of exposures of sensitive stratigraphic units that will be disturbed. Earth-moving construction activities should be monitored wherever these activities will disturb previously undisturbed sediment. Monitoring will not need to be conducted in areas where sediments have been previously disturbed or in areas where exposed sediments will be buried, but not otherwise disturbed.

PALEO-3: Prior to the start of construction, construction personnel involved with earth-moving activities should be informed: that fossils may be discovered during excavating; that these fossils are protected by laws; on the appearance of common fossils, and; on proper notification procedures. This worker training should be prepared and presented by a qualified paleontologist.

Implementation of these mitigation measures will reduce the potentially significant adverse environmental impact of Project-related ground disturbance and earth-moving on paleontological resources to an insignificant level by allowing for the salvage of fossil remains and associated specimen data and corresponding geologic and geographic site data that otherwise might be lost to earth-moving and to unauthorized fossil collecting.

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 discovery of fossil remains that would not have been exposed without Project construction and, therefore, would not have been available for study. The salvage 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.

5.8.5 LORS Compliance

Paleontological resources are classified as non-renewable scientific resources and are protected by several federal and state statutes (California Office of Historic Preservation, 1983; Marshall, 1976; West, 1991; Fisk and Spencer, 1994; Gastaldo, 1999), 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 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 county and city requirements and SVP professional standards.

5.8.5.1 Federal

Federal legislative protection for paleontological resources stems from the Antiquities Act of 1906 (Public Law (P.L.) 59-209; 16 United States Code (USC) 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. The Antiquities Act of 1906 forbids disturbance of any object of antiquity on federal land without a permit issued by the responsible managing agency. This act also establishes criminal sanctions for unauthorized appropriation or destruction of antiquities. The Federal Highways Act of 1958 clarified that the Antiquities Act applied to paleontological resources and authorized the use of funds appropriated under the Federal-Aid Highways Act of 1956 to be used for paleontological salvage in compliance with the Antiquities Act and any applicable state laws.

In addition to the Antiquities Act, other federal statutes protect fossils. The Historic Sites Act of 1935 (P.L. 74-292; 49 Stat. 666, 16 USC 461 *et seq.*) declares it national policy to preserve objects of historical significance for public use and gives the Secretary of the Interior broad powers to execute this policy,

including criminal sanctions. The National Environmental Policy Act (NEPA) of 1969 (P.L. 91-190, 31 Stat. 852, 42 USC 4321-4327) requires that important natural aspects of our national heritage be considered in assessing the environmental consequences of any proposed project. The Federal Land Policy Management Act (FLPMA) of 1976 (P.L. 94-579; 90 Stat. 2743, USC 1701-1782) requires that public lands be managed in a manner that protects the quality of their scientific values. Paleontological resources are also afforded federal protection under 40 Code of Federal Regulation (CFR) 1508.27 as a subset of scientific resources. Federal protection for significant paleontological resources would apply to this Project if any construction or other related project impacts occurred on federally owned or managed lands.

5.8.5.2 State

The CEC environmental review process under the Warren-Alquist Act is considered functionally equivalent to that of the CEQA (Public Resources Code Sections 15000 *et seq*.) with respect to paleontological resources. Guidelines for the Implementation of CEQA, as amended 7 September 2004 (Title 14, Chapter 3, California Code of Regulations (CCR): 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 directly or indirectly destroy a unique paleontological resource or site?*"

Although neither CEQA nor the Guidelines define what is "*a unique paleontological resource or site,*" CEQA Section 21083.2 defines "*unique archaeological resources*" as "*…any 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 any of the following criteria*:

1) *Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information.*
2) *It has a special and particular quality such as being the oldest of its type or the best available example of its type.*
3) *Is directly associated with a scientifically recognized important prehistoric or historic event."*

With only slight modification, this definition is equally applicable to recognizing "*a unique paleontological resource or site.*" Additional guidance is provided in CEQA Guidelines Section 15064.5(a)(3)(D), which indicates "*generally, a resource shall be considered historically significant if it has yielded, or may be likely to yield, information important in prehistory or history.*"

Paleontological resources are considered to be significant if they:

- Provide important information on the evolutionary trends among organisms, relating living organisms to extinct organisms.
- Provide important information regarding development of biological communities or interaction between botanical and zoological biota.
- Demonstrate unusual circumstances in biotic history.

- Are in short supply and in danger of being depleted or destroyed by the elements, vandalism, or commercial exploitation, and are not found in other geographic localities.

CEQA Guidelines Section XVII, part a, of the Environmental Checklist asks a second question equally applicable to paleontological resources: "*Does the project have the potential to . . . eliminate important examples of the major periods of California history or pre-history*?" Fossils are important examples of the major periods of California prehistory. To be in compliance with CEQA, environmental impact assessments, statements, and reports must answer both these questions in the Environmental Checklist. If the answer to either question is yes or possibly, a mitigation and monitoring plan must be designed and implemented to protect significant paleontological resources.

The CEQA lead agency having jurisdiction over a project is responsible to insure that paleontological resources are protected in compliance with CEQA and other applicable statutes. California Public Resources Code Section 21081.6, entitled Mitigation Monitoring Compliance and Reporting, requires that the lead agency demonstrate project compliance with mitigation measures developed during the environmental impact review process.

Other state requirements for paleontological resources management are in Public Resources Code Chapter 1.7, Section 5097.5 (Stats. 1965, c. 1136, p. 2792), entitled Archaeological, Paleontological, and Historical Sites. This statute defines any unauthorized disturbance or removal of a fossil site or fossil remains on public land as a misdemeanor and specifies that state agencies may undertake surveys, excavations, or other operations as necessary on state lands to preserve or record paleontological resources. This statute would apply to the CESF if any construction or other related project impacts occurred on state owned or managed lands, 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, cooling and potable water lines, and/or sewer line) were built on state-, county-, or city-owned lands, including streets and highway right-of-ways.

5.8.5.3 Local

California Planning and Zoning Law requires each county and city jurisdiction to adopt a comprehensive, long-term general plan for its development. The general plan is a policy document designed to give long-range guidance to those making decisions affecting the future character of the planning area. It represents the official statement of the community's physical development as well as its environmental goals. The general plan also acts to clarify and articulate the relationship and intentions of local government to the rights and expectations of the general public, property owners, and prospective investors. Through its general plan, the local jurisdiction informs these groups of its goals, policies, and development standards; thereby, communicating what must be done to meet the objectives of the general plan. State planning law requires each jurisdiction to identify environmental resources and to prepare and implement policies which relate to the utilization and management of these resources. The current San Luis Obispo County General Plan does not address paleontological resources. However, the County is currently in the process of updating the Conservation Element of the General Plan, and paleontological resources are planned to be addressed in the revised edition (personal communication with James Caruso, Senior Planner, San Luis Obispo County, June 18, 2007). PRC is unaware of any current specific local-level requirements,

regulations, ordinances, goals, or objectives specifically designed to mitigate the negative impacts of development on paleontological resources.

Table 5.8-1
Summary of LORS

Jurisdiction	LORS	Requirements	Conformance Section
Federal			
	Antiquities Act of 1906	Protects paleontological resources on federal lands	5.8.5.1
	NEPA, 1969	Protects paleontological resources on federal lands	5.8.5.1
State			
	CEQA	Protects paleontological resources on state lands	5.8.5.2
	Public Resources Code Sections 5097.5/5097.9	Protects paleontological resources on state lands	5.8.5.2
Local			
	Not Applicable (N/A)	N/A	N/A

5.8.5.4 Agencies and Agency Contacts

No state or local agencies have specific jurisdiction over paleontological resources. Because federal lands will not by impacted by the Project, the Bureau of Land Management (BLM) does not need to be contacted. Agency contacts are provided in Table 5.8-2.

Table 5.8-2
Agency Contact List

	Agency	Contact	Address	Telephone
1	San Luis Obispo County Department of Planning and Building	James Caruso, Senior Planner	976 Osos Street, Room 200 San Luis Obispo, CA 93408	(805) 781-5702
2	U S Department of the Interior Bureau of Land Management	Steve Larson, Assistant Field Office Manager, Resources	3801 Pegasus Drive Bakersfield, California 93308	(661) 391-6000

5.8.5.5 Permits Required and Permitting Schedule

No state or county agency requires a paleontological collecting permit to allow for the salvage of fossil remains discovered as a result of construction-related earth moving on state or private land in a project site. Because federal lands will not be impacted by the Project, a Paleontological Resource Use Permit or Fieldwork Authorization Permit from the BLM is not required (see Table 5.8-3).

Table 5.8-3
Applicable Permits

Responsible Agency	Permit/Approval	Schedule
Federal	None required	N/A
State	None required	N/A
Local	None required	N/A

5.8.5.6 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 salvage, 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. The SVP's standard guidelines were approved by a consensus of professional paleontologists and are the standard against which all paleontological monitoring and mitigation programs are judged. Many federal and California state regulatory agencies have either formally or informally adopted the SVP's "standard guidelines" for the mitigation of construction-related adverse impacts on paleontological resources as a measure of professional practice.

Briefly, SVP guidelines recommend that each project have literature and museum archival reviews, a field survey, and, if there is a high potential for disturbing significant fossils during project construction, a mitigation plan that includes monitoring by a qualified paleontologist to salvage fossils encountered, identification of salvaged fossils, determination of their significance, and placement of curated fossil specimens into a permanent public museum collection (such as the designated California State repository for fossils, the UCMP at Berkeley).

5.8.6 References

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5.9 LAND USE

This section provides an assessment of land use issues and impacts for the Carrizo Energy Solar Farm (CESF or Project). An evaluation of the Project's conformance with local plans, land use regulations, and general land use compatibility is provided in this section. Land uses are described within 5 miles of the Project site. This analysis includes the 1-mile area around the CESF site referred to as the Affected Environment.

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 and are found in the Land Use Ordinance (LUO). Building codes establish requirements for safe and sanitary structures, found in the Building and Construction Ordinance. The chapters of these two regulatory documents contain specifics about building controls and grading requirements and regulations for the design and improvement of property within San Luis Obispo County.

5.9.1 Affected Environment

The affected environment is defined by the California Energy Commission (CEC), based on the study area boundary. San Luis Obispo County has jurisdiction over all of the affected area within 1 mile of the Project site, referred to as the Project area. The Project site will encompass approximately 640 acres of fenced area on Section 28 (APN 072-091-001) and the construction laydown area will be the 380 acres immediately south of the Project on Section 33 (APN 072-091-010).

The Project site is zoned for agriculture but is primarily composed of disturbed ranchland. The CESF is located in an area zoned for agricultural uses as specified in the San Luis Obispo County General Land Use Plan; however, electrical generation is listed in the San Luis Obispo County Land Use Ordinance as an allowed use within the agricultural zone. Abandoned farm structures that currently exist on the site will be demolished prior to change of ownership. The site is generally flat, sloping gently to the southwest with elevations ranging from approximately 2,064 feet to 2,014 feet above mean sea level. There is an unnamed tributary running from the northwest to the southeast corner of Section 33 that eventually drains to Soda Lake.

The jurisdictional boundaries in San Luis Obispo County, the proposed CESF site footprint and APN lot boundaries, and the surrounding development are shown on Figures 5.9-1, 5.9-2, and 5.9-3.

5.9.1.1 Regional Setting

The Shandon-Carrizo planning area (see Figure 5.9-1) is the largest of the San Luis Obispo County planning areas, encompassing approximately 842,411 acres (1,316 square miles) of sparsely populated

land devoted almost exclusively to dry-land farming and rangeland. The Shandon-Carrizo planning area is in the eastern portion of the County and includes California Valley, located just south of the CESF site, and Whitley Gardens and Shandon, both located north of the Project site. The Project area is located adjacent to California State Route 58 (SR-58)/Carrisa Highway on unincorporated lands west of Simmler and northwest of California Valley, California. The Project site and construction laydown are located on Sections 28 and 33, Township 29 South, Range 18 East, APNs 072-091-001 and 072-091-010.

The surrounding regional landscape is relatively undeveloped and residences that exist outside of the urban areas and villages are primarily agricultural-related. The Carrizo Plain is a large enclosed plain, approximately 50 miles long and up to 15 miles wide containing mainly agricultural land and open space. To the west and south of the Project area, approximately 6 miles distance, is the Los Padres National Forest. The Carrizo Plain National Monument is approximately 6.5 miles to the southeast of the site and contains one of the largest single native grasslands remaining in California. Soda Lake is a 3,000-acre alkaline lake located within the Carrizo Plain National Monument (approximately 9.0 miles southeast from the site) that receives all runoff from the Plain. The Plain is bounded by the Temblor Mountain Range to the east and the La Panza Range to the west.

The Shandon-Carrizo Area Plan (San Luis Obispo County, 2003) designates land uses within the planning area by land use category. The current land use designation for the Project area and the Project site is agriculture (Agricultural District). Other regional uses include primarily agriculture and rangeland, open space, some rural residences related to agriculture, and the undeveloped villages of California Valley and Simmler containing small residential populations. Regional areas located to the northwest of the Shandon-Carrizo Area Plan are governed by the Creston Community Advisory Committee and the Santa Margarita Community Advisory Committee (see Figure 5.9-1).

5.9.1.2 Project Site and Vicinity

The CESF site and construction laydown area will have a combined land area footprint of 1,020 acres (640 and 380 acres, respectively). The majority of land surrounding the site is used for agricultural/dry-farming activities. Immediately adjacent land uses include a number of rural residences surrounding the site and the existing PG&E Carrizo Plain Substation located adjacent to the northeast corner of the Project site. Additionally, existing power/transmission lines extend in an east-west orientation adjacent to the northern boundary of the site. Other notable land uses near the Project site include Carrisa Plains School (an elementary school) located approximately 0.8-mile to the south-southeast (APN 072-101-007); Simmler Community Hall which is approximately 2.5 miles east along SR-58; a few rural residences to the west and south; and the communities of Simmler and California Valley.

The Carrisa Plains School has a total enrollment, from kindergarten through 8th grade, of 31 students. The enrollment is not expected to increase as a result of the Project. The change of use will not cause an impact to or change in the land use of the Carrisa Plains School. Potential visual impacts are discussed in Section 5.13, Visual Resources.

Nearby residences are related to agricultural land uses, and should be inured to the use of industrial agricultural equipment and disturbance resulting from the agricultural uses of the surrounding areas. Although the CESF will contrast significantly with the surrounding land use in terms of character, the County's General Plan designates this area for potential solar energy conversion and identifies electrical

generation as an allowed use within the agricultural zone; thus, the CESF will not require variance in noise levels, use regulations, or land use ordinances.

Further, in 1983, Atlantic Richfield Company (ARCO) Solar, Inc. built a 5-MW solar energy generating station in the section of land immediately east of the CESF site (see Figure 5.9-2 for ARCO Carrisa Plain Solar Project facility location). The facility had the potential to service 300 to 400 residential customers. Unfortunately, the solar energy was not able to compete with lower-priced fossil fuel-based sources of energy, and the facility was dismantled in the late 1990s. Thus the area has had previous solar/energy-related development.

5.9.1.2.1 Site Control

The 640-acre CESF site is located on a single legal parcel (APN: 072-091-001). Title is vested in Robert G. Lewis and Alberta A. Lewis, Trustees of the Robert G. Lewis Family Trust, an undivided half interest; and William R. Cochrane, Jr. and Susan A. Cochrane, an undivided half interest. The Project site is currently under option and will be purchased by Ausra CA II, LLC (dba Carrizo Energy, LLC) prior to the start of construction. The proposed CESF will be owned and operated by Carrizo Energy, LLC. The 380-acre construction laydown site is situated on APN 072-091-010. Title is vested in Ann Jopling, an undivided 1/3 interest; Linda Gwen Lowery, an undivided 1/3 interest; and John M. Lowery, Trustee of the Peter G. Lowery Family Trust, an undivided 1/3 interest and will be purchased by Carrizo Energy, LLC.

5.9.2 Environmental Consequences

The following section discusses the potential effects of site preparation, construction, and facility operation on existing land uses and land use resources in the Project area. The facility, site preparation and construction, abandonment/closure, and operations and maintenance of the CESF project are discussed below. Potential cumulative impacts are also discussed in Section 5.9.3. Other issues related to land use are addressed in Section 5.2, Air Quality; Section 5.11, Traffic and Transportation; Section 5.12, Noise; Section 5.13, Visual Resources; and Section 5.18, Cumulative Impacts.

Potential environmental consequences were analyzed for the study area within 1 mile of the proposed Project site. Potential land use impacts relate to both construction and operation of the CESF and any ancillary facilities. The potential environmental consequences, relating to land use, arise mainly due to the conversion of 640 acres in the agriculture zone of the Shandon-Carrizo Planning Area from agricultural use, to solar energy capture and energy conversion apparatus, attendant outbuildings, supporting structures, roadways, and parking lots.

Potential temporary impacts may result from the proximity of the construction laydown area to Carrisa Plains School that abuts Section 33 (see Figure 5.9-3). The school is located less than 0.25 miles south-southeast of the laydown area. While some temporary impacts may be associated with noise and distracting views caused by construction activities, these activities are expected to take place on the northern portion of Section 33, while the elementary school is abutting the southern most corner on the east.

The proposed renewable energy installation and the opportunity to observe the development of a large solar array may be of educational benefit to the students and provide material for instruction and a field trip destination upon Project completion.

5.9.2.1 CESF Facility

The CESF will consist of approximately 195 Compact Linear Fresnel Reflector (CLFR) solar concentrating lines, and associated steam drums, steam turbine generators (STGs), air cooled condensers (ACCs), and associated infrastructure, producing up to a nominal 177 megawatts (MW) net (see Section 3.0, Facility Description and Location; Figures 3.1-1 and 3.4-4 for a depiction of the solar field).

The construction of the CESF facility will require a Minor Use Permit (MUP) and associated building, construction, and grading permits. Environmental impact issues associated with solar energy conversion are outlined in the Energy Element of the General Plan. These are: aesthetic and safety concerns; removal of land for other purposes; erosion and biological concerns in some areas; and water use and chemical spills in the case of solar thermal designs. The potential impact that relates to land use and zoning is the removal of land for other purposes, and this issue is discussed below in Section 5.9.2.2. The other potential impacts outlined in the General Plan are discussed in Section 5.4, Soils; Section 5.13, Visual Resource; Section 5.15, Hazardous Materials Handling; Section 5.16, Public Health and Safety; and Section 5.17, Worker Safety.

5.9.2.2 Agricultural Land

Much of the Project area land is not currently in agricultural production but is fallow disturbed ranchland. The Project site is currently in disuse. Soils of the Project site and surrounding area are not suitable for irrigated crop production, thus there is no large-scale crop production in the area. According to the Shandon-Carrizo Inland General Plan, there are 637,660 acres of agricultural land within the rural areas of the planning area, which contains over 608,778 acres of parcels of Williamson Act protected farmland; however, the Project is not situated on Williamson Act Lands. Additionally, the Project area does not contain prime or non-prime farmlands and these areas are not subject to the California Land Conservation Act at this time. Williamson Act acreage within the Shandon-Carrizo Planning Area boundary is listed in Table 5.9-1.

Table 5.9-1
Williamson Act Acreage in Shandon-Carrizo Planning Area

Williamson Act Categories	Parcel Acreage
Agricultural preserve	143,296.4
Mixed (prime and non-prime not spatially defined)	160.4
Non-prime	425,226.1
Non-prime, non-renewal	1860.9
Prime	37,780.5
Prime, non-renewal	454.2

The inland area plan designates the preferred farmland within the Shandon-Carrizo Plain. On page 5-1 the element states: "The Estrella River Valley, San Juan Creek Valley and the area around Shandon Valley are generally used most intensively because of better soils and water availability." The Project site is not within these specified agricultural areas, and does not contain the preferred soils and water availability that facilitate intensive agricultural use; therefore, the Project site is not within the preferred farmland areas of the Shandon-Carrizo area.

According to the Energy Element of the General Plan for San Luis Obispo, "a solar energy conversion facility in the Carrizo Plains could minimize the county's reliance on imported electricity," and have other positive benefits both local and county-wide. The current energy policy calls for more development of solar energy within the mainly agricultural Shandon-Carrizo Plains, promotion of sustainable business, and greater use of renewable forms of energy. According to the goals and policies of the Energy Element and the General Plan, the Project site rangeland, which will be converted, has an ideal location and planned use for solar energy conversion.

5.9.2.2.1 Site Preparation and Construction

Construction activities will include all work on the main site, installation, connection, access road improvements, and plant startup. Sequential activities for onsite and offsite work include: site preparation; foundation construction, erection of major equipment, and structures; installation of piping and pump, electrical systems, and control systems; and startup/testing.

Construction of the CESF, from site preparation and grading to full commercial operation, is expected to take approximately 35 months. Heavy construction will be scheduled to occur between 7:00 a.m. and 7:00 p.m., Monday through Friday. Additional hours may be necessary to make up schedule deficiencies or to complete critical construction activities. Some activities will continue 24 hours per day, 7 days per week. These activities include, but are not limited to, refueling equipment, staging material for the following day's construction activities, quality assurance/control, and commissioning. During these hours, noise will be within regulatory limits determined by the LUO (see Section 5.12, Noise).

The planned location of the facility is generally flat; however, the power block will be graded to provide a level site area for the STGs, air cooled condensers, buildings, tanks, switchyard, and all associated facilities. Movement of material will be limited to that required for a level site for the CESF power block equipment and facilities. No fill is anticipated, but in the event fill is required, material present onsite is expected to be adequate, subject to final geotechnical evaluation. Construction of the solar field requires level ground, so the blocks will be prepared in a terraced configuration (see Section 3.0, Facility Description and Location, Figures 3.3-1 through 3.3-4).

Land uses located near the Project site may experience short-term impacts associated with CESF construction, including visual disruption, increased traffic, dust, increased noise levels, project equipment, and vehicle emissions. Additional information on these issues is provided in Section 5.2, Air Quality; Section 5.11, Traffic and Transportation; Section 5.12, Noise; and Section 5.13, Visual Resources.

While construction activities may result in temporary land use impacts, there is a high degree of compatibility between CESF operation and the existing and past surrounding land uses: transmission lines, substation, agricultural, rural residences, and prior ARCO solar field (adjacent to the Project site).

Overall, the short-term impacts due to Project construction are considered less than significant. In addition, there are no land uses impacts identified that are associated with the operation of the CESF.

5.9.2.2.2 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.

5.9.2.2.3 Operations and Maintenance

There are no changes proposed to the land uses or zoning designations surrounding the CESF site. The existing character of the Project area and immediate surroundings of the Project site will remain unchanged by the development of the Project. The current land use of the Project site will change from undeveloped open space to solar power generation. Solar energy conversion is a planned use for the Project area, according to the San Luis Obispo County General Plan, Energy Element, LUO, and Agriculture and Open Space Element.

Operations and maintenance will not disturb the agricultural use of surrounding land and open space conservation. Project operations will consist of few inputs, mostly associated with the day-to-day operations of the facilities, and the resulting energy production will decrease the area's reliance on imported electricity. The existing transmission lines which run adjacent to the Project site make the location of this Project ideal relative to land use and the goals and policies of the Energy Element.

5.9.3 Cumulative Impacts

The CESF and other projects in the vicinity are not expected to result in significant cumulative impacts to environmental resource areas, including, but not limited to, air quality, land use, cultural resources, water resources, or traffic during the construction or operation phases. All existing and proposed projects can be characterized primarily as residential development (i.e., new single-family dwellings and mobile homes). Of the 41 projects with permit applications submitted since January 2000, only 6 projects proposed new residential construction (i.e., single-family dwellings). The remaining 35 projects include minor construction projects such as manufactured and mobile home permits, mobile home foundations, carport additions, roof replacements, deck additions, and residential renovations. Further, some of the listed projects have permits that have expired since their issuance and thus, can be dismissed from this cumulative impact analysis.

The closest permitted project is located approximately 0.5-mile to the west of the CESF site and includes the addition of a mobile home. In addition, all permitted projects within 2.0-miles of the CESF site include manufactured and mobile home permits and/or mobile home foundations. All other proposed projects are located over 2.0-miles from the Project site. Thus, as mentioned above, no significant cumulative impacts have been identified as a result of the construction, operation, maintenance, or long-term presence of the CESF and other projects in the area. For further discussion of cumulative impacts, see Section 5.18, Cumulative Impacts.

5.9.4 Mitigation Measures

The construction and operation of the CESF minimally diminishes San Luis Obispo County's Dry Farming and Rangeland, and is consistent with the goals, policies, and zoning ordinances outlined in the General Plan, Energy Element, and LUO. No Williamson Act lands are jeopardized, and the soils of the project site are not suitable for irrigated crop production. Additionally, the project presents an opportunity to develop a portion of the vast sources of renewable energy available in the Carrizo Plains.

Construction impacts are expected to be less than significant after mitigation outlined in other resource areas. Operational impacts are not expected to be significant. The proposed use is classified as an A2 Permitted Use subject to a Minor Use Permit according to the LUO, and is deemed compatible with surrounding development; therefore, no mitigation measures relating to land use controls are recommended at this time.

5.9.5 LORS Compliance

LORS related to land use and their applicability to the Project are summarized in Table 5.9-2. The CESF will be constructed and operated in compliance with all applicable land use LORS, as discussed below.

5.9.5.1 Federal

There are no federal LORS related to the land use associated with the CESF.

5.9.5.2 State

5.9.5.2.1 California Public Resources Code *25523 (a); 20 California Code of Regulations (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 5.9.1 and 5.9.2.1.

5.9.5.2.2 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 San Luis Obispo County. Conformance is discussed in Sections 5.9.1.3, 5.9.1.4, and 5.9.1.5.

5.9.5.2.3 California State Planning Law Government Code Section 51200 through 51207 California Land Conservation Act (Williamson Act)

The California Land Conservation 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 non-renewal," the contract is automatically renewed annually for an additional year). In return, landowners receive property tax assessments much lower than normal because they are based upon the lowest of three values; Williamson Act restricted value, current market value, or factored base year value. Restricted parcels are assessed for property tax purposes at a rate consistent with their actual use, rather than potential market value. The administering agency for these state requirements is San Luis Obispo County. None of the parcels considered for the project site are currently under contract pursuant to the Williamson Act, nor are they considered important farmlands by the state of California (see Figure 5.9-3).

5.9.5.3 Local

The San Luis Obispo County General Plan, adopted in September 1980 and last revised in January 2007, 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.

5.9.5.3.1 General Plan and Zoning Designation

The Project, as proposed, is consistent with San Luis Obispo County General Plan and zoning designations for the site, with the approval of a MUP. The project site is designated agriculture, and the proposed use is an allowable use according to Section 22.30, Standards for Specific Land Uses of the San Luis Obispo County General Plan. The existing zoning designation is Agriculture District (AG). Energy production is an unclassified conditional use in the AG zone district. According to Section 22.06.010 – 22.06.030 and Section 22.32.060, electrical generation is an allowable (A2) use within the AG zone, subject to the approval of an MUP required for a solar generation facility with a footprint greater than 40,000 square feet.

While the Project site parcels are zoned for agricultural use, some of the parcels have an additional zoning designation as flood hazard areas. Flood hazard areas exist on an unnamed tributary running from the northeast to the southwest corners of Section 33, and in the upper northeast corner of Section 28. These areas are designated flood hazard Zone A by Federal Emergency Management Agency (FEMA) and have a 100-year flood risk.

5.9.5.3.2 Framework for Planning (Inland), the Land Use and Circulation Elements of the San Luis Obispo County General Plan

The following General Plan land use policies apply to the CESF site.

- Maintain and protect a living environment that is safe, healthful, and pleasant for all residents by conserving nonrenewable resources and replenishing renewable resources.

- Balance the capacity for growth allowed by the Land Use Element with the sustained availability of resources.
- Preserve and protect the air quality of the county by seeking to attain and maintain state and federal ambient air quality standards.
- Maintain a distinction between urban and rural development by providing for rural uses outside of urban village areas, which are predominately agriculture, low intensity recreation, residential, and open space uses, which will preserve and enhance the pattern of identifiable communities.
- Design and maintain a land use pattern and population capacity that is consistent with the capacities of existing public services and facilities, and their programmed expansion where funding has been identified.
- Encourage the phasing of urban development in a compact manner, first using vacant or underutilized "infill" parcels and lands next to existing development.
- Designate a pattern of strategically located commercial and/or industrial areas compatible with overall land use that is convenient to patrons, realistically related to market demand and needs of the community and near areas designated for residential use.

The following goals outlined in Chapter 6, Land Use Categories, apply to the CESF site.

- To support protection and preservation of county open space and recreational resources while providing for appropriate development.
- To provide areas where agricultural, residential, commercial, and industrial uses may be developed in harmonious patterns and with all the necessities for satisfactory living and working environments.
- The need for new development to be compatible with both existing adjacent uses, as well as planned future developments.

5.9.5.3.3 Shandon-Carrizo Area Plan

This part of the Land Use Element allocates land use throughout the planning area by land use categories. The land use categories determine the varieties of land use that may be established on a parcel of land, as well as defining their allowable density and intensity.

This section includes ordinances regulating utility supply; including water supply, sewage disposal, solid waste disposal, and drainage.

Agriculture continues to be the primary use of land within the area. Aside from the Estrella River Valley, San Juan Creek Valley, and the area around Shandon Valley, dry farming and grazing operations encompass the rest of the agricultural uses. Continued agricultural production is encouraged adjacent to the Shandon urban area.

5.9.5.3.4 Energy Element of the San Luis Obispo General Plan

According to the Energy Element, "The solar energy potential available in the county remains nearly unused." Additionally the Energy Element states that the county could make better use of available solar resource, "through construction of large scale solar conversion facilities in the Carrizo Plains."

5.9.5.3.4.1 Renewable Energy Projects: Solar

"The solar resource available in the Carrizo Plains gives San Luis Obispo County the opportunity to make a bold statement regarding the development of renewable energy facilities." (Energy Element, Chapter 4, Pg. 4-13). In addition, the Energy Element states that conversion facilities should generally be located in areas suitable for industrial development and away from sensitive land uses such as residential, commercial, or recreational areas, and sensitive wildlife habitats.

Goal X: Encourage Renewable Energy Projects, Policies 37-43, Guidelines 39.1-39.4: "Policy 39. Encourage and support the development of solar power systems as commercial energy enterprises where visual and environmental impacts can be mitigated." (Energy Element, pg. 4-20) Guidelines 39.1-39.4 address regulatory requirements and site design designations for solar energy conversion facilities. Guideline 39.3 states: "The applicant shall submit a complete description of the type of solar facility that will be employed, including an analysis of the tracking system (if appropriate) showing that no concentrated reflections are directed at occupied structures, recreation areas, or roads." (Energy Element, pg. 4-20).

5.9.5.3.4.2 General Electricity Generation and Transmission

Goal IX: Protect Public Health, Safety and the Environment, Policies 28-36, Guidelines 29.1-29.14: These goals, policies, and guidelines ensure that preference will be given first to increased use of conservation measures in energy use, and second to facilities that use renewable resources. Further, these sections regulate safety, health, and environmental issues for electricity generation and transmission facilities. Guideline 29.8 states: "If the proposed location visually impacts a home site, prepare a screening plan to minimize visual impacts." (Energy Element, pg. 4-8). Guideline 29.9 states: "All exterior lighting should be energy efficient and shielded to not extend beyond the site."

5.9.5.3.5 Agriculture and Open Space Element of the San Luis Obispo General Plan California State Planning Law, Government Code Section 51200 through 51207 (Williamson Act)

The mission of the Agriculture and Open Space Element is to identify those areas of the county with productive farms, ranches and soils, and establish goals, policies, and implementation measures that will enable their land term stability and productivity; and to identify open space lands that are worth of protection for their intrinsic value, and establish goals, policies, and implementation measures that will enable the long term protection of those resources.

Since soil characteristics are critical for agriculture, this section discusses the quality of soil for agricultural production. The soils in the project area have limitations, which reduce choice of plants and require conservation practices or both. The affected area is composed mainly of rangeland used for

grazing operations. The Agriculture and Open Space Element determines specific standards for the conversion of rangeland to other uses as well.

The goals and policies of the Agriculture and Open Space Element seek to preserve and conserve agricultural lands with suitable soils and resources for commercial agricultural use by encouraging non-profit and organizational efforts to protect these areas.

Agricultural Policy 24: Conversion of Agricultural Land: AGP24 regulates the conversion of agricultural land to other designations by establishing criteria for change of use designation that avoid land rezoning and locating of new public facilities outside urban village reserve lines unless they serve a rural function or there is no feasible alternative location within the urban and village reserve lines.

5.9.5.3.6 Land Use Ordinance, Title 22 of the County Code

The following sections of Title 22 apply to the CESF site.

- Section 22.06.030 states that Solar Electricity Generation is an allowable use, subject to the land use permitting requirement.
- Section 22.30 sets Standards for Specific Land Uses.
- Section 22.32 sets Standards for Electric Generation Plants and permit application requirements.
- This section states: "Except where county land use permit authority is preempted by state law, and except where other provisions of this Chapter establish a different permit requirement, the required land use permit is determined by the area in square feet per site of grading or the removal of natural ground cover, as follows: Zoning Clearance for Less than 40,000 sq. ft., MUP for 40,000 sq. ft., or more."
- Section 22.32.060 sets Standards for Photovoltaic Generating Facilities.
- Section 22.10.120 sets Noise Standards according to the General Property Development and Operating Standards.

5.9.5.3.7 Permit Process

Electrical generation is listed in the San Luis Obispo County Land Use Ordinance as an allowed use, coded A2, within the agricultural zone. The allowed use designation of A2 states that a particular land use is allowed subject to the approval of the land use permit required for the particular use by Article 4, Standards for Specific Land Uses, per Section 22.06.030 of the code. According to the LUO, an MUP is required for a solar energy conversion facility of the size of the Project; however, this is subject to review by San Luis Obispo County, and a Conditional Use Permit may be required.

Except where county land use permit authority is preempted by state law, the required land use permit for an electrical generation facility is determined by the area in square feet per site of grading or the removal of natural ground cover. Areas of less than 40,000 square feet (sq. ft.) require a zoning clearance, and areas equal to and greater than 40,000 sq. ft., require an MUP. Therefore, for the purposes of CESF, an MUP application will need to be filed.

Land use permit applications shall comply with the requirements of Chapter 22.62 of the Land Use Ordinance. Specific requirements are included below:

Applications for energy generation facilities shall describe the following:

- The physical and operating characteristics of the facility; the proposed design capacity of the facility; the operating schedule; how the electric energy shall be used; and if any electric energy shall leave the site, the physical and contractual arrangement for tying-in to other facilities.
- Alternatives to the proposed facility and to separable aspects of the proposal. This will include reliability, as well as economic and environmental advantages and disadvantages.
- Plans for any overhead or underground transmission lines, transformers, inverters, switchyards, or any required new or upgraded offsite transmission facilities.
- The number and characterization by trades of the estimated construction and operation force. If construction is estimated to take over six months, the construction workforce will be estimated for each six-month period and will include estimates of numbers of locally hired employees and employees who will move into the area, and a discussion of the estimated impact that employees moving into the area will have on housing, schools, and traffic.

If another public agency must approve the proposed facility, the applicant shall:

- Describe the requirements of that agency, summarize the agency's procedures for acting on the proposed use, and describe the studies, analyses, and other data collection which the applicant or agency will perform in order to resolve each substantive requirement of the agency.
- List the required actions related to the proposed facility by other public agencies and utilities and a schedule for application and approval of those actions.
- Provide a copy of necessary state and federal permits and all written comments and decisions made by officials of the agencies listed prior to the start of construction.

County Development Standards include the following:

Bonding: Following permit approval and prior to any work on the proposed Project, the applicant shall post a surety bond in favor of the county, conditioned on conformance with all applicable conditions, restrictions, requirements of the land use ordinance, and any conditions required by the permit. Such guarantee is in addition to any bond required by the state. The total value of this bond will be established through the conditional use permit review and approval process, and will be administered in compliance with Section 22.64.040.

Environmental Quality Assurance: An environmental quality assurance program covering all aspects of construction and operation shall be submitted prior to construction of any Project component. This program will include a schedule and plan for monitoring and demonstrating compliance with all requirements of the conditional use permit. Specific requirements of this environmental quality assurance program will be determined during the environmental review process and conditional use permit review and approval process.

Clearing and Revegetation: The land area exposed and the vegetation removed during construction shall be the minimum necessary to install and operate the facility. Topsoil must be stripped and stored separately. Disturbed areas no longer required for operation will be regarded, covered with topsoil, and replanted during the next appropriate season.

Utility Interconnect: All distribution lines, electrical substations, and other interconnection facilities shall be constructed to the specifications of the utility. A statement from the utility confirming that the proposed interconnection is acceptable shall be filed with the County building inspector prior to the issuance of any building permit. Interconnection shall conform to procedures and standards established by the California Public Utilities Commission.

Other Requirements: Development standards in addition to those specified in this section and in this chapter may be imposed through conditions of approval where MUP of conditional use permit approval is required.

In addition to the requirements of Section 22.32.020, an application for a photovoltaic generating facility shall describe:

- Tracking system design, including a showing that no concentrated reflections will be directed at occupied structures, recreation areas, or roads.
- How public access will be restricted or why public liability is not a concern at the particular facility.

Electrical distribution lines on the Project site shall be under grounded up to the low voltage side of the step-up transformer, to the point of onsite use, or to the utility interface point of an onsite substation.

5.9.5.3.8 Building and Construction Ordinance, Title 19 of the San Luis Obispo County Code

The intent of this ordinance is to regulate the design and construction of buildings and structures through basic standards for site preparation, construction activities, quality of materials, occupancy classifications, location and maintenance of buildings and structures, and certain equipment associated with buildings and structures.

According to Section 19.01.030, it shall be unlawful and a violation of this code for any person to engage in any construction activity, including but not limited to grading and site work, any construction, alteration, use, or occupancy of structures without first obtaining all construction permits required by Chapter 19.04 of this title, and Chapter 22.52 of the Land Use Ordinance.

Additionally all applicable construction standards promulgated in Chapter 19.20 shall be observed and obeyed. Notable sections of Chapter 19.20 include Section 19.20.360 Solar Energy Apparatus.

Section 19.20.360 Solar Energy Apparatus: "For the purpose of regulating the construction, installation, alteration, repair, relocation, replacement, maintenance, or use of solar energy systems, most recently adopted "Uniform Solar Energy Code," published by the International Association of Plumbing and Mechanical Officials, is hereby adopted by and incorporated into this title by reference as though it were fully set forth here, except where otherwise provided in this title."

5.9.5.3.9 2006 Uniform Solar Energy Code, International Association of Plumbing and Mechanical Officials (IAPMO)

The Uniform Solar Energy Code is included within the Building and Construction Ordinance for San Luis Obispo County. This document applies to the building, installation, alteration, addition, repair, relocation, replacement, use, or maintenance of solar systems. The use of this document is intended to provide a safe and functional solar energy system with minimum regulations. Users of the Uniform Solar Energy Code are urged to strive for not just the minimum good solar energy system, but to keep the consumer in mind.

Since this document is included by extension in the Building and Construction Code of San Luis Obispo County, the provisions set herein should be complied with as if it was part of the county code.

5.9.5.4 Summary of LORS

A summary table of relevant LORS, relating to land use, affecting Project permitting, and construction, is provided in Table 5.9-2.

Table 5.9-2
Summary of LORS

Jurisdiction	LORS	Requirements	Conformance Section	Administering Agency
Federal				
	Not Applicable (N/A)	N/A	N/A	N/A
State				
	California Public Resources Code *25523 (a): 20 CCR **1752, 1752.5, 2300-2309, and Chapter 2, Subchapter5, Appendix B, Part (1) (3) and (4)	Evaluate compatibility of the proposed project with relevant land use plans.	5.9.5.2.1	CEC
	California State Planning Law, Government Code Section 65300 through 65302	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. San Luis Obispo County has adopted a General Plan.	5.9.5.2.2	Department of Planning and Building

Table 5.9-2
Summary of LORS
(Continued)

Jurisdiction	LORS	Requirements	Conformance Section	Administering Agency
	California State Planning Law, Government Code Section 51200 through 51207 (Williamson 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.	5.9.5.2.3	Department of Planning and Building
Local				
	San Luis Obispo County General Plan	Comply with all applicable land use provisions.	5.9.5.3.1	Department of Planning and Building
	San Luis Obispo County, Land Use Ordinance, Title 22	Comply with allowable land uses and permit requirements set forth in Section 22.06.030; Standards for specific land uses in Section 22.30.	5.9.5.3.2	Department of Planning and Building
	San Luis Obispo County General Plan, Energy Element, Policy 29	Projects shall be sited and constructed in a manner to protect the public from potential hazards and significant environmental impacts.	5.9.5.3.4	Department of Planning and Building
	San Luis Obispo County General Plan, Energy Element, Policy 39	Comply with Policy 39 requirements regarding the building and development of solar power facilities in San Luis Obispo County.	5.9.5.3.4	Department of Planning and Building
	San Luis Obispo County, Zoning, Title 19, Building and Construction Ordinance	Comply with applicable policies, development standards, and specific zoning requirements.	5.9.5.3.6	Department of Planning and Building
	San Luis Obispo County General Plan, Land Use Ordinance,Title 22	Comply with all applicable land use goals, policies, implementation measures, and programs.	5.9.5.3.2	Department of Planning and Building

Table 5.9-2
Summary of LORS
(Continued)

Jurisdiction	LORS	Requirements	Conformance Section	Administering Agency
	San Luis Obispo County General Plan, Land Use Element, Land Use Ordinance, Title 22, Section 22.06.010-22.06.040	Comply with determined uses of land allowed, and the type of land use permit required to authorize each proposed development and new land use, within the land use categories established by the Land Use Element. Electricity generation is deemed an allowable use subject to the land use permit required by the specific use standards.	5.9.5.3.2	Department of Planning and Building
	San Luis Obispo County Land Use Ordinance, Land Use Ordinance, Title 22, Electric Generating Plants, Section 22.32.010 , 22.32.030	Comply with permit and application requirements, and development standards to mitigate the potential adverse effects of various types of electric generating plants provided in Chapter 22.32.010.	5.9.5.3.2	Department of Planning and Building
	San Luis Obispo County Land Use Ordinance , Photovoltaic Generating Facilities, Land Use Ordinance, Title 22, 22.32.060	Comply with specific permit application contents and requirements for under-grounding required for photovoltaic generation facilities, attendant to the requirements stated in Section 22.32.010.	5.9.5.3.2	Department of Planning and Building
	San Luis Obispo County General Plan, Agriculture & Open Space Element, Agricultural Goals, AG1-AG4	Comply with goals, policies, implementation measures, and programs to promote and protect the agricultural industry of the county, to provide for a continuing sound and healthy agriculture in the county, and to encourage a productive and profitable agriculture industry.	5.9.5.3.5	Department of Planning and Building
	San Luis Obispo County General Plan, Agriculture and Open Space Element, Agricultural Policies, AGP24	Comply with policy AGP24 governing the conversion of agricultural lands to other uses.	5.9.5.3.5	Department of Planning and Building
	San Luis Obispo County General Plan, Noise Element	Conform to regulations covering construction-related noise to reduce impacts on adjacent uses in accordance with the county's noise control ordinance.	5.9.2.2.1	Department of Planning and Building

5.9.5.5 Agencies and Agency Contacts

Agencies with jurisdiction to issue applicable permits and/or enforce LORS related to land use are shown in Table 5.9-3.

Table 5.9-3
Agency Contact List for LORS

	Agency	Contact	Address	Telephone
1	San Luis Obispo County, Department of Planning and Building	Planner John Busselle	976 Osos Street Room 200 San Luis Obispo, CA 93408 jbusselle@co.slo.ca.us	(805) 781-5154
2	San Luis Obispo County, Department of Planning and Building	Division Manager Matt Janssen	976 Osos Street Room 200 San Luis Obispo, CA 93408 mjanssen@co.slo.ca.us	(805) 781-5104
3	San Luis Obispo County, Department of Planning and Building	Planner Susan Callado	976 Osos Street Room 200 San Luis Obispo, CA 93408 scallado@co.slo.ca.us	(805) 781-5104

5.9.5.6 Permits Required and Permitting Schedule

Table 5.9-4 lists all applicable permits for the CESF in the area of land use.

Table 5.9-4
Applicable Permits

Responsible Agency	Permit/Approval	Schedule
Federal	None required	N/A
State	None required	N/A
Local	Minor Use Permit	1 year
Local	Building Permit	1 year
Local	Grading Permit	1 year

5.9.6 References

Agriculture and Open Space Element, San Luis Obispo County General Plan, January 2007.

California Energy Commission, 2000a. Improvements to the Energy Commission's Energy Facility.

Energy Element, The Land Use and Circulation Elements of the San Luis Obispo County General Plan, April 1995.

Land Use Ordinance, Title 22 of the County Code, June 2007.

Licensing Process, March 2000b. Energy Facility Licensing Process: Developer's Guide of Practices and Procedures. Staff Report/Draft. December 7.

San Luis Obispo County General Plan, Framework For Planning (Inland), Revised January 2007.

Shandon-Carrizo Area Plan, Revised January 2003.

5.10 SOCIOECONOMICS

The socioeconomics section describes the potential impact to the social and economic structure within the Project vicinity and region resulting from Carrizo Energy Solar Farm (CESF or Project) 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, LORS, and agency contacts relevant to socioeconomics are also discussed in this section.

5.10.1 Affected Environment

The Project site will encompass approximately 640 acres of fenced area on Section 28 (APN 072-091-001) and the construction laydown area will be approximately 380 acres adjacent south of the Project site on Section 33 (APN 072-091-010); within the Shandon-Carrizo planning area of San Luis Obispo County. This planning area has been historically, and is currently, utilized primarily for agriculture, and will likely remain a viable agricultural area in the foreseeable future. The planning area in general is home to a rarefied population of dedicated farmers, and should experience limited population growth, primarily related to future increased demands for agricultural labor. Over the last 20 years the population has remained nearly stationary, comprising less than 1 percent of the total county population. The Shandon-Carrizo planning area includes the small unincorporated urban areas of Shandon, California Valley, and Whitley Gardens Village (Figure 5.10-1).

California Valley, a small community southeast of the Project, has experienced an incipient increase in residential densities and could become a substantial community if services (primarily water) were available, and an increase in market demand for treated water was indicated.

Whitley Gardens Village is a very small suburban residential settlement in the extreme northwest portion of the planning area, with potential for sustainable population growth that would be supported by the currently established water supply and sewage system.

The Shandon urban area is located in the northern portion of the planning area, about 20 miles east of Paso Robles and has a population of about 984. The urban reserve line of Shandon encompasses 555 acres. It is primarily a rural farming community completely surrounded by various agricultural lands.

The Shandon-Carrizo planning area is expected to retain an overall stable economy that is strictly related to the success of surrounding agricultural uses and rising potential for solar energy conversion. According to the San Luis Obispo County General Plan, proscribed factors contributing to the viability of the Shandon-Carrizo area include: (1) continuing agricultural uses; (2) the rural agricultural environment and large agricultural acreages that discourage suburban residential encroachment; (3) remoteness from populated areas; and (4) surface mining in the Temblor Range, as well as limited oil exploration.

5.10.1.1 Population

The current population of the Shandon-Carrizo planning area is approximately 2,580 and is predominantly white (71.2 percent); however, the region has seen an increase in Hispanic composition, which comprises the second largest ethnic group in the County. The population density is low compared to the County of San Luis Obispo at large. Diversity is low compared to the statewide composition which is 32 percent Hispanic. As the region grows over the next 20 years, diversity is expected to grow.

The current annual growth rate over the last 15 years for the County has hovered between 1.1 and 1.5 percent, while the annual growth rate for the Shandon-Carrizo planning area has averaged at around 3 percent over the past 15 years. The median age for the County was 35.3 in 1990, 37.3 in 2000, and is expected to rise to 40 by the year 2025, impacting health care services, dial-a-ride, and public transit. As the region grows over the next 20 years, the average age of citizenry will be older and the population will be more ethnically diverse.

Over the last 15 years, the County's average annual growth rate was 1.24 percent. As shown in Table 5.10-1, extrapolating from this average rate, the Shandon-Carrizo population will reach approximately 10,124 by the year 2025.

Table 5.10-1
Growth by Planning Area or Community

Planning Area or Community	Population 2004	Population 2025	Percent Growth 2000-2025	Absolute Growth	Percent of Region's Growth
Shandon	984	8,445	758%	7,461	10%
Shandon-Carrizo (rural)	1,441	1,679	17%	238	0%
Shandon-Carrizo Total	2,425	10,124	417%	7,699	10%
County Total	258,208	334,775	30%	76,567	100%

Reference: Bianchi, Shirley, Tony Ferrara, George Luna, John Shoals, Betty Winholtz, Frank Mecham, Mary Anne Reiss, Dave Romero, Harry Ovitt, Jerry Lenthall, Katcho Achadjian, and James Patterson. County of San Luis Obispo. Regional Transportation Planning Agency. San Luis Obispo Council of Governments. Vision 2025: the 2005 Regional Transportation Plan for San Luis Obispo County. 6 Apr. 2005. 28 June 2007 <http://www.slocog.org/ecm/Publications_and_Reports/Regional_Transportation_Plan.html>.

5.10.1.2 Housing

The pattern of residential use in the Project area is shown in Section 5.9, Land Use (see Figures 5.9-1, 5.9-2, and 5.9-3). Construction of CESF will not physically divide an established community because the nearest established community is California Valley. This town of approximately 800 lies five miles to the southeast. The Project area is zoned for agricultural use (see Section 5.9, Land Use). There are few residences in the area, and no inhabited residence will be displaced by the construction of CESF.

The sources of housing for operational and construction workers are likely to be located within a one to two hour commute distance. Communities in this area include the Shandon-Carrizo Village

Communities, Atascadero, Templeton, Paso Robles, San Luis Obispo, and Bakersfield. According to the General Plan, there is not a strong demand for housing in the Shandon-Carrizo area. Housing data for the County and representative areas are displayed below in Table 5.10-2.

Table 5.10-2
Available Housing

Type of Housing	SLO County	Simmler	California Valley	Atascadero
Multi-Family	18,923 (2000 Census)	NA	NA	NA
Single-Family	11,293 (2000 Census)	NA	NA	NA
Average Vacancy Rate	1.1% (Homeowner); 3.2% (Rental) (2002 Census)	NA	NA	3.3%
Available Hotel Rooms	8,700 with 27.4% vacancy (100-62.6; 62.6 = occupancy rate)	NA	22 at the California Valley Lodge	275
Median Home Price	$529,500 (2005 Census)	$403,786	NA	$321,750
Median Household Income	$49,721 (2004 Census)	$52,202	NA	$48,725
Total Number Housing Units	112,099 (2005 Census) 102,275 (2000 Census)	1,183	100 (Owner of California Valley Lodge, Kenny Tab (805) 475-2363)	9,848

References:
Chamber of Commerce Community Economic Profile, www.atascaderochamber.org/economy.asp.
California Association of Realtors, 2005 Census, www.car.org/www.sanluisobispo.com/static/index.cfm?contentID=226.

Note: NA = Not available.

The county housing has an overall vacancy rate of 9.0 percent according to the General Plan Housing Element, compared to the nationwide vacancy rate of 10.8 percent. The Housing Element states that "Due to the high cost of land in the county, most new housing units affordable to low and very low income households will be built in the medium to high density residential Multi-Family zones (allowing 26 units/acre or higher)." In response, the county has plans for re-zoning some areas for high density development, to accommodate 4,000 affordable housing units.

In California, an average of 25 percent of the median income households can buy a home, however in San Luis Obispo County home ownership has become unaffordable for most households that do not already own a home. The Shandon-Carrizo area has many housing constraints including lack of water and public utilities. Income of the local residents is also a factor. Housing problems exist for many farm workers. Overcrowding of permanent farm workers also exists and is due to the relatively low wages offered to farm workers.

5.10.1.3 Economic Base and Employment

The county economy is strong. Median per capita income has risen over the last ten years. Income definitions for the county are listed below in Table 5.10-3.

Table 5.10-3
Income Definitions for San Luis Obispo County

Persons in Family	Very Low Income	Lower Income	Median Income	Moderate Income
1	$20,200	$32,300	$40,400	$48,500
2	$23,100	$36,950	$46,150	$55,400
3	$25,950	$41,550	$51,950	$62,350
4	$38,850	$46,150	$57,700	$69,250
5	$31,350	$49,850	$62,300	$74,800
6	$33,450	$53,550	$66,950	$80,350
7	$35,750	$57,250	$71,550	$85,850
8	$38,100	$60,950	$76,150	$91,400

References:
SLO County General Plan, Housing Element, 2004.
U.S. Census, 2005.

San Luis Obispo has a low unemployment rate compared with the average for the state of California. The current unemployment rate in San Luis Obispo County is 4.6 percent. The unemployment rates for Shandon and Atascadero are 2.6 and 3.8 percent, respectively, while the unemployment rate for the state of California is 5.3 percent. The employment rate is projected to remain consistent with current employment rates.

The predominant industry in the Shandon-Carrizo plains and surrounding regions is agriculture. San Luis Obispo County's relative employment by industry is shown in Table 5.10-4.

Table 5.10-4
San Luis Obispo Employment by Industry
Annual, By Percentage

Industry	SS-NAICS	1990	1995	2000	2005	2006
By Type						
Civilian Labor Force	00-000010	99,800	100,800	122,400	133,100	133,900
Civilian Employment	00-000020	95,200	94,200	117,500	127,400	128,600
Civilian Unemployment	00-000030	4,600	6,600	4,900	5,700	5,300
Civilian Unemployment Rate	00-000040	4.6%	6.6%	4.0%	4.3%	4.0%
Total, All Industries	01-000000	77,800	79,900	99,000	105,600	107,500
Total Farm	11-000000	2,700	3,000	4,800	4,300	4,300
Total Nonfarm	00-000000	75,200	76,800	94,200	101,300	103,300
Total Private	05-000000	57,900	58,600	71,200	79,500	81,100
By Industry						
Goods Producing	06-000000	10,800	9,800	13,500	14,300	14,500

Table 5.10-4
San Luis Obispo Employment by Industry
Annual, By Percentage
(Continued)

Industry	SS-NAICS	1990	1995	2000	2005	2006
Natural Resources, Mining, and Construction	15-000000	5,500	4,100	6,100	7,800	8,100
Manufacturing	30-000000	5,400	5,800	7,400	6,400	6,400
Durable Goods	31-000000	3,200	3,300	4,200	3,400	3,400
Machinery Manufacturing	31-333000	200	700	700	800	800
Computer and Electronic Product Manufacturing	31-334000	1,300	600	700	400	400
Residual-Miscellaneous Manufacturing	31-339000	1,700	2,100	2,800	2,200	2,200
Nondurable Goods	32-000000	2,200	2,400	3,200	3,100	3,000
Food Man, Beverage, and Tobacco	32-310012	700	700	1,000	1,500	1,600
Residual-Textile Mills	32-313000	1,500	1,700	2,200	1,600	1,500
Service Providing	07-000000	64,300	67,000	80,800	87,000	88,800
Private Service Producing	08-000000	47,100	48,700	57,700	65,200	66,600
Trade, Transportation, and Utilities	40-000000	15,500	15,000	18,100	20,100	20,700
Wholesale Trade	41-000000	1,400	1,500	2,400	2,500	2,600
Retail Trade	42-000000	11,100	10,500	12,600	13,900	14,300
Food and Beverage Stores	42-445000	2,800	2,200	2,600	3,000	3,000
General Merchandise Stores	42-452000	1,400	1,300	1,500	1,600	1,900
Residual-Miscellaneous Store Retailers	42-453000	6,900	7,000	8,500	9,300	9,400
Transportation, Warehousing and Utilities	43-000000	3,000	3,100	3,200	3,600	3,800
Utilities	43-220000	2,100	2,000	1,800	2,100	2,000
Transportation and Warehousing	43-400089	900	1,100	1,400	1,600	1,800
Information	50-000000	1,500	1,300	1,800	1,600	1,600
Financial Activities	55-000000	3,600	3,200	3,700	4,800	4,900
Finance and Insurance	55-520000	2,500	1,900	2,100	2,600	2,700
Real Estate, Rental, and Leasing	55-530000	1,100	1,300	1,600	2,200	2,200
Professional and Business Services	60-000000	5,600	5,800	8,800	8,900	9,500
Educational and Health Services	65-000000	6,300	7,700	8,700	10,800	10,700

Table 5.10-4
San Luis Obispo Employment by Industry
Annual, By Percentage
(Continued)

Industry	SS-NAICS	1990	1995	2000	2005	2006
Leisure and Hospitality	70-000000	10,600	11,800	13,000	14,900	14,900
Arts, Entertainment, and Recreation	70-710000	1,000	1,000	1,100	1,400	1,400
Accommodation and Food Service	70-720000	9,600	10,800	11,800	13,500	13,500
Accommodation	70-721000	2,400	2,500	2,800	3,400	3,300
Food Services and Drinking Places	70-722000	7,300	8,400	9,100	10,100	10,200
Other Services	80-000000	4,400	3,700	4,300	4,300	4,300
Government	90-000000	16,900	18,600	22,400	21,800	22,200
Federal Government	90-910000	700	700	800	600	700
State and Local Government	90-940000	16,200	17,900	21,600	21,200	21,500
State Government	90-920000		8,400	9,200	9,300	9,300
State Government Education	90-921611		3,200	3,700	3,500	3,600
Other State Government	90-922999		5,200	5,500	5,800	5,700
Local Government	90-930000		9,500	12,500	11,900	12,300

Reference: U.S. Department of Labor, Bureau of Labor Statistics, 2007, located at: http://www.bls.gov/emp/.

5.10.1.4 Construction Workforce

Due to the limited population of the Shandon-Carrizo planning area it is expected that the construction of the Project will attract a number of temporary workers. However, the Shandon-Carrizo planning area is located within San Luis Obispo County; so it is assumed that the major source of the workers will be derived from within San Luis Obispo County. The Shandon-Carrizo planning area abuts Kern County and the Project has the potential to draw workers from there as well.

According to the Electric Power Research Institute's (EPRI) report titled, *"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 California confirms that the combined counties of San Luis Obispo and Kern have a large available workforce. Additionally, a review of the estimated labor demands compared to current and historical

labor and employment trends indicates that the supply of workforce within a commuting distance is available for the Project needs. Buses will also be provided from surrounding regional centers to transport workers to and from the Project site.

Construction is not expected to cause a significant impact to local employment. The Project will primarily draw upon a labor pool within San Luis Obispo County. In the event that additional workers are required, for instance during the period of the Project's peak worker demand, the Project will refer workers within the daily commute distance from nearby Kern County/Bakersfield. It is expected that the Project will not encounter difficulties finding an available labor force within the daily commute distance to the CESF.

Carrizo Energy, LLC will provide approximately $170 million (in 2007 dollars) in construction payroll. During construction, the average salary per employee is expected to be $30-40 per hour, including benefits. The projected monthly construction labor is presented in Table 5.10-5 for the 35-month construction period. The size of the workforce onsite will range from 85 during month 1 to a peak of 396 during month 17. Table 5.10-5 also shows the workforce available within the County of San Luis Obispo, thus illustrating the County's capability to adequately meet the construction demands associated with CESF.

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Table 5.10-5
Labor Personnel Requirement

Discipline	Months After Notice to Proceed																																				Requirement vs. Availability		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	Highest Per Day Requirement by CESF During Project	SLO County Total Available for Project[1]	Bakersfield Total Available for Project[1]
Laborers / Cement Mason	15	16	25	30	40	40	45	50	55	55	50	45	45	45	45	45	45	45	40	40	40	40	40	40	40	35	35	35	35	30	30	30	30	30	25	55	1,530	3,840
Carpenters	7	11	30	35	45	45	45	45	45	40	40	30	30	30	30	30	30	25	25	22	18	18	18	18	18	13	13	13	13	13	11	8	7	7	7	45	1,140	1,900
Iron Workers	8	17	24	35	48	48	53	58	58	58	58	68	63	63	6	3	63	58	48	49	48	48	46	41	41	38	38	38	28	28	23	23	16	15	17	68	60	120
Pipe Fitters / Welders	8	9	16	32	37	37	42	47	47	52	57	65	75	75	75	65	65	65	60	60	60	55	50	38	43	41	36	36	31	27	25	20	16	12	12	75	440	880
Electricians & Instrumentation	7	7	8	9	10	11	11	11	18	18	26	35	40	50	55	55	55	55	45	35	35	35	35	35	35	35	40	40	38	31	26	20	23	21	21	55	420	1,750
Operator / Mechanics	10	13	17	17	17	10	10	10	10	15	15	15	15	15	15	15	15	15	15	15	7	7	7	7	7	7	7	7	5	5	5	5	5	4	3	17	360/50	530/1,370
Millwrights	1	3	6	10	10	10	10	15	15	15	15	15	15	20	20	25	25	30	30	30	30	30	30	30	30	20	20	16	11	11	10	10	10	10	10	30	8	110
Teamsters	9	13	17	20	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	14	14	14	14	13	13	13	13	13	8	8	8	20	480	
Insulators														0	0	10	15	15	20	25	30	30	30	30	30	30	25	25	25	20	20	25	15	10	5	30	N/A	
Boilermakers	0	2	3	4	4	6	8	8	0	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	6	6	6	6	6	3	3	3	3	0	8	N/A	
Painters														0	0	0	0	0	0	0	2	2	2	2	5	5	5	5	5	5	5	5	5	2	2	5	460	650
Indirect	10	10	10	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	10	10	10	15	15	15	10	15		
Craft Labor Total	75	101	156	207	241	237	254	274	278	291	299	311	321	336	341	346	346	336	322	313	312	301	291	278	284	259	254	249	220	199	181	177	153	137	120	386	16,098	
Field Non-Manual	10	15	25	25	40	40	45	50	50	50	50	50	50	50	50	50	50	50	50	50	45	45	45	45	40	35	35	35	30	25	25	20	20	20	20	50		
Total	85	116	181	232	281	277	299	324	328	341	349	361	371	386	391	396	396	386	372	363	357	346	336	323	324	294	289	284	250	224	206	197	173	157	140	446	16,098	

[1] Reference: U.S. Department of Labor, Bureau of Labor Statistics, May 2006 Wage Estimates, www.bls.gov/oes/current/oes_42020.htm.

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5.10.1.5 Operational Workforce

The County General Plan encourages economic development that will provide employment opportunities in communities with high unemployment and that are distant from existing job opportunities. Permanent employees will be drawn from the areas surrounding the Project. Permanent employees will commute as much as one hour to their workplace (Socioeconomic *Impacts of Power Plants*, EPRI). CESF is expected to have a total staff of 75 persons. Staff will commute to the CESF from surrounding areas (e.g., Paso Robles, San Luis Obispo, and Bakersfield). The staff will consist of five supervisory, general, and administrative positions, 20 operations and maintenance personnel in the power block, and 50 maintenance personnel in the solar field. The facility will be staffed 24 hours per day, with the majority of staff onsite during daytime operating hours. Five staff will remain onsite during non-operating hours. As the Project will require 75 employees during operation; the annual operation payroll will be approximately $4-4.5 million for the facility.

5.10.2 Environmental Consequences

The criteria used in determining whether project-related socioeconomic impacts would be significant are presented in the 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.

Impacts to socioeconomics cause changes in community interaction patterns, social organizations, social structures, social institutions, and conflicts with community attitudes, values, or perceptions. This section assesses the potential occurrence and significance of socioeconomic impacts for the construction and operation of the CESF.

The potential socioeconomic impacts to the Carrizo Plain arise from the introduction of permanent jobs to 75 employees, increased tax revenues, and the potential for solar renewable energy conversion as a viable economic alternative to agriculture, represented by CESF.

Site construction activities will commence in the first quarter of 2009 and continue through the 35-month construction schedule. The Project is to be on line and available for PG&E to dispatch into the grid on or before May 31, 2010. It is currently anticipated that the entire CESF will be on line and in commercial service by the first quarter of 2012. Workers will be bused to the Project site each day from various locations in the surrounding areas. CESF plans to recruit locally, and within the surrounding areas like Atascadero, Paso Robles, and Bakersfield for permanent employees; therefore, this Project will not substantially cause a growth or reduction of population.

The operation of the CESF will require 75 full time employees; construction will require an average of 290 laborers for the 35 month duration of construction of the CESF. The addition of the CESF will cause

a permanent influx of a significant number of operational employee jobs, and a temporary concentration of a large number of construction jobs into the local area. Workers from across San Luis Obispo County and Bakersfield are available for these positions, and some professionals may be drawn to the Project from a larger labor pool.

This Project will not displace any current jobs, nor affect the surrounding agricultural enterprises. Nor will this Project displace any people because the site is currently unused. The increase in permanent employees is not expected to have any adverse impact on employment, housing, tax revenues, public services, or utilities. The Project is expected to have an affect on the local economy by introducing jobs, and potentially raising tax revenues.

The schools and public services in the area are not expected to suffer any adverse impact. Labor and employment will be recruited locally to the extent practicable; therefore, schools will not be required to deal with immigration of students. No additions to the enrollment at Carrisa Plains School are expected. The Project site is not located within the nearest established communities of Simmler and California Valley, which are miles from the site. The CESF will not divide an established community.

CESF will result in a decreased reliance on imported energy resources, which will have positive impacts to the local area, as well as the county at large. In addition, construction of CESF will lead to increased revenue due to construction and operational employees' economic activities.

The San Luis Obispo County General Plan, Energy Element, mentions the abundant renewable resources available throughout the County and specifically calls for the development of solar energy conversion capabilities in the Shandon-Carrizo area. Additionally, the local economy would benefit from the capital input required for facility construction and operational needs. According to the Economic Element, Policy 1i, it is a policy of the county to encourage businesses that promote the concept of sustainability. Development of solar energy production in the Carrizo Plains could potentially decrease the County's reliance on imported energy and this would have a positive effect on the economy by increasing SLO County energy production and distribution. There are no adverse health impacts associated with this solar power facility; therefore, this Project may be considered a sustainable business model.

5.10.2.1 Schools

The planning area is served by four unified school districts: Paso Robles Unified School District; Shandon Unified School District; Atascadero Unified School District; and the New Cuyama School District. Bus service is provided to most areas. There is an elementary school located two miles east of Simmler and one in Whitley Gardens village area. An elementary school and high school are located in Shandon. Students in the Carrizo area attend Atascadero schools, with many of them rooming in Atascadero. In the Cuyama area, students attend elementary or high school in New Cuyama (Santa Barbara County). There is also a junior college in Taft (Kern County), about 40 miles east of California Valley. The schools are presently adequate to serve existing rural agricultural school populations. The development of existing undeveloped rural subdivisions could lead to overburdened school facilities and require future expansion. No future schools are anticipated in the area.

The Carissa Plains School is located less than a mile from the Project site. While some temporary impacts may be associated with noise and distraction caused by construction activities, these activities are

expected to take place on the northern portion of Section 33, while the elementary school is abutting the southern most corner of the Section on the east. Furthermore, the addition of a renewable energy installation, and the opportunity to observe the development of a large solar array, may be of educational benefit to the students, and provide material for instruction and a field trip destination upon completion of the Project. The completed Project will be over 3,000 feet away from the school grounds. Enrollment for the Carissa Plains School is listed below in Table 5.10-6.

Table 5.10-6
Carrisa Plains School (K-8th Grade) Enrollment

Grade	Enrollment	
	2006/2007	2007/2008
K	5	5
1	5	5
2	3	4
3	3	2
4	3	2
5	6	2
6	6	5
7	3	3
8	4	3

Reference: Carrisa Plains School Registrar.

The area's secondary school needs are primarily served by Atascadero High School. Most students of high school age will attend Atascadero High School or schools located in Bakersfield, Paso Robles, and other surrounding areas. Because the CESF employees will be drawn from locally available labor, it is not expected that the CESF will cause any additions to high school enrollment. Enrollment for Atascadero High School is provided in Table 5.10-7.

Table 5.10-7
Atascadero High School Enrollment

Grade	Enrollment 2007/2008
9	394
10	398
11	407
12	389

Reference: Atascadero High School, Office of the Registrar.

5.10.2.2 Fiscal Impact

The anticipated total construction cost of the CESF is approximately $500 million. This includes construction costs of the approximate one hundred ninety-five Compact Linear Fresnel Reflector (CLFR) solar concentrating lines, and associated steam drums, steam turbine generators (STGs), air cooled condensers (ACCs), and infrastructure and construction of a new 230-kV switchyard. Of the total construction cost, roughly $55 million will be paid out as wages and salaries, including benefits. When available, local products will be purchased; therefore, sales tax revenue will be immediately realized for San Luis Obispo County. The sales tax rate in San Luis Obispo County is currently 7.75 percent. Operation of the CESF will have an additional incremental and permanent benefit to the local economy, primarily through local expenditures for maintenance and equipment-related material purchases. The anticipated value of operation materials purchased will vary from year to year.

5.10.2.2.1 Property Tax Exemption

The property tax rate area for the Project site is 054-060, and the current tax rate is 1.09971 percent. However, the CESF is expected to be allowed a 100 percent Property Tax Exemption as part of the California Incentives for Renewables and Efficiency. This would remove the potential for County and Local Property Tax Revenues derived from the CESF.

According to Section 73 of the California Revenue and Taxation Code, a property tax exemption is allowed for certain types of solar energy systems installed on or before December 31, 2009. (The original expiration year of 2005 was extended by AB 1099 [2005].) Qualifying active solar energy systems are defined as those that "are thermally isolated from living space or any other area where the energy is used, to provide for the collection, storage, or distribution of solar energy." These include solar space conditioning systems, solar water heating systems, active solar energy systems, solar process heating systems, photovoltaic (PV) systems, solar thermal electric systems, and solar mechanical energy.

Components included under the exemption include storage devices, power conditioning equipment, transfer equipment, and parts. Pipes and ducts that are used to carry both solar energy and energy derived from other sources qualify for the exemption only to the extent of 75 percent of their full cash value. Likewise, dual-use equipment for solar-electric systems qualifies for the exemption only to the extent of 75 percent of its value.

5.10.2.3 Utilities

The CESF will not lead to a significant increase in the population of the Shandon-Carrizo planning area. As a result, emergency and social services will not be negatively impacted. The current use levels of public services, including fire protection, law enforcement, emergency response, medical facilities, other assessment districts, are adequate and there will not be the need for any expansion. However, the San Luis Obispo County General Plan indicates that water cost and lack of public utilities is indicated to be a limiting factor of agricultural and residential development within the Carrizo plain.

An expansion of utilities, gas, water, and waste, due to the CESF will not be necessary. The CESF will draw water from the local aquifer (Carrizo Plain Groundwater Basin) via a well and all water for use will be treated onsite. Presently, the Shandon-Carrizo area has an adequate water supply to support CESF,

through the utilization of this onsite groundwater well. Wastewater will generally be dealt with onsite and the generation of solid waste is expected to be minimal. Hazardous waste, such as oil, will be stored in a 500-gallon tank until disposed of at an authorized waste disposal facility.

Employees who live in the residential areas of Simmler and California Valley may rely on local services. Local water is supplied from a group of wells scattered throughout the area, and delivered by County Service Area (CSA) No. 16. The County estimates that present growth rates are supported by availability of water.

5.10.2.4 Emergency Services

The Project site is located in a remote area in San Luis Obispo County, California. The nearest hospital is Mercy West Hospital located at 110 E. North Street, Taft, California. The nearest hospital is approximately 43 miles from the Project site and could take an estimated 53 minutes to reach. Another emergency services provider is Sierra Vista Regional Medical Center, a full service facility located at 1010 Murray Street in San Luis Obispo.

Emergency Medical Services (EMS) is provided by three private ambulance services. The northern portion of the area is serviced from Paso Robles, the central portion is served from Atascadero, and the Southern portion from Arroyo Grande. Response time is poor, particularly in the southern planning area. EMS support for the Project will be provided by the Simmler Fire Station 42 located at 13080 Soda Lake Road, California Valley, California, 93453. Response time to an emergency is approximately 10 minutes. In the event of a life threatening injury, the responding fire station can request one of the two helicopters that serve San Luis Obispo County.

Fire protection for the entire planning area is provided by the California Department of Forestry and Fire Protection (CDF) with fire stations in California Valley-Simmler, Shandon, La Panza and Cuyama (Santa Barbara County). As is usual with fire protection stations, there are reciprocal firefighting arrangements with Cuyama, Kern County (McKittrick) and Monterey County (Parkfield). Rural fire protection is judged to be generally adequate for the anticipated growth. Year-round fire protection is provided Shandon by county personnel through County Service Area (CSA) No. 16. CDF provides additional staffing during the fire season. Additional fire protection through CSA No. 16 is recommended by the General Plan.

The entire planning area is serviced by the county sheriff. Response can be delayed due to distance. The California Highway Patrol (CHP) patrols most of the major rural roads.

Since the Project does not expect to add to the planning area population, EMS and other emergency services will not experience significant impacts.

5.10.2.5 Environmental Justice

In response to Executive Orders 122250 and 12898, the California Energy Commission (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 United States (U.S.) Environmental Protection Agency (EPA)'s published guideline for addressing environmental justice concerns, Final Guidance for Incorporating Environmental Justice Concerns in EPA's National Environmental Policy Act (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 disproportionately.

5.10.2.5.1 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 rural areas of the Shandon-Carrizo planning area is approximately 1,486. This is slightly increased over the 2004 population for rural Shandon-Carrizo of 1,441. Of these inhabitants 1,055 are white. While the population of Hispanics or Latinos is increasing, as a percentage this group is under-represented compared to statewide statistics.

According to a 2005 report by San Luis Obispo County, Shandon is one of two rural communities in the north county that qualifies as economically disadvantaged, with approximately 59.7 percent of the population consisting of low income households. A rising demand for housing in Shandon began in 2000, due to intensification of agricultural employment in the area, combined with a county-wide housing shortage. Currently, the community sewage and disposal system needed for high density housing is lacking, and would be required to sustain further growth in the area.

The CESF project site is located in a sparsely populated area of relatively low income, but not ethnically diverse, households. Lower incomes can be attributed to the lower wages originating in the agricultural activities of the area, and lack of other job opportunities. However, the purpose of executive order 12898 is to prevent "disproportionately high or adverse human health effects of its programs, policies, and activities on minority populations and low-income populations." The operation of the plant will not contain risk for adverse human health effects to local populations. The CESF does not pollute and uses minimal hazardous materials in the construction phase. The CESF project does not conflict with this order, and will not result in a disproportionately high adverse health affect to this community.

5.10.3 Cumulative Impacts

The CESF and other projects in the vicinity are not expected to result in significant cumulative impacts to environmental resource areas, including, but not limited to, air quality, land use, cultural resources, water resources, or traffic during the construction or operation phases. All existing and proposed projects can be characterized primarily as residential development (i.e., new single-family dwellings and mobile homes). Of the 41 projects with permit applications submitted since January 2000, only 6 projects proposed new residential construction (i.e., single-family dwellings). The remaining 35 projects include minor construction projects such as manufactured and mobile home permits, mobile home foundations, carport additions, roof replacements, deck additions, and residential renovations. Further, some of the listed projects have permits that have expired since their issuance and thus, can be dismissed from this cumulative impact analysis.

The closest permitted project is located approximately 0.5-mile to the west of the CESF site and includes the addition of a mobile home. In addition, all permitted projects within 2.0-miles of the CESF site include manufactured and mobile home permits and/or mobile home foundations. All other proposed projects are located over 2.0-miles from the Project site. Thus, as mentioned above, no significant cumulative impacts have been identified as a result of the construction, operation, maintenance, or long-term presence of the CESF and other projects in the area. For further discussion of cumulative impacts, see Section 5.18, Cumulative Impacts.

5.10.4 Mitigation Measures

No significant impacts to the socioeconomic environment, due to construction and operation of the CESF are expected. No mitigation measures are identified for socioeconomic resources.

5.10.5 LORS Compliance

All applicable LORS and their conformance measures are detailed in Table 5.10-8 and summarized in the text below.

5.10.5.1 Federal

Federal LORS that are considered to be directly applicable to socioeconomic issues for the proposed Project include Executive Orders 12250 and 12898. These orders apply directly to environmental justice and compliance is discussed in Section 5.10.9.

5.10.5.2 State

California State Planning Law (Government Code Sections 65300-65303.4) requires that each city and county adopt a General Plan. The General Plan should consist of seven mandatory elements to guide planning and development within the jurisdiction. The County of San Luis Obispo does not have LORS specifically addressing the socioeconomic aspects of a project such as the proposed Project.

5.10.5.3 Local

Locally applicable LORS arise from the tax auditor and the General Plan. The tax auditor implements the tax rates and distribution for dispersal of tax revenues (see Section 5.10.8.2) from the project while, the General Plan determines jurisdictional policy for the project. In regards to socioeconomics, the General Plan calls for the pursuance of economic development activities that will benefit the economy while maintaining the quality of life. It encourages the support of development of solar power systems as commercial energy enterprises where visual and environmental impacts can be mitigated. However, the Agricultural Element calls for the protection of agricultural lands and open spaces. Further attention is given to encouragement of sustainable development patterns. The socioeconomic policy surrounding the sustainable development of solar renewable energy in the Shandon-Carrizo planning area requires a series of trade-offs and compromises within the framework of the General Plan. Therefore, the relevant sections of the General Plan are referred to in the LORS summary table.

Table 5.10-8
Summary of LORS

Jurisdiction	LORS	Requirements	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.	5.10.9
	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.	5.10.9
	The Pollution Prevention Act 42 U.S. Code 13101 and 13102, s/s et seq. (1990)	The Pollution Prevention Act focused industry, government, and public attention on reducing the amount of pollution through cost-effective changes in production, operation, and raw materials use.	5.10.8
State			
	Government Code Sections 65300-65303.4 (General Plan)	Each city/county must implement a General Plan.	5.10.5.2
	California Revenue and Taxation Code, Section 73	A property tax exemption is allowed for certain types of solar energy systems installed on or before December 31, 2009.	5.10.2.2.1
Local			
	San Luis Obispo County General Plan Energy Element Policy 39	Encourage and support the development of solar power systems as commercial energy enterprises where visual and environmental impacts can be mitigated.	5.10.8, 5.10.8.2

Table 5.10-8
Summary of LORS
(Continued)

Jurisdiction	LORS	Requirements	Conformance Section
	San Luis Obispo County General Plan Economic Element Policy 1a	Pursue economic development activities that will benefit the economy while maintaining the quality of life.	5.10.8
	San Luis Obispo County General Plan Economic Element Policy 1a1	Target the industry clusters that match the skills of the existing labor force, including environmental technology.	5.10.5, 5.10.6, 5.10.7
	San Luis Obispo County General Plan Economic Element Policy 1e	Protect open space resources that make San Luis Obispo County an attractive place for economic development.	5.10.8
	San Luis Obispo County General Plan Economic Element Policy 1f	Protect agricultural resources that make San Luis Obispo County an attractive place for economic development.	5.10.8,5.10.8.2
	San Luis Obispo County General Plan Economic Element Policy 1i	Encourage businesses that promote the concept of sustainability.	5.10.8
	San Luis Obispo County General Plan Economic Element Policy 2a	In evaluating proposed projects, consideration of potential economic benefits should be in balance with environmental and social considerations.	5.10.8, 5.10.9
	San Luis Obispo County General Plan Economic Element Policy 2d	Promote economic development that will enhance job opportunities for existing county residents.	5.10.5,5.10.6, 5.10.7,5.10.8, 5.10.8.2
	San Luis Obispo County General Plan Economic Element Policy 2e	Work with the private sector to improve job opportunities for underemployed and low income persons.	5.10.4, 5.10.5, 5.10.6, 5.10.7
	San Luis Obispo County General Plan Economic Element Policy 2f1	Monitor conversion of agricultural land to ensure that (1) such conversion does not adversely affect the surrounding agricultural operations, (2) there are adequate services to support a non-agricultural land use, and (3) the land to be converted is contiguous to an urban area or village area and could be designated urban land.	5.10.8
	San Luis Obispo County General Plan Economic Element Policy 3a	Encourage a pattern of commercial and/or industrial development that is consistent with the General Plan, convenient to patrons, realistically related to market demand and the needs of the community, and, when compatible, near areas designated for residential use.	5.10.8

Table 5.10-8
Summary of LORS
(Continued)

Jurisdiction	LORS	Requirements	Conformance Section
	San Luis Obispo County General Plan Economic Element Policy 3d	Encourage economic development that will provide employment opportunities in communities with high unemployment and that are distant from existing job opportunities.	5.10.7
	18.03.020-Public Facility Fees	The imposition of Public Facility Fees may be a condition of permits for, or the approval of, new development projects in the county.	5.10.8.3, 5.10.8.4
	San Luis Obispo County - Tax Collector	Tax Revenues.	5.10.8.2

5.10.5.4 Agencies and Agency Contacts

Agencies with jurisdiction to issue applicable permits and/or enforce LORS related to socioeconomics are shown in Table 5.10-9.

Table 5.10-9
Agency Contact List for LORS

	Agency	Contact	Address	Telephone
1	San Luis Obispo County	Susan Callado	976 Osos Street, Room 200 San Luis Obispo, CA	(805) 781-5600
2	County Assessor's Office	General	976 Osos Street, San Luis Obispo, CA	(805) 781-5831
3	County Auditor's Office	Barbara Godwin	1055 Monterey Street, San Luis Obispo, CA	(805) 781-1371
4	California State Board of Equalization	Ken Thompson	Sacramento, CA	(916) 323-6941
5	Carrisa Plains School	Jani Kasfeldt, Registrar	9640 Carrisa Hwy Santa Margarita, CA 93453	(805) 475-2244
6	Atascadero High School	Cathy Bugg, Registrar	1 High School Rd Atascadero, CA 93422	(805) 462-4313
7	Atascadero Unified School District	Judi Lilley	1 High School Rd Atascadero, CA 93422	(805) 462-4200
8	San Luis Obispo County – Treasurer, Tax Collector	Frank L. Freitas, CPA	SLO Co. Government Center 1055 Monterey Street, Room D-290 san Luis Obispo, CA 93408	(805) 781-5831

5.10.5.5 Permits Required and Permitting Schedule

Table 5.10-10 lists all applicable permits for the CESF in the area of socioeconomics.

Table 5.10-10
Applicable Socioeconomic Permits and Fees

Responsible Agency	Permit/Approval	Schedule
Federal	No permits or fees have been identified	N/A
State	No permits or fees have been identified	N/A
San Luis Obispo County	Potential development permit and fee requirements	TBD

5.10.6 References

Bureau of Economic Analysis (BEA): Regional Economic Measurement Division (REMD), Interactive Maps, Regional Economic Accounts; 2007. Located at: http://www.bea.gov.

California Board of Equalization (BOE). California City and County Sales and Use Tax Rates, April 2007. Located at: http://www.boe.ca.gov/cgi-bin/rates.cgi.

California Department of Finance (DOF), Research Unit. Population and Housing Estimates, San Luis Obispo County; 2007. Located at: http://www.dof.ca.gov.

California Energy Commission, Environmental Reports. Located at: www.energy.ca.gov.

California State Employment Development Department, Labor Market Division. 2007. Located at: http://www.edd.ca.gov.

Database of State Incentives for Renewables and Efficiency, August 2007. Located at: http://www.dsireusa.org/index.cfm?EE=1&RE=1.

Environmental Protection Agency, Laws, Regulations, Guidance, and Dockets, 2007. Located at: www.epa.gov.

San Luis Obispo County Office of Education, Education Forecast, 2007. Located at: http://www.slocoe.org.

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The County of San Luis Obispo. San Luis Obispo County Population Projections. June 2005. Located at: www.slocounty.ca.gov/Assets/PL/pdfs/projections+June+2005.pdf.

U.S Department of Labor, Bureau of Labor Statistics. May 2006. Metropolitan Area Occupational Employment and Wage Estimates. Located at: www.bls.gov/oes/current/oes_42020.htm.

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U.S. Department of Labor, May 2006 Wage Estimates, Construction Workforce Located at: www.bls.gov/oes/current/oes_42020.htm.

5.11 TRAFFIC AND TRANSPORTATION

This section assesses traffic and transportation impacts associated with the construction and operation of the proposed Carrizo Energy Solar Farm (CESF or Project). The analysis primarily examines impacts on roadway system circulation levels of service within the Project study area during the construction and operation of the CESF.

This section also identifies and reviews applicable laws, ordinances, regulations, and standards (LORS) relevant to traffic and transportation activities.

Information sources include data collected from the California Department of Transportation (Caltrans) traffic count database, field review and observations, and communications with local, regional, and federal level agencies. URS staff performed study area reconnaissance on June 25, 2007, to document roadway characteristics, identify physical constraints, and assess general traffic conditions.

Figure 5.11-1 shows the CESF project site in context to the regional circulation system.

5.11.1 Affected Environment

This section describes the existing conditions of the roadway circulation system within the proposed CESF study area. This section also presents the traffic volume and existing operating conditions of the study roadway segments near the vicinity of the Project site. Figure 5.11-2 shows the CESF project study area.

The relatively rural isolation of the Carrizo Plains in general and the Project site in particular from major population centers effectively eliminates potential conflicts with infrastructures associated with urban environment including major airports, transportation centers, rail lines, bus 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 California State Route 58 (SR-58)/Carrisa Highway, the main and only Project access route during the construction and operation phase of the Project.

5.11.1.1 Existing Transportation Facilities

5.11.1.1.1 Regional Roadway Facilities

<u>SR-58</u>: SR-58 is an east-west state highway, located immediately south of the Project site providing regional and primary access route to the Project site. Within the study area, it is a two-lane highway posted at 55 mph. SR-58 is designated as a state truck route. Originating from Highway 101 to the west, (San Luis Obispo, Post Mile (PM) 0.0 to 1.64) it is a 2-lane conventional state highway with 4 to 8 feet shoulders on flat terrain and moderate grades. From San Luis Obispo PM 1.64 to 57.15 at the Kern County line to the east, it has 0 to 2 feet shoulders on rolling terrain with moderate to steep grades. It is also designated as a Class III bike route as described in Caltrans District 5 bicycle map for state highways in the central coast. The average daily traffic (ADT) on the roadway segments within the Project study area ranges from 720 vehicles per day to the west and 350 vehicles per day to the east of the Project site respectively.

United States Route 101 (US-101): US-101 is a regional roadway that traverses through San Luis Obispo County, continuing north to San Francisco, and south to Los Angeles. Located west of the study area, US-101 is a four-lane freeway with an interchange with SR-58.

Interstate 5 (I-5): I-5 is a major north/south route through the Central Valley and the length of California, extending from San Diego County towards the states of Oregon and Washington. Located east of the study area, I-5 provides for two mainline lanes in each direction with wide shoulders and a center median.

5.11.1.1.2 Local Roadway Facilities

The primary local north/south roadways near the vicinity of the proposed Project site include Soda Lake Road and Branch Mountain Road. Tracy Lane provides local east-west access. These locations were not counted due to negligible observed traffic.

5.11.1.2 Existing Roadway Volumes

Figure 5.11-3 shows existing traffic volume at the study area roadway segments. The source of the roadway segment count data was from Caltrans, Traffic Operations Program, Traffic, and Vehicle Data Systems (2006). The traffic counts are provided in Appendix O, Traffic and Transportation.

5.11.1.3 Existing Level of Service (LOS) Analysis

The results of the existing conditions roadway segment LOS analysis is discussed 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.

5.11.1.3.1 Existing Roadway Segment Analysis

Table 5.11-1 displays the roadway segment LOS analysis results for the key study area roadway segments under existing conditions. The two roadway segments were selected for evaluation, as they are the locations that would most likely be affected by Project traffic during both Project construction and operations.

Table 5.11-1
Roadway Segment LOS, Existing Conditions

Roadway	Segment	Cross-Section Classification	Average Daily Traffic	Peak Hour Traffic Volume	Peak Hour LOS
SR-58	At Cammati Creek	2-Lane Collector	720	80	A
SR-58	West of Soda Lake Road	2-Lane Collector	350	50	A

As shown in Table 5.11-1, all study roadway segments are currently operating at acceptable LOS-A under existing conditions.

5.11.1.4 Other Transportation Elements

5.11.1.4.1 Parking

Where there is adequate shoulder width, on-street parking on local streets is generally allowed within the Project study area. With the exception to roadway emergencies, parking or stopping is restricted along the two-lane state highway segments.

5.11.1.4.2 Public Transportation

There is no public transportation provider servicing the area.

5.11.1.4.3 Bicycle and Pedestrian Circulation

SR-58 is a designated Class III bicycle route and is used as a motorcycle recreational route. Due to the remoteness of the CESF project site, there was no observed pedestrian activity.

5.11.1.4.4 Airports

An existing private airport is located in California Valley approximate 4.0 miles southwest of the CESF project site. As described in the Shandon Carrizo Area Plan, California Valley Airport is privately operated, with a II-C (General Aviation) functional classification. The airport has a 2,500-foot graded runway with minimal traffic.

The proposed low structure heights of the CESF project components will not interfere with current and future airport operations. Due to distance and the orientation of the CESF reflector arrays, the potential glint/glare from the solar reflectors will not distract and/or affect pilots during landing or take-off operations. This conclusion is consistent with the detailed visual impact analysis conducted for the CESF presented in Section 5.13, Visual Resources.

5.11.1.4.5 Safety

The majority of local roadways and crossings within the Project study area are generally uncontrolled. Within the immediate vicinity of the Project site, there are no stop signs or traffic signals present and SR-58 is generally uninterrupted. Further, east of the Project site, Soda Lake Road is controlled by a stop sign at the intersection with SR-58 that is un-controlled. A traffic accident data request was submitted to the California Highway Patrol (CHP) Templeton office, as there is no readily available traffic accident information for SR-58.

5.11.2 Environmental Consequences

This subsection provides the criteria used to determine if the proposed Project would have the potential to result in significant traffic-related impacts within the CESF study area.

5.11.2.1 LOS Concept

Table 5.11-2 provides the LOS definitions as specified in the highway capacity manual.

Table 5.11-2
LOS Descriptions

Average Vehicle Delay per Vehicle	LOS Characteristics
≤10	LOS-A describes operations with very low delay, up to 10 seconds (sec) per vehicle. This LOS 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 sec 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 sec 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 with out stopping.
>35 and ≤55	LOS-D Describes operations with delay greater than 35 and up to 55 sec 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 sec 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 sec per vehicle. This level, consider 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.

Reference: 2000 Highway Capacity Manual, TRB Special Report 209.

5.11.2.2 LOS Methodology

The traffic analyses prepared for this study were performed in accordance with San Luis Obispo County requirements, the California Environmental Quality Act (CEQA) project review process, and consistent with procedures outlined in the Caltrans guide for the preparation of traffic impact studies. Detailed information on roadway segment analysis methodologies, standards, and thresholds are discussed in the following sections.

5.11.2.2.1 Two-Lane Highways

Roadway segment LOS standards and thresholds provide the basis for analysis of arterial roadway segment performance. The analysis of roadway segment LOS is based on the functional classification of the roadway, the maximum capacity, roadway geometrics, and existing or forecast, or peak hour or ADT volumes.

According to the highway capacity manual, the applicable classification for the SR-58 study roadway segment is a Class I two-lane highway. Class I highways are two-lane highways on which motorist expect to travel at relatively high speeds and most often serve long-distance trips or provide connecting links between facilities that serve long distance trips.

Table 5.11-3 provides the LOS criteria for Class I two-lane highways as specified in the highway capacity manual.

Table 5.11-3
LOS Criteria for Class I Two-Lane Highways

LOS	Percent of Time Spent-Following	Average Travel Speed (mi/h)
A	< 35	> 55
B	> 35-50	> 50-55
C	> 50-65	> 45-50
D	> 65-80	> 40-45
E	> 80	< 40

Reference: 2000 Highway Capacity Manual.

5.11.2.3 Significance Thresholds

San Luis Obispo County: For county roadway segments, degradation in the LOS from an acceptable level (LOS-C or better) to an unacceptable level (LOS-D, E, or F) is a significant impact. For segments already operating at LOS-D, E, or F without the project, the addition of any project traffic to that location is a significant impact.

Caltrans: For Caltrans' facilities (intersections, roadway segment, freeway segments, and freeway ramp junctions), a degradation in the LOS from an acceptable level (LOS-C or D threshold or better) to an unacceptable level (LOS-D, E, or F) is a significant impact.

5.11.2.4 Construction Related Impacts (Year 2010 Peak Project Construction)

The CESF project construction is envisioned to be completed within a 35-month construction schedule. The size of the construction workforce on site will range from 85 during month 1 to a peak of 396 during months 16 and 17. The CESF construction manpower-loading curve is presented in Figure 5.11-4.

Year 2010 baseline conditions were developed using historical growth factor derived from traffic volume information from the Caltrans traffic count database. On average, peak hour traffic growth along the SR-58 study segments within the Project study area is 2 percent per year.

During the Project construction, small quantities of hazardous materials will be delivered and construction waste products will be hauled to and from the Project site. Additional 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 Handling, respectively. All applicable laws, ordinances, regulations, and standards will be observed during the course of Project construction.

5.11.2.5 Operations Related Impacts (Year 2011 Project Operations)

Similar to Year 2010 baseline conditions, Year 2011 baseline conditions were developed consistent with the historical traffic growth assumptions. Upon completion of construction and commissioning of the proposed Project, the CESF will generate operation related trips that are substantially less than peak construction activities.

During the normal operational phase of the Project, a planned 75-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 facility.

Based on the operational needs of the CESF, the following sources of vehicular traffic are anticipated:

- Operations personnel vehicles.
- Maintenance and supply vehicles.
- 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. Additional 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 Handling, respectively. All applicable laws, ordinances, regulations, and standards will be observed during the Project operations.

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 San Luis Obispo County and Kern 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 and long-term operations trips would primarily use SR-58.

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 35-month CESF construction schedule was used in the construction traffic impact analysis for the proposed Project.

Construction traffic should commence in the first quarter of 2009 and continue through the 35-month construction schedule. Traffic should peak during the first quarter of 2010. Due to the remote location of the site, the majority of craft labor will be transported by bus between the surrounding areas (e.g., Paso Robles, San Luis Obispo, and Bakersfield) and the site each day.

Typically, construction activity early work starts before the 7:00 a.m. to 9:00 a.m. and 4:00 p.m. to 6:00 p.m. adjacent street peak hour traffic, but for traffic impact analysis purposes, it was conservatively assumed that construction worker bus traffic would commute within the 7:00 a.m. to 9:00 a.m. and 4:00 p.m. to 6:00 p.m. adjacent street peak hour traffic window.

In addition to the construction work force bus trips, construction equipment deliveries and construction related truck traffic would contribute additional trips during the construction period. Bus, truck, and heavy equipment traffic were estimated using a passenger car equivalent (PCE) factor of three cars per truck.

Table 5.11-4 presents the peak Project construction trip generation estimates for the proposed Project. The estimated construction passenger car equivalent traffic is summarized in Table 5.11-5.

Table 5.11-4
Peak Construction Trip Generation

	Peak Daily Trips	Average	A.M. Peak Hour Trips		P.M. Peak Hour Trips	
		Daily Trips	In	Out	In	Out
Peak CESF construction (workers) buses	84	52	21	21	21	21
Equipment deliveries	14	6	4	4	0	3
Construction trucks	150	108	25	25	0	10
Total trips per peak hour	248	166	50	50	21	34

Table 5.11-5
Estimated Peak Construction Traffic (PCE)

Vehicle Type	(PCE)	A.M. Peak Hour In	A.M. Peak Hour Out	P.M. Peak Hour In	P.M. Peak Hour Out
Construction personnel (buses)	3	63	63	63	63
Delivery trucks	3	12	12	0	9
Heavy vehicles and trucks	3	75	75	0	30
TOTAL		150	150	63	102

As shown in Table 5.11-5, during the peak 3-month Project construction period, it is conservatively estimated that there will be 300 a.m. peak hour and 165 p.m. peak hour trips commuting to and from the

Project respectively. These peak hour trips 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 would be approximately 75 workers staffing the CESF operations. The staff will consist of five supervisory, general, and administrative positions; 20 operations and maintenance personnel in the power block; and 50 maintenance personnel in the solar field. The facility will be staffed 24 hours per day with up to five workers staffing and securing the facility during nighttime hours.

The above workers would not likely all commute during the 7:00 to 9:00 a.m. and 4:00 to 6:00 p.m. adjacent street peak hour traffic but were included just the same for purposes of evaluating the worse possible case scenario during CESF operations. During normal 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 7:00 to 9:00 a.m. and 4:00 to 6:00 p.m. analysis peak hours.

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]	150	70	5	5	70
Total Trips	150	70	5	5	70

Note:
[1]Operational workers (75 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 2010 Conditions Impact Analysis

As described earlier in this report, construction traffic should commence in the first quarter of 2009 and continue through the 35-month construction schedule. Construction traffic would peak during the first quarter of 2010. This section describes Year 2010 traffic conditions “with” and “without” the proposed peak Project construction. The following scenarios were analyzed under Year 2010 conditions:

- Year 2010 No Project conditions.
- Year 2010 Peak Project Construction conditions.

5.11.2.8.1 Year 2010 No Project Conditions

To establish Year 2010 No Project conditions, SR-58 historical traffic volume data from the Caltrans traffic count database was reviewed and the findings indicate that on average, peak hour traffic growth

along the SR-58 study segments within the Project study area is 2 percent. Figure 5.11-5 shows Year 2010 No Project conditions peak hour traffic volumes at the Project study roadway segments.

The findings are consistent with the information gathered through URS staff's conversation with Mr. Dave Flynn, the San Luis Obispo County Traffic Engineer, who stated that SR-58 is not a high traffic volume route except for the occasional recreational bikers riding through the area.

Year 2010 No Project Roadway Segment Analysis: Table 5.11-7 displays the LOS analysis results for the study area roadway segments under Year 2010 No Project conditions.

Table 5.11-7
Roadway Segment LOS
Year 2010 No Project Conditions

Roadway	Segment	Cross-Section Classification	Peak Hour Traffic Volume	LOS
SR-58	At Cammati Creek	2-Lane Collector	93	A
SR-58	West of Soda Lake Road	2-Lane Collector	58	A

As shown in Table 5.11-7, all of the study roadway segments are forecast to operate at acceptable LOS-A under Year 2010 No Project conditions. The roadway segment LOS calculation worksheets are provided in Appendix O, Traffic and Transportation.

5.11.2.8.2 Year 2010 Peak Project Construction Conditions

This scenario includes Year 2010 No Project traffic volumes plus CESF peak Project construction activity trip generation. The Year 2010 No Project peak hour volume data was used to assess both a.m. and p.m. Year 2010 Peak Project Construction conditions.

Figure 5.11-6 shows Year 2010 Peak Project Construction peak hour traffic volumes at the Project study roadway segments.

Year 2010 Peak Project Construction Roadway Segment Analysis: Table 5.11-8 displays the LOS analysis results for the study area roadway segments under Year 2010 with Peak Project Construction conditions.

Table 5.11-8
Roadway Segment LOS
Year 2010 Peak Project Construction Conditions

Roadway	Segment	Cross-Section Classification	Peak Hour Traffic Volume A.M. / P.M.	LOS A.M. / P.M.
SR-58	At Cammati Creek	2-Lane Collector	243 / 176	A / A
SR-58	West of Soda Lake Road	2-Lane Collector	208 / 40	A / A

As shown in Table 5.11-8, all of the study roadway segments are forecast to operate at acceptable LOS-A under Year 2010 Peak Project Construction conditions. The roadway segment LOS calculation worksheets are provided in Appendix O, Traffic and Transportation.

As discussed earlier in this section, the Year 2010 Peak Construction activities represent the worst possible case traffic analysis scenario during the lifetime of the CESF.

5.11.2.8.3 Year 2010 Conditions Traffic Impact Summary

Based on the San Luis Obispo County Department of Public Works traffic impact threshold criteria, none of the Project study roadway segments would be significantly impacted during the peak Project construction activity in Year 2010. The existing roadway circulation system has sufficient capacity to accommodate peak CESF project construction traffic.

5.11.2.9 Year 2011 Conditions Impact Analysis

This section focuses on Year 2011 traffic conditions for both "with" and "without" proposed Project operations.

The operation of the CESF would not require a significant number of workers onsite; however, non-recurring site visits are anticipated as a result of the CESF operations. The following analysis scenarios were conducted under the Year 2011 conditions analysis:

- Year 2011 No Project conditions.
- Year 2011 Project Operations conditions.

5.11.2.9.1 Year 2011 No Project Conditions

The Year 2011 No Project baseline conditions builds upon the Year 2010 No Project conditions with minor increases in ambient traffic growth to account for background traffic. Figure 5.11-7 shows Year 2011 No Project peak hour traffic volume at the Project study roadway segments.

Year 2011 No Project Roadway Segment Analysis: Table 5.11-9 displays the peak hour roadway segment volume and LOS under Year 2011 No Project Conditions. The roadway segment LOS calculation worksheets are provided in Appendix O, Traffic and Transportation.

Table 5.11-9
Roadway Segment LOS
Year 2011 No Project Conditions

Roadway	Segment	Cross-Section Classification	Peak Hour Traffic Volume	LOS
SR-58	At Cammati Creek	2-Lane Collector	96	A
SR-58	West of Soda Lake Road	2-Lane Collector	60	A

As shown in Table 5.11-9, all of the study roadway segments are forecast to operate at acceptable LOS-A under Year 2011 No Project conditions.

5.11.2.9.2 Year 2011 Project Operations Conditions

This scenario includes Year 2011 No Project traffic volume and incorporates the proposed Project operation added trips. Figure 5.11-8 shows Year 2011 Project Operations a.m. and p.m. peak hour traffic volumes at the Project study roadway segments.

Year 2011 Project Operations Roadway Segment Analysis: Table 5.11-10 displays the LOS analysis results for the key study area roadway segments under Year 2010 Project Operations conditions. The roadway segment LOS calculation worksheets are provided in Appendix O, Traffic and Transportation.

Table 5.11-10
Roadway Segment LOS
Year 2011 Project Operations Conditions

Roadway	Segment	Cross-Section Classification	Peak Hour Traffic Volume A.M. / P.M	LOS A.M. / P.M
SR-58	At Cammati Creek	2-Lane Collector	134 / 134	A / A
SR-58	West of Soda Lake Road	2-Lane Collector	97 / 97	A / A

As shown in Table 5.11-10, all of the study roadway segments are forecast to operate at acceptable LOS-A under Year 2011 Project Operations conditions.

5.11.2.9.3 Year 2011 Conditions Traffic Impact Summary

As discussed previously, the Year 2010 Peak Project Construction activities represented the worst possible case traffic analysis scenario for the proposed CESF. Upon completion of the proposed CESF project construction and commissioning of the facility, the CESF will generate operation 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 CESF operations.

Based on the San Luis Obispo County Department of Public Works traffic impact threshold criteria, none of the Project study roadway segments would be significantly impacted with the start of Project operations by Year 2011. 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 Cumulative Impacts

In consultation with the San Luis Obispo Public Works Department, there were no identified cumulative projects that may be starting within the CESF project construction (2010) and Project opening and operations (2011) timeframes.

5.11.4 Mitigation Measures

The result of the Project construction traffic analysis showed that no study roadway segment would be significantly impacted by the proposed Project during Year 2010 Peak Project Construction activities. Based on these findings, the Year 2010 Peak Project Construction conditions would not require traffic mitigation.

The following mitigations are voluntarily offered by CESF either as part of the construction activity requirements, or as pro-active measures initiated by CESF to minimize construction related tripmaking and resultant increases of traffic to the surrounding roadway circulation system.

TRAFFIC-1: Construction Traffic Route. During Project construction, CESF will designate a construction worker, equipment, and material delivery/haul route crossing SR-58 between the CESF site and the construction laydown area to the south. This proposed measure will provide a dedicated crossing point and eliminate multiple crossings across SR-58 resulting in less crossing conflicts for both CESF construction and SR-58 traffic.

TRAFFIC-2: Traffic Control Plan. If required, a traffic and transportation control plan will be prepared in coordination with the San Luis Obispo County and Caltrans to address short-term construction traffic and material deliveries during Project construction.

5.11.5 LORS Compliance

Based on the information provided in this documentation, the Project would comply with the applicable traffic and transportation LORS discussed below. Table 5.11-11 summarizes the applicable LORS.

5.11.5.1 Federal

5.11.5.1.1 Title 49, Code of Federal Regulations (CFR), Parts 171-177

Title 49, Code of Federal Regulations (CFR), 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 CESF 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, CFR, Section 77.13(2)(i)

Title 14, CFR, 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

5.11.5.2.1 California Vehicle Code (CVC) 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 CESF would comply with these codes by classifying all hazardous materials in accordance with their clarification.

5.11.5.2.2 CVC Sections 2500-2505

Authorizes the CHP to issue licenses for the transportation of hazardous materials including explosives.

The administering agency for the above statutes is the CHP.

The CESF 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 CVC Sections 13369, 15275, 15278

Addresses the licensing of drivers and the classification of license required for the operation of particular types of vehicles. Requires a commercial driver's license to operate commercial vehicles. Requires an endorsement issued by the Department of Motor Vehicles (DMV) to drive any commercial vehicle identified in Section 15278.

The administering agency for the above statutes is the DMV.

The CESF 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 CVC Sections 31303-31309

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 CESF 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 CVC Sections 31600-31620

Regulates the transportation of explosive materials.

The administering agency for the above statutes is the CHP.

It must be noted that the proposed CESF would not use explosive materials specifically defined in Section 12000 of the Health and Safety Code; however, the CESF 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 CVC Sections 32000-32053

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 proposed CESF would comply with this law by requiring that motor carriers of hazardous materials be properly licensed by the CHP.

5.11.5.2.7 CVC Sections 32100-32109

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 proposed CESF 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 CVC Sections 34000-34100

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 proposed CESF 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 CVC 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 proposed CESF 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 CVC 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, "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 proposed CESF 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 CVC 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 proposed CESF 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 California Streets and Highways Code, Section 117

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 proposed CESF 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 The California Streets and Highways Code, Sections 660, 670, 672, 1450, 1460, 1470, 1480 *et seq.*

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 San Luis Obispo County Public Works Department.

CESF would apply for encroachment permits for any excavation in state and county roadways prior to construction.

5.11.5.2.14 California Health and Safety Code (CHSC), Section 25160 *et seq.*

Addresses the safe transport of hazardous wastes, requires a manifest for hazardous waste shipments, and 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 proposed CESF would comply with this law by requiring that shippers of hazardous wastes are properly licensed by the DTSC and hazardous waste transport vehicles comply with DTSC requirements.

5.11.5.2.15 Caltrans California Manual on Uniform Traffic Control Devices, Part 6

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 San Luis Obispo County Public Works Department. The Applicant would file a traffic control plan prior to the start of construction.

5.11.5.2.16 Caltrans, Division of Traffic Operations

From Caltrans' Division of Traffic Operations, the following is a list of requirements for legal, unpermitted vehicles to operate in California.

Vehicle Width: The maximum allowable vehicle width is 102 inches (some exceptions apply).

Vehicle Height: The maximum allowable vehicle height is 14 feet.

Vehicle Length (California Legal): 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) is 40 feet maximum.
- Doubles – 75 feet for combination of vehicles consisting of a truck tractor and two trailers, provided neither trailer length exceed 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.

Vehicle Length – Surface Transportation Assistance Act (STAA): 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.

Vehicle Weight: 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 CHP 889, "Vehicle Code Size and Weight Law Summary" or call the commercial vehicle section of the CHP.

5.11.5.3 Local

Key roadways in San Luis Obispo County serve as vital transportation corridors. Passenger vehicles, motor homes, and trucks cross San Luis Obispo County in route to out-of-county and interstate destinations. In addition, rail traffic and pipelines have major routes through San Luis Obispo County.

The San Luis Obispo Council of Governments (SLOCOG) is the regional transportation agency that prepares the region's Long Range Transportation Plan (LRTP) to examine long-range transportation issues, opportunities, and needs for San Luis Obispo County. SLOCOG provides transportation planning and funding for the region, plans public transit, and alternative modes of transportation.

5.11.5.4 San Luis Obispo County Transportation Plan

The San Luis Obispo County Transportation Plan serves as the mandated Circulation Element of the County General Plan.

The following goals of the transportation plan could be potentially affected by short and long-term traffic and circulation issues associated with the construction and operation of the proposed CESF:

- In developing the county transportation plan, the betterment of the quality of life shall be the yardstick against which all plans and programs are measured.
- The county transportation plan is patterned after the regional transportation plan and as such should be compatible with plans of several cities within the County.
- The transportation system should be a well-coordinated multimodal system that is sensitive to the needs and desires of its citizens. Similarly, transportation programs should serve to reinforce federal, state, regional, and local agency goals including land use, population, employment, urban development, and environment.
- The transportation system should be compatible with the environment, avoid the despoliation of irreplaceable resources, use available resources wisely, promote the aesthetic quality of the county, and minimize environmental changes.
- In developing the county transportation system, all proposals should be financially and politically feasible, and have broad public support.
- Proposed transportation system should be designed to maximize safety and ensure high quality of facilities using all economically and technically feasible means available.
- Transportation systems should minimize social, environmental, and economic disruption and be designed to meet the needs of all social groups.

5.11.5.4.1 Shandon-Carrizo Area Plan

In September 22, 1980, the San Luis Obispo County adopted the Shandon-Carrizo Area Plan that is composed of a Land Use and Circulation Element of the San Luis Obispo County General Plan for the Shandon-Carrizo Planning Area. The Shandon-Carrizo Area Plan was last revised in January 1, 2003, and contains the following relevant circulation policies, goals, programs, and proposals:

Shandon-Carrizo Area Plan, Chapter 4: Circulation, A. Roads, Arterials: Construct minor improvements on SR-58 including shoulders and culverts as necessary.

Shandon-Carrizo Area Plan, Chapter 4: Circulation, C. Planning Area Circulation Programs, California Valley, Airport Land Use Plan: The county airport land use commission was tasked to prepare an airport land use plan for the California Valley airport.

San Luis Obispo County Public Works Department, LOS-C Threshold: Maintain roadway segment LOS-C or better within the Project study area.

Table 5.11-11
Summary of LORS

Jurisdiction	LORS	Requirements	Conformance Section	Administering Agency	Agency Contact
Federal					
	Title 49, CFR Section 171-177	Governs the transportation of hazardous materials, including the marking of transportation vehicles.	5.11.5.1, federal authorities and administering agencies.	CHP	2
	Title 14, CFR Section 77.13(2)(i)	Requires applicant to notify FAA of any construction greater than height limits defined by the FAA.	5.11.5.1, federal authorities and administering agencies.	FAA	1
State					
	CVC Section 353	Defines the hazardous materials.	5.11.5.2, state authorities and administering agencies.	CHP	2
	CVC 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.	5.11.5.2, state authorities and administering agencies.	California DMV	4
	CVC Section 31303-31309	Requires transporters of hazardous materials to use the shortest route possible.	5.11.5.2, state authorities and administering agencies.	CHP	2
	CVC Section 32000-32053	Regulates the licensing of carriers of hazardous materials and noticing requirements.	5.11.5.2, state authorities and administering agencies.	CHP	2
	CVC Section 32100-32109	Transporters of inhalation hazardous materials or explosive materials must obtain a hazardous materials transportation license.	5.11.5.2, state authorities and administering agencies.	CHP	2
	CVC Section 34000-34100	Establish special requirements for the flammable and combustible liquids over public roads and highways.	5.11.5.2, state authorities and administering agencies.	CHP	2

Table 5.11-11
Summary Of LORS
(Continued)

Jurisdiction	LORS	Requirements	Conformance Section	Administering Agency	Agency Contact
	CVC Section 34500	Regulate the safe operation of vehicles, including those that are used for the transportation of hazardous materials.	5.11.5.2, state authorities and administering agencies.	CHP	2
	CVC Section 35550	Imposes weight guidelines and restrictions upon vehicles traveling upon freeways and highways.	5.11.5.2, state authorities and administering agencies.	Caltrans	3
	CVC Section 35780	Requires approval for a permit to transport oversized or excessive load over state highways.	5.11.5.2, state authorities and administering agencies.	Caltrans	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.	5.11.5.2, state authorities and administering agencies.	Caltrans	3
	California Streets and Highways Code, Sections 660, 670, 672, 1450,1460,1470, 1480 *et seq*.	Defines highways and encroachment. Regulate ROW encroachment and the granting of permits with conditions for encroachment in state and county roads.	5.11.5.2, 5.11.5.3, state and local authorities and administering agencies.	Caltrans and San Luis Obispo County	3, 5
	CHSC Section 25160 *et seq*.	Addresses the safe transport of the hazardous materials.	5.11.5.2, state authorities and administering agencies.	CHP	2
	Caltrans Manual on Uniform Traffic Control Devices, Part 6	Requires traffic control plans to ensure continuity of traffic during roadway construction.	5.11.5.2, 5.11.5.3, state and local authorities and administering agencies.	Caltrans and San Luis Obispo County	5, 6

Table 5.11-11
Summary of LORS
(Continued)

Jurisdiction	LORS	Requirements	Conformance Section	Administering Agency	Agency Contact
Local					
	County of San Luis Obispo, Official Traffic Regulations Code, County Code, Title 15 Vehicles and Traffic	Establishes county traffic regulations for speed, parking and vehicle operations.	5.11.5.2, 5.11.5.3, state and local authorities and administering agencies.	San Luis Obispo County and California Highway Patrol	2, 5
	San Luis Obispo County General Plan, Transportation Plan	County roadways to accommodate existing and future developments.	5.11.5.3, local authorities and administering agencies.	San Luis Obispo County	5
	San Luis Obispo County Public Works Department, Minimum Roadway Segment LOS.	Maintain roadway segment LOS-C or better within the project study area.	5.11.5.3, local authorities and administering agencies.	San Luis Obispo County	5

5.11.5.5 Agencies and Agency Contacts

Agencies with jurisdiction to issue applicable permits and/or enforce LORS related to traffic and transportation are shown in Table 5.11-12.

Table 5.11-12
Agency Contact List for LORS

	Agency	Contact	Address	Telephone
1	FAA	Karen McDonald	Western Pacific Region AWP5202 15000 Aviation Boulevard, Lawndale, CA 90261-1002	(310) 725-6557
2	CHP	Lt. Cmdr. Mark Bakios Officer Scott Coleman Cytasha Campa	101 Duncan Road, Templeton, CA 93465	(805) 434-1822
3	Caltrans North Region Permits Office MS# 41	Kien Le	Caltrans North Region Permits Office MS# 41 1823 14th Street	(916) 3220-6001
4	DMV, Licensing Operations Division	Public Inquiry	2415 1st Avenue Mail Station F101 Sacramento, CA 95818	(916) 657-8698

Table 5.11-12
Agency Contact List for LORS
(Continued)

	Agency	Contact	Address	Telephone
5	San Luis Obispo County Public Works	Dave Flynn	County Government Center Room 207 San Luis Obispo, CA 93408	(805) 781-5252
6	Caltrans, District 5	David Murray	50 Higuera Street, San Luis Obispo, CA 93401-5415	(805) 549-3168
7	Caltrans, District 6	Kurt Hatton	1352 W. Olive Avenue Fresno, CA 93728	(559) 243-3451

5.11.5.6 Permits Required and Permitting Schedule

The County of San Luis Obispo Public Works Department issues the following permits:

Encroachment Permit: Any connection to a county-maintained road is considered an encroachment. If a building permit involves the construction of a new driveway or improvement to an existing one, or the connection to utilities under the road, it will require an encroachment permit. Encroachment permits allow individuals, contractors, or utilities to do work within the public right-of-way.

Transportation Permit: Required whenever the size or weight of a vehicle and/or load exceed the maximums allowed by the CVC. A transportation permit is written permission to move an oversized load on roads within the county of San Luis Obispo's jurisdiction. A permit may be granted to a private company or an individual. Permits are issued by the traffic division.

Building Permit: Building permits issued within the jurisdiction of the county follow the County of San Luis Obispo Planning and Building permit process.

- General Permit: This standardized application provides general information about the applicant, the property owner, and the property. A “consent of landowner” form authorizing an agent to act for the landowner is at the back of this application
- Construction Permit: This application provides specific information about the proposed project being built. This form also lists the project contractor and/or architect.

In addition to San Luis Obispo County, Caltrans District 5, which has operational jurisdiction on SR-58, also requires permits for work conducted within state highway ROW. Table 5.11-13 identifies applicable permits.

Table 5.11-13
Applicable Permits

Responsible Agency	Permit/Approval	Schedule
Caltrans (for SR-58)	State Highway Encroachment Permit	To be determined (TBD)
San Luis Obispo County Department of Public Works	Local Encroachment Permit	TBD
San Luis Obispo County Department of Public Works, Development Services Division	Building Permit	TBD
Caltrans (for SR-58)	State Highway Transportation Permit	TBD
San Luis Obispo County Department of Public Works Traffic Division	Local Transportation Permit	TBD

5.11.6 References

California Code, 2005. Vehicle Code.

California Code, 2005. Streets and Highways Code.

California Department of Transportation, District 5, Division Planning, 2007. Telephone conversation with Terri Leaf on August 23, 2007, (805) 549-3648.

California Department of Transportation, District 5, Division Planning, 2007. Telephone conversation with David Silverburger on August 24, 2007, (805) 549-3798.

California Department of Transportation, District 6, Program Project Management, 2007. Telephone conversation with Kurt Hatton on August 23, 2007, (559) 243-3451.

California Department of Transportation, Traffic Operations Program, Traffic and Vehicle Data Systems, 2007.

California Department of Transportation, 2006. 2006 Traffic Volumes.

California Department of Transportation, 2005. 2005 Truck Volumes.

California Highway Patrol, Coastal Division, Templeton Area Office, 2007. Telephone conversation with Cytasha Campa on August 28, 2007, (805) 434-1822.

Caltrans District 5 Bicycle Map for State Highways in the Central Coast, 2004.

Code of Federal Regulations, 2002. Title 14 Aeronautics and Space, Federal Aviation Administration.

Code of Federal Regulations, 2002. Title 49 Environment, Subtitle B – Other Regulations Relating to Transportation.

San Luis Obispo County, 1979. San Luis Obispo County Transportation Plan Circulation Element (Superseded).

San Luis Obispo County, 2003. San Luis Obispo County General Plan, Land Use and Circulation Element, Shandon-Carrizo Area Plan.

San Luis Obispo County, 2007. San Luis Obispo County General Plan, Land Use and Circulation Element, Framework for Planning (Inland).

County of San Luis Obispo Public Works Department, 2007. Telephone conversation with Mr. Dave Flynn, P.E., County Traffic Engineer, July 26 and August 13, 2007, (805) 781-5252.

McTrans Center, University of Florida, 2000. Highway Capacity Software. Version 4.1a.

Transportation Research Board, 2000. Highway Capacity Manual.

5.12 NOISE

Noise is generally defined as loud, unpleasant, unexpected, or undesired sound that is typically associated with human activity and that interferes with or disrupts normal activities. 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; the perceived importance of the noise, and its appropriateness in the setting; the time of day and the type of activity during which the noise occurs; and the 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 pitch of the sound and is measured in Hertz (Hz), while 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 approximately 110 dB begin to be felt inside the human ear as discomfort and eventually pain at 120 dB and higher levels. The minimum change in the sound level of individual events that an average human ear can detect is about 1 to 2 dB. A 3 to 5 dB change is readily perceived. A change in sound level of about 10 dB is usually perceived by the average person as a doubling (or if -10 dB, halving) of the sound's loudness.

Due to the logarithmic nature of the decibel unit, sound levels cannot be added or subtracted directly and are somewhat cumbersome to handle mathematically; however, some simple rules are useful in dealing with sound levels. First, if a sound's intensity is doubled, the sound level increases by 3 dB, regardless of the initial sound level. For example: 60 dB + 60 dB = 63 dB, and 80 dB + 80 dB = 83 dB.

Sound level is usually expressed by reference to a known standard. This report refers to sound pressure level. In expressing sound pressure on a logarithmic scale, the sound pressure is compared to a reference value of 20 micropascals (µPa). Sound pressure level depends not only on the power of the source, but also on the distance from the source and on the acoustical characteristics of the space surrounding the source.

Hertz is a measure of how many times each second the crest of a sound pressure wave passes a fixed point. For example, when a drummer beats a drum, the skin of the drum vibrates a number of times per second. When the drum skin vibrates 100 times per second it generates a sound pressure wave that is oscillating at 100 Hz, and this pressure oscillation is perceived by the ear/brain as a tonal pitch of 100 Hz. Sound frequencies between 20 and 20,000 Hz are within the range of sensitivity of the best human ear.

Sound from a tuning fork contains a single frequency (a pure tone), but most sounds one hears in the environment do not consist of a single frequency but rather a broad band of frequencies differing in sound level. The method commonly used to quantify environmental sounds consists of evaluating all frequencies of a sound according to a weighting system that reflects that human hearing is less sensitive at low frequencies and extremely high frequencies than at the mid-range frequencies. This is called "A-weighting," and the decibel level measured is called the A-weighted sound level (dBA). 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.

Although the dBA may adequately indicate the level of environmental noise at any instant in time, community noise levels vary continuously. Most environmental noise includes a mixture of noise from distant sources that creates a relatively steady background noise in which no particular source is identifiable. A single descriptor called the equivalent sound level (L_{eq}) may be used to describe sound that is changing in level. L_{eq} is the energy-mean dBA during a measured time interval. It is the "equivalent" constant sound level that would have to be produced by a given source to equal the acoustic energy contained in the fluctuating sound level measured. In addition to the energy-average level, it is often desirable to know the acoustic range of the noise source being measured. This is accomplished through the maximum L_{eq} (L_{max}) and minimum L_{eq} (L_{min}) indicators that represent the root-mean-square maximum and minimum noise levels measured during the monitoring interval. The L_{min} value obtained for a particular monitoring location is often called the acoustic floor for that location.

To describe 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 10 percent, 50 percent, and 90 percent of the measured time interval. Sound levels associated with the L_{10} typically describe transient or short-term events, half of the sounds during the measurement interval are softer than L_{50} and half are louder, while levels associated with L_{90} often describe background noise conditions and/or continuous, steady-state sound sources.

Finally, another sound measure known as the Community Noise Equivalent Level (CNEL) is defined as the A-weighted average sound level for a 24-hour day. It is calculated by adding a 5-decibel penalty to sound levels during the evening period (7:00 p.m. to 10:00 p.m.) and a 10 dB penalty to sound levels during the night period (10:00 p.m. to 7:00 a.m.) to compensate for the increased sensitivity to noise during the quieter evening and nighttime hours. The Day-Night Average Sound Level (L_{dn} or DNL) also represents the average sound level for a 24-hour day and is calculated by adding a 10 dB penalty only to sound levels during the night period (10:00 p.m. to 7:00 a.m.). The CNEL and L_{dn} are typically used to define acceptable land use compatibility with respect to noise. Because of the time-of-day penalties associated with the CNEL and L_{dn} descriptors, the L_{eq} for a continuously operating sound source during a 24-hour period will be numerically less. Thus, for a power plant operating continuously for periods of 24 hours, the L_{eq} will be 6 dB lower than the L_{dn} value and 7 dB lower than the CNEL value. But for a facility that only operates during daytime hours, with evening and nighttime background sound levels being significantly quieter, L_{eq} can be slightly higher than the corresponding L_{dn} and CNEL values over the same 24-hour period. Sound levels of typical noise sources and environments are provided in Table 5.12-1 to provide a frame of reference.

Table 5.12-1
Sound Levels of Typical Noise Sources and Noise Environments

Noise Source (At a Given Distance)	Scale of A-Weighted Sound Level in Decibels	Noise Environment	Human Judgment of Noise Loudness
Military Jet Take-off with After-burner (50 feet), Civil-defense Siren (100 feet)	140, 130	Aircraft Carrier Flight Deck	

Table 5.12-1
Sound Levels of Typical Noise Sources and Noise Environments
(Continued)

Noise Source (At a Given Distance)	Scale of A-Weighted Sound Level in Decibels	Noise Environment	Human Judgment of Noise Loudness
Commercial Jet Take-off (200 feet)	120	Thunderclap	Threshold of Pain 32 Times as Loud*
Pile Driver (50 feet)	110	Rock Music Concert	Average Human Ear Discomfort 16 Times as Loud*
Ambulance Siren (100 feet), Newspaper Press (5 feet), Power Lawn Mower (3 feet)	100		Very Loud 8 Times as Loud*
Motorcycle (25 feet), Propeller Plane Flyover (1,000 feet), Diesel Truck, 40 Miles Per Hour (50 feet)	90	Boiler Room Printing Press Plant	Likely Damage, 8-Hour Exposure 4 Times as Loud*
Garbage Disposal (3 feet)	80		Possible Damage, 8-Hour Exposure 2 Times as Loud*
Passenger Car, 65 Miles Per Hour (25 feet), Vacuum Cleaner (10 feet)	70	Data Processing Center, Department Store	Reference Loudness Moderately Loud*
Normal Conversation (5 feet), Air-conditioning Unit (100 feet)	60	Private Business Office, Restaurant	1/2 as Loud*
Light Traffic (100 feet)	50	Lower Limit of Daytime Urban Ambient Sound	1/4 as Loud*
Bird Calls (distant)	40	Quiet Urban Nighttime	1/8 as Loud*
Soft Whisper (5 feet)	30	Recording Studio, Library	Very Quiet 1/16 as Loud*
	20	Whistling, Rustling Leaves	Just Audible 1/32 as Loud*
	10	Breathing	Barely Audible 1/64 as Loud
	0		Threshold of Hearing 1/128 as Loud*

Reference: URS Corporation, 2007.
Note: * Relative to a Reference Loudness of 70 Decibels.

5.12.1 Affected Environment

In accordance with California Energy Commission (CEC) regulations, this section describes the existing noise environment on site and in the vicinity of the Carrizo Energy Solar Farm (CESF or Project), and assesses potential noise impacts associated with the proposed Project. Noise-sensitive receivers that may be affected are identified, as well as the laws, ordinances, regulations, and standards (LORS) that regulate noise levels at those receivers.

5.12.1.1 Project Area

The CESF site is located in San Luis Obispo County in central California in the Shandon-Carrizo Planning Area approximately 50 miles east of Santa Margarita. The major noise-producing Project components are located within an approximate 640-acre plot of land north of California State Route 58 (SR-58)/Carrisa Highway on Section 28 (see Figure 5.12-1). The temporary construction laydown area will be approximately 380 acres south and adjacent to the Project, located on the northern half of Section 33.

Some land uses are considered sensitive to noise. Based on CEC guidelines, residences, hospitals, libraries, schools, places of worship, or other facilities where quiet is an important attribute of the environment are considered to be noise sensitive land uses. Five single-family residences are located west of the proposed CESF. There are four along SR-58 approximately 1,300, 3,600, 4,100 and 5,700 feet away. The fifth is 5,700 feet away off of the road. Two single-family residences are located approximately 400 and 2,700 feet north of the CESF. One abandoned receiver is located 1,900 feet north of SR-58 in Section 28. Additionally, Carrisa Plains School is located southeast of the temporary construction laydown area.

5.12.1.2 Ambient Noise Measurements

A series of sound level measurements was taken on June 13 and 14, 2007, at residences and other locations in the surrounding community to quantify the existing noise environment near the Project site. Short-term (10 - 15 minutes in duration) and long-term (25-hour duration) measurements were taken at locations that provide representative characterizations of the ambient noise levels in the Project vicinity. The results of the short-term measurements are summarized in Table 5.12-2 and the long-term measurement is summarized in Table 5.12-3. The measurement locations are shown on Figure 5.12-1.

The short-term measurements were gathered using a Brüel & Kjær Type 2250 American National Standards Institute (ANSI) Type 1 Integrating Sound Level Meter (Serial Number 2506704). The sound level meter was set on slow-time response using the dBA scale for all the measurements and a windscreen was used. The instrument's calibration was validated before and after each measurement period with a Brüel & Kjær Type 4231 acoustic calibrator (Serial Number 2432189). The meter was mounted on a tripod 5 feet above the ground to approximate the average height of the human ear. All sound level measurements conducted by URS were in accordance with ISO (1996a, b, and c). Measurements were taken over a broad land area initially understood to be the potential Project siting or affected area; however, not all measurement locations were considered in subsequent sound prediction models and

analyses. Those measurement locations not considered are noted as such in the descriptions that follow Table 5.12.-2 and are intended to help illustrate ambient noise levels.

The long-term measurements were gathered using Larson Davis Model 720 ANSI Type 2 Integrating Sound Level Meters (Serial Numbers 0395 and 0436). Each meter was placed in a watertight container and the microphones were securely affixed to upright fencing posts so as to approximate the elevation of a human ear with respect to the grade. The long-term measurements consisted of consecutive 15-minute averages.

Weather conditions during the survey period were hot with clear skies and no precipitation. The air temperature varied from 66 degrees Fahrenheit (°F) to 104°F, with 18 percent to 42 percent relative humidity. Winds were gusty and moderate, ranging from 0 to 9 miles per hour, and directed toward south and southeast for all measurements.

Table 5.12-2
Short-Term Sound Level Measurements (dBA)

Measurement Identification	Location Description	Time	L_{eq}	L_{min}	L_{max}	L_{10}	L_{50}	L_{90}
ML01	8710 SR-58, 1283 feet west of Project site	3:44-3:59 p.m.	35	20	52	39	31	25
		2:29- 2:44 a.m.	43	33	57	45	41	37
ML02	Northern property line, under transmission lines	6:40-6:55 p.m.	44	40	74	44	41	41
		2:58- 3:08 a.m.	43	42	46	43	42	42
ML03	9368 SR-58, north of Project site	7:43 – 7:58 p.m.	46	24	71	37	32	27
		---	---	---	---	---	---	---
ML04	Northern property line, under transmission lines	4:11 – 4:26 p.m.	31	20	46	34	26	22
		3:13 – 3:18 a.m.	47	32	60	51	37	36
ML05	Western property line of construction laydown on SR-58	5:37 – 5:52 p.m.	59	21	85	44	32	25
		3:57 – 4:07 a.m.	43	32	55	46	41	34
ML06	Branch Mountain Road, south of Project site	4:42 – 4:57 p.m.	34	19	54	37	29	22
		4:16 – 4:31 a.m.	42	20	55	46	39	27
ML07	SR-58, 2700 feet east of Project site	5:08 – 5:23 p.m.	49	19	73	47	39	26
		4:40 – 4:55 a.m.	43	36	57	45	42	39

Note: Measurements taken on June 13 and 14, 2007.

ML01: Measurements were conducted during the daytime and nighttime at the northeastern fence line of the residence at 8710 SR-58 (see Figure 5.12-1; ML01). The meter was located on the northeastern corner of fence adjacent to the small access driveway 511 feet north of SR-58. The property is located approximately 4100 feet west of the CESF site. The daytime measurement was taken between 3:44 p.m. and 3:59 p.m. on June 14, 2007. The nighttime measurement was taken between 2:29 a.m. and 2:44 a.m. on June 14, 2007. Daytime noise sources included birds and cows vocalizing, wind induced tree noise,

roadway traffic from SR-58, and wind noise. The low-frequency hum typical of a propeller plane was audible, but no plane was visible. Nighttime noise sources consisted of a consistent unidentifiable source (due to no visibility) that sounded like running water and infrequent cow vocalizations. The daytime L_{eq} was 35 dBA and the nighttime L_{eq} was 43 dBA. The calculated L_{dn} is 49 dBA.

ML02: Measurements were conducted during the daytime and nighttime 200 feet east of the proposed CESF project boundary at the existing PG&E Carrizo Plain Substation and directly underneath overhead transmission lines (see Figure 5.12-1; ML02). The substation was located one mile north of SR-58. The daytime measurement was taken between 6:40 p.m. and 6:55 p.m. on June 13, 2007. The nighttime measurement was taken between 2:58 a.m. and 3:08 a.m. on June 14, 2007. Daytime noise sources included birds and a consistent hum from the transformer in the substation. Nighttime noise sources were the consistent hum from the substation and crickets. The daytime L_{eq} was 44 dBA and the nighttime hour L_{eq} was 43 dBA. The calculated L_{dn} is 50 dBA.

ML03: Measurements were conducted only during the daytime at the residence at 9368 SR-58 due to resident requested privacy and concerns of intent (see Figure 5.12-1; ML03). The residence is located approximately 2,700 feet north of the northern CESF project boundary. The daytime measurement was taken between 7:43 p.m. and 7:58 p.m. on the afternoon of June 13, 2007. Daytime noise sources included children activity, wind induced tree noise, an occasional dog bark, and a peacock vocalizing. The daytime L_{eq} was 46 dBA.

ML04: Measurements were conducted during the daytime and nighttime directly underneath overhead transmission lines (see Figure 5.12-1; ML04). ML04 was located 2,700 feet east of ML02. The daytime measurement was taken between 4:11 p.m. and 4:26 p.m. on June 14, 2007. The nighttime measurement was taken between 3:13 a.m. and 3:18 a.m. on June 14, 2007. Daytime noise sources included birds vocalizing, wind noise, a jet flyover, analyst movement, and consistent "crackling" from the electrical cabling. Nighttime noise sources were wind noise, the consistent "crackling" from the cabling, rooster vocalizing in the distance, and crickets. The daytime L_{eq} was 31 dBA and the nighttime hour L_{eq} was 47 dBA. The calculated L_{dn} is 53 dBA.

Several other noise measurements were taken to help ascertain ambient conditions. These were not utilized in the analysis and are not shown on the corresponding map (Figure 5.12-1). There are included here as background only.

ML05: Measurements were conducted during the daytime and nighttime. The meter was located on the shoulder of SR-58. The daytime measurement was taken between 5:37 p.m. and 5:52 p.m. on June 14, 2007. The nighttime measurement was taken between 3:57 a.m. and 4:07 a.m. on June 14, 2007. Daytime noise sources included wind noise, a jet flyover, two-propeller plane flyovers, and roadway traffic on SR-58. Nighttime noise sources were minimal; however, roadway traffic is clearly audible from large distances (> 2 miles). The daytime L_{eq} was 59 dBA and the nighttime hour L_{eq} was 43 dBA. The calculated L_{dn} is 58 dBA. This measurement is not included in the analysis and is not included on Figure 5.12-1 as it does not represent an operational property line or a sensitive receiver.

ML06: Measurements were conducted during the daytime and nighttime on Branch Mountain Road, 647 feet south of SR-58. The meter was located next to a storage area for heavy agricultural equipment. The daytime measurement was taken between 4:42 p.m. and 4:57 p.m. on June 14, 2007. The nighttime

measurement was taken between 4:16 a.m. and 4:31 a.m. on June 14, 2007. Daytime noise sources included roadway traffic from SR-58, a propeller aircraft flyover (not visible), and slight movement from the analyst. Nighttime noise sources included crickets vocalizing. The daytime L_{eq} was 34 dBA and the nighttime hour L_{eq} was 42 dBA. The calculated L_{dn} is 48 dBA. This measurement is not included in analysis and is not included on Figure 5.12-1 due to its proximity to the final Project location. It does not represent a sensitive receiver.

ML07: Measurements were conducted during the daytime and nighttime 2,700 feet to the east of Soda Lake Road at a location representative of the residences on SR-58. The meter was located 89 feet south of SR-58 in a lot between a residence and an office location of the San Luis Obispo County Engineering/Transportation Department. The daytime measurement was taken between 5:08 p.m. and 5:23 p.m. on June 14, 2007. The nighttime measurement was taken between 4:40 a.m. and 4:55 a.m. on June 14, 2007. Daytime noise sources included birds vocalizing, wind-induced tree noises as well as the wind noise itself, roadway traffic from SR-58, and a diesel engine truck at the adjacent facility. Nighttime noise sources were distant road noise, early morning birds vocalizing, and crickets. The daytime L_{eq} was 49 dBA and the nighttime hour L_{eq} was 43 dBA. The calculated L_{dn} is 51 dBA. This measurement is not included in analysis and is not included on Figure 5.12-1 due to its proximity to the final Project location. It does not represent a sensitive receiver.

The following information details the long-term measurement location.

LT-1: A 26-hour measurement was conducted on the fence line yard of the Carrisa Plains School, located southeast of the construction laydown area on Section 34. This school is on SR-58. The measurement location was on the northeastern corner of the school property which was 445 feet east of SR-58 as well as approximately 1,060 feet north of SR-58. The measurement was taken between 5:00 p.m. on June 13, 2007, and 7:00 p.m. on June 14, 2007. Daytime noise sources consisted of roadway traffic from SR-58, birds vocalizing, dogs barking, and aircraft flyovers. Nighttime noise sources consisted of roadway traffic from SR-58 and crickets vocalizing. The hourly L_{eq} ranged from 39 to 59 dBA (average = 47 dBA) and the hourly L_{90} ranged from 36 to 42 dBA (average = 37 dBA). The average hourly L_{eq} during the nighttime hours was 47 dBA L_{eq}, and the L_{dn} was 51 dBA, both as appearing in Table 5.12-3. Detailed hourly long-term data, with appropriate statistical descriptors, is located in Table 5.12-4. In addition, long term measurement summary data is included as Appendix P-1, Noise.

Table 5.12-3
Long-Term Noise Measurement Data Summary

Site ID	Measurement Location	Measurement Period			25-hr Measurement Results (dBA)			
		Start Date	Start Time	Duration (hh:mm)	L_{eq}	L_{dn}	L_{50}	L_{90}
LT-1	Carrisa Plains School	6/13/07	5:00 p.m.	26:00*	47	51	41	37

Note: The first one-half hour and final one-half hour of collected data were not used for purposes of reporting and analysis.

Table 5.12-4
Detailed Long-Term Noise Measurement Data Summary

25-hr Measurement Hourly Results at LT-1 (dBA)							
Hour Start	Hour End	Statistical Descriptors					
		L_{eq}	L_{max}	L_{10}	L_{50}	L_{90}	L_{min}
17:30	18:30	50	67	53	46	40	37
18:30	19:30	45	58	49	43	39	37
19:30	20:30	42	59	45	39	37	36
20:30	21:30	40	53	42	38	37	36
21:30	22:30	47	62	47	42	39	38
22:30	23:30	45	58	47	44	40	38
23:30	0:30	43	57	45	42	40	39
0:30	1:30	41	46	43	41	39	38
1:30	2:30	42	53	43	41	39	39
2:30	3:30	40	49	42	40	38	38
3:30	4:30	42	50	44	41	39	38
4:30	5:30	43	55	45	42	39	37
5:30	6:30	43	58	46	39	36	36
6:30	7:30	42	58	44	38	36	36
7:30	8:30	48	60	52	44	39	37
8:30	9:30	44	61	46	41	37	36
9:30	10:30	46	65	45	40	38	37
10:30	11:30	44	59	46	41	38	37
11:30	12:30	48	63	51	43	39	37
12:30	13:30	48	66	51	43	39	37
13:30	14:30	50	65	53	43	38	37
14:30	15:30	49	65	52	40	37	36
15:30	16:30	52	72	54	41	37	36
16:30	17:30	49	63	54	41	37	36
17:30	18:30	42	63	45	38	36	36

5.12.1.3 Topographical Conditions

The elevation of the Project area ranges from 2014 to 2064 feet and consists of gradual contours that give the Project a flat landscape. The area is pastoral with large expanses of tilled soil. SR-58 is the main paved portion of the area; all driveways and yards, including the schoolyard, are unpaved. The arborage is sparse.

5.12.2 Environmental Consequences

Noise will be produced at the proposed Project site during construction and operation of the Project. Potential noise impacts from both activities will be assessed in this section. Federal, state, and local laws, ordinances, regulations and standards (LORS) that apply to the Project are included in Section 5.12.6. These include the noise elements and noise ordinances of the County to determine the significance of

Project-generated increases in noise levels. Based on state of California and San Luis Obispo County guidelines, environmental consequences of the Project would be considered significant if:

- Noise from Project construction takes place between 9:00 p.m. and 7:00 a.m. Monday through Friday or 5:00 p.m. and 8:00 a.m. on Saturday or Sunday.
- Noise from Project operations exceeds 50 dBA L_{eq} hourly sound levels at a noise sensitive land use between 7:00 a.m. and 10:00 p.m.
- Noise from Project operations exceeds 45 dBA L_{eq} hourly sound levels at a noise sensitive land use between 10:00 p.m. and 7:00 a.m.
- Based on CEC guidelines, if noise from the Project increases the existing background noise level by 5 dBA or more an impact may result.

5.12.2.1 Construction Noise

The construction schedule of the Project will take place over a period of 35 months between the hours of 7:00 a.m. and 7:00 p.m. Monday through Friday. During construction activities, a varying number of construction equipment and personnel will be in the area of the Project, resulting in varying levels of construction noise. The Project will utilize conventional construction techniques and equipment including excavators, bulldozers, heavy trucks (e.g., water truck, dump truck), and similar heavy construction equipment. A limited amount of specialized construction using pile-driving equipment may also be needed.

Conventional construction activities at the Project would result in a short-term, temporary increase in the ambient noise level resulting from the operation of construction equipment. The increase in noise level would be primarily experienced close to the noise source. The magnitude of the noise effects would depend on the type of construction activity, noise level generated by construction equipment, duration of the construction phase(s), and the distance between the noise source and receiver.

Noise impacts associated with the proposed Project were assessed with spreadsheet-based noise calculations. User inputs include (1) distances between the modeled acoustic "centers" and the receivers and (2) quantities of equipment or events over a specific time period (e.g., equipment utilization per month) and hours of daytime (up to 8.5 hours). The acoustic "center" was considered to be in the geographical center of the power block area at the CESF site. Parameters specific to construction activities were input in the model to predict individual sound level contributions with the following equation:

Where SPL = Sound Pressure Level

$$L_{eq} = \text{Source SPL} + 10 * \log_{10}(\text{Duty Cycle}) + 10 * \log_{10}(\text{Quantity}) + 10 * \log_{10}(\text{Hours}/12) - 20 * \log_{10}(\text{Distance from Source / Reference Distance})$$

The calculation then logarithmically sums these individual sound levels (equipment-related sources, as defined below) to arrive at "aggregate" L_{eq} values for a construction activity category with respect to a specific receiver point. These aggregate values were averaged across each activity category for this analysis. The results of the aggregate calculations for each sensitive receiver are summarized in Table 5.12-5. Onsite receiver locations are expressed as "quads" and prefixed by an "x" (i.e. "x-quad #",

"x-Access Way"). This nomenclature was adopted for the representative onsite receiver locations merely to facilitate analysis by the operational noise prediction model (see Section 5.12.2.2.1). All onsite and offsite receiver locations are shown in Figure 5.12-1. The calculations are provided in Appendix P-2, Noise. As shown in the table, sound levels at sensitive receivers would remain below 74 dBA L_{eq} during construction activities. Although predicted level ranges exceed existing levels by greater than 5 dB, the impacts perceived are considered to be temporary, and therefore less than significant.

Table 5.12-5
Calculated Construction Levels at Sensitive Receivers

Sensitive Receiver Identification	Direction from Center of Power Block	Distance from Center of Power Block (ft)	Calculated Level Over 35 months (dBA L_{eq})
SR01	West	9036	57-61
SR02	Southwest	10063	56-60
SR07	Southeast	20,861	50-54
SR08	Southeast	20,694	50-54
SR09	Southeast	20,949	50-54
SR10	Southeast	6633	59-63
ML01	Southwest	8282	58-62
SR11 / ML02 [1]	East	2125	70-74
ML03	Northeast	5261	62-66
LT-1	Southeast	20,694	57-61
x-quad 1	Onsite: WSW of power block	2231	68-72
x-quad 2	Onsite: SSW of power block	4085	63-67
x-Access Way	Onsite: South of power block	2333	68-72
x-quad 3	Onsite: SE of power block	1342	74-78
x-quad 4	Onsite: SSE of power block	4774	62-66

Note: [1]The identified noise-sensitive receiver at location SR11 in Figure 5.12-1 is, acoustically speaking (< 1dB difference), represented by the measurement location ML02.

5.12.2.1.1 Occupational Noise

Compliance with California Occupational Safety and Health Administration (Cal/OSHA) regulations will ensure that construction personnel are adequately protected from potential noise hazards. The noise exposure level to protect hearing of workers is regulated at 90 dBA over an 8-hour work shift. The Project's contractors are required to comply with all Cal/OSHA regulations. Occupational noise is considered to be less than significant.

5.12.2.1.2 Off-site Construction Laydown, Staging, and Parking Areas

The primary construction laydown and parking areas will be adjacent to the Project site south of SR-58 where approximately 380 acres will be used.

The primary construction laydown area is nearly level and thus requires little grading. Pads will be prepared for setting the trailers housing the temporary construction facilities (offices, restrooms, meal rooms, meeting and conference rooms, etc.). The soil in the laydown area will be covered with protective gravel along the access roadways, parking and vehicle marshalling areas, or with construction material on dunnage in the material storage areas so that soil losses will be negligible. In the areas to be restored after their use as temporary construction laydown areas, geotech fabric and gravel will be removed and shallow swales and/or depressions will be created for revegetation. The closest sensitive receiver to the laydown area is the elementary school approximately 1,200 feet to the southeast. Based on this distance, the estimated sound level from construction vehicles operating at an average level of 89 dBA at 50 feet (Environmental Protection Agency (EPA) 1971) would be 61 dBA. Although predicted level ranges exceed existing levels by greater than 5dB, the impacts perceived are considered to be temporary, and therefore less than significant.

5.12.2.1.3 Construction Traffic

Access to the CESF and laydown area for construction activities will be via SR-58 from the east and the west. The construction workforce will typically arrive and depart by bus. The maximum number of truck round trips to the Project would be approximately 103 vehicles, including 75 heavy trucks, 7 delivery trucks, and 21 personnel vehicles. Average daily traffic volumes on SR-58 are approximately 720 vehicles at segment Cammati Creek and 350 vehicles at segment west of Soda Lake Road (see Section 5.11, Traffic and Transportation). The truck mix is 8 percent on the Cammati Creek segment and 21 percent on Soda Lake Road segment. Based on these volumes, the existing sound level from traffic at a distance of 50 feet would be 61.5 dBA at the Cammati Creek segment and 61.1 dBA at the Soda Lake Road segment. The maximum number of 103 daily round trips to and from the Project site over a short period of time would result in a 2.4 dBA and 2.6 dBA increase on the Cammati Creek and Soda Lake Road segments, respectively. Changes in sound level of less than 3 dBA, per CEC Guidelines, are not significant noise impacts to local roads in the study area.

5.12.2.2 Operational Noise

5.12.2.2.1 Prediction Methods

The Cadna/A® Noise Prediction Model (Version 3.6.119) was used to estimate the Project-generated sound level at the property lines and noise-sensitive receivers. Cadna/A® is a Windows® based software program that predicts and assesses noise levels near industrial noise sources based on ISO 9613-2 standards for noise propagation calculations. The model uses industry-accepted propagation algorithms and accepts sound power levels (in dB re: 1 pico Watt) provided by the equipment manufacturer and other sources. The calculations account for classical sound wave divergence, plus attenuation factors resulting from air absorption, basic ground effects, and barrier/shielding. The Project 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 pre-defined noise source, as summarized in Table 5.12-6. The Applicant supplied the sound power level values for the air cooled condenser. For noise sources lacking Applicant-supplied sound data, sound levels were based on appropriate calculation methods based on the information provided in the Project Description. See Appendix P, Noise, for further description. The Project configuration was imported into Cadna/A® from available Project CAD files. The Project is assumed to operate continuously during a daytime period for which solar intensity is sufficient for operation. The model operation time is based on the summer solstice at 35° Earth latitude. (Approximately 15 hours, maximum, of daylight). Although the Project will only operate during daytime hours, the County guidelines consider "daytime" to be the hours of 7 a.m. to 10 p.m., regardless of the Sun's ascension and descension schedule (typically 5:30 a.m. to 8:30 p.m.). Therefore, the model assumed that the equipment operated for 13.5 hours during the daytime and 1.5 hours during the nighttime. This model uses the octave band sound power levels (PWL) of the major subcomponents to calculate the corresponding SPL for the equipment. The formula used to derive the SPL (in dBA) is as follows:

$$SPL = PWL - 20 \text{ Log } (r) - 10.9 + C$$

Table 5.12-6
Noise Model Parameters

Project Component	Type of Source	Sound Power Level (PWL) at Octave Band Center Frequency (Hz)									A-Weighted	Unweighted (linear)	Acoustic Height (feet)
		31.5	63	125	250	500	1000	2000	4000	8000			
(2) Air Cooled Condenser (ACC)	Area	118.7	115.7	115.7	111.7	109.9	107.1	101.8	95.9	90.8	112.0	122.8	56.7
(2) Air Compressor System	Point	94.0	90.0	95.0	94.0	92.0	95.0	100.0	97.0	90.0	103.9	104.8	8.2
(2) Steam Turbine	Point	111.9	117.9	115.9	110.9	106.9	102.9	99.9	91.9	85.9	109.4	121.3	8.2
Building Insulation	N/A	0	0	-13	-16	-25	-32	-37	-46	N/A			N/A
Reflector Line Average Distance Levels (rpm-only)	Area	0.0	53.8	56.7	56.7	56.5	53.4	50.0	46.6	36.7	63.0	80.9	6.5
(2) Pipe Flow –Trunk	Line	105.4	96.8	88.3	79.6	71.0	62.4	53.8	45.2	36.5	77.2	106.0	9.2
(10) Pipe Flow – Manifold	Line	98.0	90.0	81.0	73.0	64.0	55.0	47.0	38.0	30.0	70.2	98.7	115
(6) Pipe Flow – 6" Return Collector	Line	63.0	61.0	61.0	61.0	52.0	44.0	35.0	27.0	18.0	55.0	67.8	1-4
(190) Pipe Flow – 2" Receiver	Line	106.9	105.3	103.8	102.1	100.5	91.9	83.3	74.7	66.0	100.1	111.3	56
Piping Insulation	N/A	-1	-7	-10	-13	-18	-25	-34	-41	-41			N/A
(2) GSU Transformer	Area	108.0	111.0	105.0	105.0	100.0	94.0	91.0	88.0	88.0	102.0	114.3	15.2
(1) Auxiliary Transformer	Area	90.8	96.8	98.8	93.8	93.8	87.8	82.8	77.8	70.8	94.2	102.8	10.8

Reference: URS calculations per project description (see Section 3.0, Facility Description and Location). Levels for ACC provided by SPX Corporation.

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5.12.2.2.2 Community Noise

The results of the predictive calculations are summarized in Table 5.12-7 and depicted on Figure 5.12-1. The figure depicts iso-dB level contours for the Project in 5 dB increments at a receiver height of 5 feet. The calculated sound levels at offsite receivers range from 20 to 47 dBA L_{eq}.

Table 5.12-7
Calculated Operation Levels at Sensitive Receivers

Sensitive Receiver Identification	Existing (dBA)	CESF as Designed		
		Calculated (dBA)	Existing + Calculated[5] (dBA)	Difference from Existing (dB)
SR01[1]	43.0	34.1	43.5	0.5
SR02[1]	43.0	33.2	43.4	0.4
SR07[2]	49.0	21.4	49.0	0.0
SR08[2]	49.0	21.5	49.0	0.0
SR09[2]	49.0	19.1	49.0	0.0
SR10	43.0	40.3	44.9	1.9
ML01[3]	43.0	36.2	43.8	0.8
ML02[3]	44.0	47.2	48.9	4.9
ML03[3]	46.0	38.6	46.7	0.7
LT-1[4]	47.0	33.9	47.2	0.2
x-quad 1	N/A	55.6	N/A	N/A
x-quad 2	N/A	53.5	N/A	N/A
x-Access Way	N/A	51.8	N/A	N/A
x-quad 3	N/A	56.0	N/A	N/A
x-quad 4	N/A	50.6	N/A	N/A

Notes:
[1]Based on daytime L_{eq} at ML01.
[2]Based on daytime L_{eq} at ML07.
[3]ML01, ML02, ML03 based on daytime L_{eq} at those locations.
[4]LT-1 based on 25-hour L_{eq} at Carrisa Plains School.
[5]This is a logarithmic sum of Existing and Calculated, not algebraic.

For the Project as designed and described in the project description (see Section 3.0, Facility Description and Location), the predicted operational noise levels at all recognized noise-sensitive receivers would be in compliance with all applicable LORS at sensitive receivers (less than 50 dBA L_{eq} daytime/45 dBA L_{eq} nighttime). Additionally, the calculated Project sound level at the closest receiver (ML02) was 48.9 dBA

L_{eq}, which is an increase of less than 5 dBA L_{eq} over the daytime L_{eq} of 44 dBA; therefore, the Project complies with all applicable LORS.

Please refer to Section 5.12.4.1 for a presentation of mitigation steps intended to keep operational noise levels compliant.

5.12.2.2.3 Occupational Noise

Based upon the noise level data, the noise levels inside and very near the Project would be similar in magnitude to comparably sized large industrial projects. These high noise levels may require the use of hearing protection as specified by federal OSHA and Cal/OSHA guidelines for worker noise exposure. Compliance with Cal/OSHA regulations will ensure that personnel are adequately protected from potential noise hazards. The noise exposure level to protect hearing of workers is regulated at 90 dBA over an 8-hour work shift. Areas above 85 dBA will be posted as high noise level areas and hearing protection will be required. The Project owners will implement a hearing conservation program for applicable employees as outlined in Cal/OSHA regulations. 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 29, Code of Federal Regulations (CFR), Part 1910.95 (reviewed in Section 5.12.6.1) and Title 8, California Code of Regulations (CCR), Section 5095-5100 (Article 105) (reviewed in Section 5.12.6.2). On the expectation that the above policy will be fulfilled, occupational noise is considered to be less than significant.

5.12.2.2.4 Power Transmission

Noise sources associated with power transmission include occasional breaker operation in the substation, corona noise, and very low magnetostriction hum from the conductors. Breaker noise is considered impulsive in nature, lasting a very short duration and may occur only a few times per year. Corona noise is characterized as a buzz or hums and is usually worse when the conductors are wet, such as in rain or fog.

The Electric Power Research Institute (EPRI) has conducted noise tests and studies and has published reference material on transmission line noise. Consistent with all acoustic textbooks' discussion of propagation of noise from a line source, EPRI states that noise produced by a conductor decreases at a rate of 3 dB per doubling of distance from the source. The EPRI Transmission Line Reference Book indicates that the audible noise from a typical 525-kilovolt (kV) line with two conductors per phase would likely be less than 40 dBA at a distance of 40 feet from the outside conductor at ground level. If only one conductor per phase is used, the noise level will be less. Consistent with the project description (see Section 3.0, Facility Description and Location), the levels are expected to be less than described above because the transmission line used in the Project is 230 kV (i.e., less than 525 kV).

In support of the above, the existing substation was measured to be 44 dBA and 43 dBA during day and night measurements, respectively. The existing power transmission line measurement was measured to be 31 dBA and 47 dBA during day and night measurements, respectively. The new power transmission equipment for the Project are predicted to have no audible sound contribution to either of the aforementioned existing environments measurement locations (ML02 & ML04). Additionally, the new power transmission equipment is predicted to have inaudible contribution with respect to the site's

dominant noise sources (e.g., Air-Cooled Condensers). Due to this lack of audible contribution, the impact from the proposed power transmission is expected to be less than significant.

5.12.3 Cumulative Impacts

The CESF and other projects in the vicinity are not expected to result in significant cumulative impacts to environmental resource areas, including, but not limited to, air quality, land use, cultural resources, water resources, or traffic during the construction or operation phases. All existing and proposed projects can be characterized primarily as residential development (i.e., new single-family dwellings and mobile homes). Of the 41 projects with permit applications submitted since January 2000, only 6 projects proposed new residential construction (i.e., single-family dwellings). The remaining 35 projects include minor construction projects such as manufactured and mobile home permits, mobile home foundations, carport additions, roof replacements, deck additions, and residential renovations. Further, some of the listed projects have permits that have expired since their issuance and thus, can be dismissed from this cumulative impact analysis.

The closest permitted project is located approximately 0.5-mile to the west of the CESF site and includes the addition of a mobile home. In addition, all permitted projects within 2.0-miles of the CESF site include manufactured and mobile home permits and/or mobile home foundations. All other proposed projects are located over 2.0-miles from the Project site. Thus, as mentioned above, no significant cumulative impacts have been identified as a result of the construction, operation, maintenance, or long-term presence of the CESF and other projects in the area. For further discussion of cumulative impacts, see Section 5.18, Cumulative Impacts.

5.12.4 Mitigation Measures

5.12.4.1 Offsite Operation

To ensure that acoustical design goals are met by the facility while in operation, the following conditions of certification are recommended:

NOISE-1: The proposed Project design and implementation shall include appropriate noise attenuation measures adequate to ensure that the noise level produced by operation of the Project will not exceed a daytime average exterior noise level of more than 50 dBA L_{eq} at any residence. No single piece of equipment shall be allowed to stand out as a source of noise that draws legitimate complaints, as determined by the compliance project manager (CPM). Pressure relief valves shall be adequately muffled to preclude noise that draws legitimate complaints, as determined by the CPM.

Within 30 days of the proposed Project first achieving a sustained output of 80 percent or greater of rated capacity, the Applicant shall conduct a 25-hour noise survey. The noise survey shall also include short-term measurement of one-third octave-band SPL to ensure that no new noise tones have been introduced. If the results from the operational noise survey indicate that pure tones are present, then additional noise control measures shall be implemented to eliminate the pure tones. Irrespective of the specific method used for determining the Project's noise level, the character of the Project's noise shall be evaluated at the nearest residence to determine the presence of tones or other dominant sources of Project noise.

The measurement of proposed Project noise for the purposes of demonstrating compliance with this Condition of Certification may be made at a location, acceptable to the CPM, closer to the Project than the nearest residence (e.g., 400 feet from the Project's acoustic center in the direction of residences) and this measured level is then mathematically extrapolated to determine the Project's noise contribution at the nearest residence. If the results from the operational noise survey indicate that the Project-only noise level exceeds 50 dBA, L_{eq} for any daytime hour and 45dBA for any nighttime hour at any residence, additional noise control measures shall be implemented to reduce noise to a level of compliance with this limit.

Within 30 days after completing the post-construction operational noise survey, the Project owner shall submit a summary report of the survey to the CPM. Included in the survey report will be a description of any additional noise control measures and a schedule (subject to CPM approval), necessary to achieve compliance with the above listed noise limits, when implementing these measures.

Within 30 days of completion of installation of these measures, the Project owner shall submit to the CPM a summary report of a new noise survey, performed as described above and showing compliance with this condition.

The contractors shall implement a noise complaint process and hotline number for the surrounding community. The Applicant will have the responsibility and authority to receive and resolve noise complaints.

5.12.4.2 Construction

Construction of the Project would temporarily elevate the noise levels in the surrounding community. Most often the sound levels would be moderate, with a few processes causing short-term, substantially elevated noise levels to occur. Because construction would be of a limited duration, construction will be conducted during daylight hours, and best practices for construction noise control will be implemented, no adverse construction noise effects are expected to occur in the surrounding community.

To ensure that noise emission assumptions relied upon herein is valid and acoustical design goals are met by the Project during construction, the following Conditions of Certification are recommended:

NOISE-2: Construction noise emissions shall comply with the local LORS regarding hours of construction activity and permitted noise levels affecting adjacent uses.

NOISE-3: All noise-producing Project equipment and vehicles using internal combustion engines shall be equipped with mufflers, air-inlet silencers where appropriate, and any other shrouds, shields, or other noise-reducing features in good operating condition that meet or exceed original factory specification. Mobile or fixed "package" equipment (e.g., arc-welders, air compressors) shall be equipped with shrouds and noise control features that are readily available for that type of equipment.

NOISE-4: All mobile or fixed noise-producing equipment used on the Project, which is regulated for noise output by a local, state, or federal agency, shall comply with such regulation while in the course of Project activity.

NOISE-5: The use of noise-producing signals, including horns, whistles, electronic alarms, sirens, and bells, will be for safety warning purposes only.

NOISE-6: No construction-related public address, loudspeaker, or music system shall be audible at any adjacent noise-sensitive land use.

NOISE-7: Additionally, the contractors shall implement a noise complaint process and hotline number for the surrounding community. The Applicant will have the responsibility and authority to receive and resolve noise complaints.

5.12.4.3 Onsite Occupational Noise Exposure

NOISE-8: Noise levels within the Project site were modeled to be above 85 dBA within 50 feet of major noise-producing equipment. Employees working near the noise sources will participate in a facility-specific hearing conservation program if a program is necessary for compliance with OSHA regulations. In addition, specific facility areas will have noise surveys conducted after commissioning to determine where noise hazard warnings and personal hearing protection are necessary. With these Project features in-place, no special mitigation measures will be required.

NOISE-9: Within 30 days of the proposed Project first achieving a sustained output of 80 percent or greater of rated capacity, the Applicant shall conduct an occupational noise survey to verify modeled noise levels and identify any additional noise hazard areas in the facility. The survey shall be conducted by a qualified person in accordance with the provisions of Title 8 CCR, Sections 5095-5099 (Article 105) and Title 29, CFR, Section 1910.95. The survey results shall be used to determine the magnitude of employee noise exposure. Areas above 85 dBA that may be accessed by any personnel shall be posted as high noise level areas. Hearing protectors shall be furnished and their use required in the posted areas.

NOISE-10: The Applicant shall prepare a report of the survey results and if necessary, identify proposed measures that will be employed to comply with the applicable state and federal regulations. Within 30 days after completing the survey, the Project owner shall submit the noise survey report to the CPM. The Applicant shall make the report available to OSHA and Cal/OSHA upon request.

5.12.5 LORS Compliance

5.12.5.1 Federal

There are no federal laws, ordinances, regulations, or standards that directly affect this Project with respect to noise. However, there are guidelines at the federal level that direct the consideration of a broad range of noise and vibration issues as listed below:

- National Environmental Policy Act (42 United States Code (USC) 4321, *et seq*.) (PL-91-190) (40 CPR § 1506.5)
- Noise Control Act of 1972 (42 USC 4910)

United States (U.S.) Environmental Protection Agency (EPA) has not promulgated standards or regulations for environmental noise generated by power plants; however, U.S. EPA has published a

guideline that specifically addresses issues of community noise (EPA Levels Document, Report No. 556/9-74-664). This guideline, commonly referred to as the "levels document," contains goals for noise levels affecting residential land use of L_{dn} <55 dBA for exterior levels and L_{dn} <45 dBA for interior levels.

Occupational exposure to noise is regulated by Title 29, CFR, Part 1910.95 occupational noise exposure. Protection against the effects of noise exposure shall be provided when the sound levels exceed 90 dBA for an 8-hour period. When employees are subjected to sound exceeding this limit, feasible administrative or engineering controls shall be utilized. If such controls fail to reduce sound levels within 90 dBA, personal protective equipment shall be provided and used to reduce sound levels within the limits. The employer shall administer a continuing, effective hearing conservation program whenever employee noise exposures equal or exceed an 8-hour time-weighted average sound level (TWA) of 85 decibels measured on the A scale (slow response) or, equivalently, a dose of fifty percent. For purposes of the hearing conservation program, employee noise exposures shall be computed in accordance with CFR 1910.95 Appendix A (Noise exposure computation) without regard to any attenuation provided by the use of personal protective equipment.

5.12.5.2 State

The CEC has been delegated the authority to act as the lead agency for purposes of compliance with the California Environmental Quality Act (CEQA) (Public Resources Code Division 13, Environmental Protection, Section 21000 *et seq*.).

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 (PPE) 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 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.

The state also requires local jurisdictions (California Government Code Section 65302(f)) to prepare general plans that include land use and noise elements.

5.12.5.3 Local

5.12.5.3.1 San Luis Obispo County

The Project and environs are unincorporated areas within and governed by San Luis Obispo County. Project noise at any noise-sensitive use must comply with the Noise Element of the County General Plan and the Noise Standard of the County Land Use Ordinance (22.10.120).

5.12.5.3.2 Noise Element

Noise Element Policy 3.3.5 (b) states:

> "*Noise levels shall be reduced to or below the noise level standards in Table 3-2, where the stationary noise source will expose an existing noise-sensitive land use (which is listed in the Land Use element as an allowable use within its existing land use category) to noise levels which exceed the standards in Table 3-2. When the affected noise-sensitive land use is Outdoor Sports and Recreation, the noise level standards in Table 3-2 shall be increased by 10 dB.*"

The noise sensitive land-uses include residences, heath care services, hotels and motels, bed and breakfast facilities, schools, churches, libraries and museums, public assembly and entertainment, offices, and outdoor sports and recreation. The maximum allowable noise exposure limits for a stationary noise source is provided in Table 5.12-8.

Table 5.12-8
San Luis Obispo County Exterior Noise Limits

Level	Daytime[1] (7:00 a.m. to 10:00 p.m.)	Nighttime[2] (10:00 p.m. to 7:00 a.m.)
Hourly L_{eq}, dB	50	45
Maximum Level, dB	70	65
Maximum Level, dB-Impulsive Noise	65	60

Notes:
[1] As determined at the property line of the receiving land use. When determining the effectiveness of noise mitigation measures, the standards may be applied at the receiver side of noise barriers or other property line noise mitigation measures.
[2] Applies only where the receiving land use operates or is occupied during nighttime hours.

5.12.5.3.3 Noise Ordinance

Noise Standard 22.10.120 B.1 establishes the same limits as provided in Table 5.12-8. In addition, the ordinance states that the exterior noise level standards are reduced by 5 dB for simple tone noises or for recurring impulsive noises. The ordinance also establishes maximum interior noise levels within a residential use, as summarized in Table 5.12-9.

Table 5.12-9
San Luis Obispo County Interior Noise Limits

Level	Daytime (7:00 a.m. to 10:00 p.m.)	Nighttime (10:00 p.m. to 7:00 a.m.)
Hourly L_{eq}, dB	40	35
Maximum Level, dB	60	55

The ordinance also restricts construction activities between 9:00 p.m. and 7:00 a.m., Monday through Friday; and between 5:00 p.m. and 8:00 a.m. on Saturdays and Sundays.

A summary of LORS is provided in Table 5.12-10.

Table 5.12-10
Summary of LORS

Jurisdiction	LORS	Requirements	Conformance Section	Administering Agency
Federal				
	National Environmental Policy Act (42 USC 4321, *et seq.*) (PL-91-190) (40 CPR § 1506.5)	Not applicable by statute.	5.12.6.1	EPA
State				
	California Energy Commission 140-2006-002	Increase over existing background noise level of 5 dBA or greater at noise-sensitive areas is significant.	5.12.6.2	CEC
	California Occupational Safety & Health Administration 8 CCR, General Industrial Safety Orders, Article 105	Levels over 85 dBA at 8-hr workstation require hearing conservation.	5.12.6.2	Cal/OSHA
Local				
	San Luis Obispo County General Plan, Noise Element Policy 3.3.5	Daytime Hourly L_{eq}: 50 dB Nighttime Hourly L_{eq}: 45 dB Daytime Maximum level: 70 dB Nighttime Maximum level: 65 dB Daytime Maximum Impulsive Noise: 65 dB Daytime Maximum Impulsive Noise: 60 dB	5.12.6.3	San Luis Obispo County
	San Luis Obispo County Land Use, Noise Standard 22.10.120 B	Daytime Hourly L_{eq}: 50 dB Nighttime Hourly L_{eq}: 45 dB Daytime Maximum level: 70 dB Nighttime Maximum level: 65 Db	5.12.6.3	San Luis Obispo County

5.12.5.4 Agencies and Agency Contacts

Agencies with jurisdiction to enforce LORS related to noise are shown in Table 5.12-11.

Table 5.12-11
Agency Contact List for LORS

	Agency	Contact	Address	Telephone
1	California Energy Commission	Steve Baker	1516 Ninth Street Sacramento, CA 95814	(916) 654-3915

5.12.5.5 Permits Required and Permitting Schedule

As shown in Table 5.12-12, no permits are required for the CESF in the area of noise.

Table 5.12-12
Applicable Permits

Responsible Agency	Permit/Approval	Schedule
Federal	None required	N/A
State	None required	N/A
Local	None required	N/A

5.12.6 References

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Bies, D. and Hansen, C., 2003. Engineering Noise Control: Theory and Practice. Third Edition. Spon Press New York, NY.

California Department of Transportation (Caltrans) by Hendricks, R., October, 1998. Transportation Related Earthborne Vibrations. Technical Advisory.

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EEI, 1983. Electric Power Plant Environmental Noise Guide, 2nd Edition, Revised.

Harris, Cyril M., ed., 1991. Handbook of Acoustical Measurements and Noise Control. Third edition. McGraw-Hill, Inc. New York, NY.

International Organization for Standardization (ISO), 1996a. Description and Measurement of Environmental Noise, Basic Quantities and Procedures Part 1, ISO 1996/1.

ISO, 1996b. Description and Measurement of Environmental Noise, Basic Quantities, and Procedures, Acquisition of Data Pertinent to Land Use, Part 2, ISO 1996/2.

ISO, 1996c. Description and Measurement of Environmental Noise, Basic Quantities and Procedures, Application to Noise Limits, Part 3, ISO 1996/3.

San Luis Obispo County Noise Element of the General Plan.

San Luis Obispo County Code - Title 22, Land Use Ordinance. Section 22.10.120 Noise Standards.

U.S. Department of Transportation, Federal Transit Administration, April 1995. DOT-T-95-16. Transit Noise and Vibration Impact Assessment. (Prepared under contract by Harris, Miller, Miller, and Hanson). Burlington, MA.

U.S. Environmental Protection Agency, 1971. Noise from Construction Equipment and Operations, Building Equipment and Home Appliances. (Prepared under contract by Bolt, et al., Bolt, Beranek & Newman, Boston, Massachusetts.) Washington, D.C.

5.13 VISUAL RESOURCES

This section discusses the potential for the construction, operation, and maintenance of the Carrizo Energy Solar Farm (CESF or Project) to cause significant impacts to aesthetic values within the Project vicinity. The section addresses the inventory of existing visual resources of the affected environment, the assessment of the environmental consequences of the CESF on visual resources, and the laws, ordinances, regulations, and standards (LORS) pertaining to the aesthetic effects of the CESF.

The visual resource analysis was 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 5.13.2. 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), United States Forest Service (USFS) Visual Management System (USFS, 1974, 1995), and previous methodologies used in other CEC studies and other energy related projects. Additionally, the methodology has been tailored to meet the specific issues and regulatory requirements associated with the CESF.

5.13.1 Affected Environment

This section describes the inventory of visual resources within the vicinity of CESF. 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 Regional Landscape Setting

The CESF site (Figure 5.13-1 and Figure 5.13-2) is a 640-acre site located on one section of land adjacent to California State Route 58 (SR-58)/Carrisa Highway, within the Shandon-Carrizo area of eastern San Luis Obispo County. The CESF is located immediately north of SR-58, approximately 5.0 miles west of Kern County, and west of Simmler and northwest of California Valley, California. The 640-acre Project site can be further described as Section 28 and assessor parcel number (APN) 072-091-001. The property is zoned Agricultural District (AG) and is designated as an agricultural land use by San Luis Obispo County; however, electrical generation is listed in the San Luis Obispo County Land Use Ordinance as an allowed use within the agricultural zone.

The CESF includes the solar farm site, construction laydown area, and overhead transmission lines extending northeast from the site to connect to the PG&E Carrizo Plain Substation as described in Section 3.0, Facility Description and Location. The 380-acre construction laydown area, which includes construction lay down for the solar farm site, staff parking, equipment storage, a fueling station, and construction offices, would be located entirely on Section 33 (APN: 072-091-010), directly south of the Project site across SR-58. Each of these areas is shown in Section 3.0, Facility Description and Location (see Figure 3.1-1). The CESF transmission system will require construction of approximately 850 feet of 230 kV transmission line. As depicted in Section 3.0, Facility Description and Location (see

Figure 3.4-4), the CESF transmission line extends from the Project site switchyard to a point along PG&E's Morro Bay–Midway right-of-way (ROW). The overhead line begins at the dead-end structure in the switchyard and continues east along the northern edge of Section 28 for approximately 700 feet, then north for 150 feet to interconnect with the existing PG&E Morro Bay–Midway 230 kV transmission line (Line 1). The transmission line is within the Project site boundary except for a 90-foot long segment that connects to the PG&E tower. Access to the Project site will be provided from SR-58 and Tracy Lane via a new gate located at the northeastern corner of the site.

As the CESF site has historically been utilized for agricultural use, there are a few abandoned farm structures currently onsite; however, the CESF site is largely vacant and currently consists primarily of disturbed rangeland. The site is generally flat, sloping gently to the southwest with elevations ranging from approximately 2,064 feet to 2,014 feet above mean sea level (MSL). The majority of land surrounding the site is used for agricultural/dry-farming activities. Adjacent land uses include a number of rural residences surrounding the site, the Carrisa Plains School (elementary school) approximately 0.8-mile to the southeast of the Project site, and the existing PG&E Carrizo Plain Substation located adjacent to the northeast corner of the Project site. Additionally, existing power/transmission lines extend in an east-west orientation adjacent to the northern boundary of the Project site.

The CESF site is located within the Carrizo Plain region of San Luis Obispo County. The Carrizo Plain is a large enclosed plain, approximately 50 miles long and up to 15 miles across, and contains the 180,000-acre Carrizo Plain National Monument. Bordering the plain to the east is the Temblor Range, and to the west is the La Panza Range. While neither of the mountain ranges are particularly high, they are effective visual and climatic barriers between each of the regions they define. The average elevation of the plain is approximately 2,200 feet. The general area is characterized as relatively flat allowing for open, expansive views of hills and mountains surrounding the valley.

The Carrizo Plain region consists mainly of low-lying terrain devoted almost exclusively to the agricultural uses of dry-farming and rangeland. This region is best described as a steppe – a dry grass-covered area with wide temperature fluctuations. The climate is dry with hot summers and mild winters (characteristic of a high desert climate), and there is a persistent haze, typical of the air quality in the area that impairs clarity of distant views.

Distant views from the site consist mainly of Hubbard Hill-Freeborn Mountain and the Los Padres National Forest (located within the La Panza Range) to the west, hills within the Carrizo Plain National Monument to the southeast, and mountains within the Temblor Range to the east (Kern County). The Hubbard Hill-Freeborn Mountain and Carrizo Plain National Monument are currently managed by the U.S. Bureau of Land Management (BLM). These surrounding areas offer a variety of recreational opportunities; however, there are no designated recreational trails of local importance within five miles of the Project.

Soda Lake, a 3,000-acre alkaline lake located within the Carrizo Plain National Monument (approximately 9.0 miles southeast from the Project), is the most significant water feature within the Carrizo Plain. It receives all of the runoff from both sides of the plain because it is an enclosed basin. Other water features in the region include San Juan Creek, which runs approximately 5.0 miles west of the Project site, and the California Aqueduct, which runs in a northwest to southeast orientation approximately 23.5 miles east of the Project within Kern County.

One census tract covers the majority of the Project vicinity, and contains approximately 751 residents (658 residents in 2000 Census). This tract encompasses approximately 925.2 square miles and many different land uses, including the rural community and large agricultural/farming area within the Carrizo Plain. In addition, several other semi-urban/urban areas surround the Project region. Those nearest include: California Valley (approximately 156 residents) and the community of Simmler. The nearest incorporated city in the area is the City of Shandon, which lies approximately 30 miles northwest of the Project area, and contains a population of approximately 990 people.

5.13.1.2 Visual Sphere of Influence

The VSOI for the CESF (Figure 5.13-1) 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., structures within the power block as well as the boundary of the solar farm) from sensitive viewing areas (see Section 3.0, Facility Description and Location; Figure 3.3-1 and 3.4-4 for a general layout of Project components and Figure 3.4-5 and 3.4-6 for site elevations). In addition, the distance was based upon the guidelines established in the USFS Visual Management System (USFS, 1974, 1995). Based upon USFS distance definitions, the CESF 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 30-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 9.2-based geographical information system (GIS) using the spatial analysis extension. The combined DEM was used to run viewshed analyses in Universal Transverse Mercator (UTM), Zone 10, North American Datum 83 (NAD83).

For the CESF, the centroid of the 640-acre site was used (at 6 feet above existing grade) to run an existing viewshed map. Next, a centroid of the facility site's tallest structure, the air cooled condenser at a height of 115 feet, as well as the perimeter/fence line for the entire site, was input and the viewshed model was rerun. The results represent a "typical" viewshed for the Project area.

Overall, the CESF site is clearly visible from several nearby residents and nearby roadway users (within 0.5 mile), middleground views from the Carrisa Plains School and other residences (within 1.0 mile), and sporadic locations within the valley and surrounding mountains, most notably the Hubbard Hill-Freeborn Mountain area (3.5 to 5.0 miles and beyond). Beyond the mapped VSOI, the CESF 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 (PG&E Carrizo Plain Substation and large transmission lines), as well as the visibility of the CESF facilities (e.g., the most visible components). 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 CESF 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 CESF 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 CESF 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 (e.g., the closest residences surrounding the site).
- Travel routes: major roads or highways used primarily by origin/destination travelers and designated scenic roads (e.g., local residents, workers, and commuter travelers along SR-58, aircraft using the California Valley Airfield).
  Parks, recreation areas, wildlife areas, visitor centers, areas used for camping, picnicking, bicycling, boating (e.g., Hubbard Hill-Freeborn Mountain area, the Los Padres National Forest, and the Carrizo Plain National Monument), or other recreational activities.

During field surveys conducted within the immediate Project vicinity, it was noted that several detached homes are present and have views of the CESF site (Figure 5.13-2). Approximately nine detached residences lie within one mile of the site. The majority of these viewers would have direct, unobstructed views to the Project site; however, a number of these homes have vegetative screenings that minimize current views to the site (see Figure 5.13-3, Photo 1). In addition, there are five to six other detached residences within two miles of the site. While a few of these residences may have direct views to the Project site, other views are partially obscured due to the presence of adjacent residences in the foreground and/or existing vegetative screening.

In addition to the residential viewers, travelers along SR-58 would have indirect and direct views of the site. Farming and residential structures, area topography, vegetative screening adjacent to the road and the zigzag or "Z" shape of the highway create intermittent traveler view obstructions in the vicinity of the site; however, direct unobstructed traveler views are available as the highway nears the southern boundary of the site (e.g., the intersection of SR-58 and Tracy Lane). Traffic flow/road counts along SR-58 indicate that approximately 350 travelers/average daily trips (ADT) utilize the highway along the corridor west of Soda Lake Road. California Valley Airfield is located within the VSOI, approximately

4.0 miles southwest from the site. The airfield is privately operated, with a general aviation functional classification. The airfield is only used by local residents with small planes, and currently supports little air traffic.

A nearby open space area, Hubbard Hill-Freeborn Mountain lies approximately 3.5 miles west of the Project site (at the closest point). Views to the site from this location are intermittent and exist predominately along the initial ridgeline of the mountain. Hubbard Hill-Freeborn Mountain is designated as an open space sensitive resource area (SRA) and considered to have potential for passive recreation activities (see Figure 5.13-3, Photo 2). No formal recreation has been established in this area; however, San Luis Obispo County has plans for the State to acquire this area, and together with property owners, provide recreational improvements for camping, hiking and riding. There is little-to-no public vehicle access to this area and it is understood that only few avid hikers currently utilize this area (correspondence with Carrizo Plain National Monument California Department of Fish & Game Park Ranger).

The Hubbard Hill-Freeborn Mountains block all views to the site from the Los Padres National Forest. In addition, no significant views of the site would be available from the Carrizo Plain National Monument. This is largely due to distance; however, the majority of recreational activities within the National Monument surround Soda Lake. Soda Lake is at a lower elevation than the CESF site and is a significant distance away (approximately 9.0 miles southeast from 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 view shed.
  Impact severity: the degree of change to the landscape created within a specific view shed.

Character photos of the areas surrounding the Project site (Figures 5.13-4 through 5.13-7) show sensitive viewing areas and sensitive visual resources within the surrounding Project area. Some of these character photos may not have views to the Project; however, they 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 CESF site (foreground viewers) and from the travelers along SR-58.

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 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., substations, transmission lines, and other cultural modifications) can be highly noticeable, which can reduce the inherent value of the natural setting.

The VSOI for the Project area was characterized at the Class C level for scenic attractiveness, however marginal Class B landscapes do exist. While landscapes within the VSOI provide open/panoramic views that lack intense development, no landscapes were considered to have distinctive characteristics as defined for Class A or B levels. Most landscapes within the VSOI were identified as Class C or as landscapes lacking significant natural amenities.

Scenic Attractiveness Classification Evaluation Forms (Figures 5.13-8 through 5.13-11) 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, or 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 within the VSOI include, but are not limited to, various residential farming/rangeland developments, agricultural and/or storage buildings, the existing PG&E Carrizo Plain Substation, and an elementary school. Several transmission line corridors that support electricity transmission also traverse the landscape within the VSOI. The following ESILs 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 to moderate 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., driving, recreation activities, or 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 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, travelers along SR-58, and potential recreational users within the Hubbard Hill-Freeborn Mountain area to the west. The nearest residents to the CESF site are located approximately 0.3-mile from the northern boundary of the site and approximately 0.2-mile from the western boundary of the site. These residences have foreground-direct, unobstructed views to the Project.

SR-58, runs in an east/west orientation adjacent to the southern boundary of the Project site, and due to the zigzag of the highway, also extends northward along the eastern edge of the construction laydown area towards the Project site from the south. Direct unobstructed traveler views are available as the highway nears the southern boundary of the site. SR-58 is not a designated scenic highway by FHWA or California Department of Transportation (Caltrans) standards. 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; however, SR-58 (from the Santa Margarita Urban Reserve Line to the Kern County Boundary) and Soda Lake Road (from Cholame to the California Valley) are identified within the San Luis Obispo County General Plan Agricultural and Open Space Element as study areas to determine if and where scenic corridors should be designated. No action toward studying these roadways has taken place to date and no action is planned to occur within the next few years (correspondence with County staff). Soda Lake Road is approximately 2.0 miles to the east and views to the site are sporadic due to distance and topography.

Hubbard Hill-Freeborn Mountain is the closest sensitive resource area with potential recreational users to the CESF site. Due to its elevated position potential recreational users within the Hubbard Hill-Freeborn Mountain have open, expansive views allowing for distant views of the Project. Views to the site from this location are intermittent and are considered to be background/middleground views. As stated, no formal recreation has been established and only few avid hikers currently utilize this area.

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 absence of distinctive natural amenities (e.g., diverse and distinctive natural elements) present within the VSOI. The Hubbard Hill-Freeborn Mountain area possesses a slightly higher degree of scenic attractiveness because of the elevations in topography allowing large open expansive views into the Carrizo Plain and mountains in the area.

Within the VSOI, open expanses of agricultural lands create a general continuity of the visual setting. Checkerboard parcels of an assortment of dry-farming activities add to the distinctiveness of the rural setting and openness of the landscape. The vegetative pallet within undisturbed desert areas consists

mainly of grasses, low-lying bushes, and landscaped trees surrounding farm/rangeland developments, adding little diversity to the visual setting. Background views of several large mountain ranges add variety within the background-viewing threshold; however, a persistent haze, characteristic of the air quality in the area, impairs clarity in distant views.

5.13.1.4.2 Existing Scenic Integrity Levels

Most landscapes inventoried within the VSOI can be classified as retaining primarily low to borderline-moderate ESILs. In general, there is little development within the VSOI; however, the presence of manmade development including: agricultural structures, livestock and farming lands, farming/rangeland developments, property fencing, the PG&E Carrizo Plain Substation, and overhead transmission and telephone lines are scattered throughout the area. Areas adjacent to the CESF site were also generally identified as having low ESILs due to the lack of color and topographical variation, vegetation, and overall distinctive visual character in the area.

5.13.1.4.3 Sensitive Viewing Areas and Key Observation Points (KOPs)

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 CESF 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, or low) were used to describe the sensitivity of viewers within the study area. High-sensitivity viewpoints identified in the study area include existing nearby residences. Moderate-sensitivity viewers identified in the study area consist of existing primary area roadway travelers along SR-58. Hubbard Hill-Freeborn Mountain open space/recreational users were identified as moderate-to-low sensitivity viewers. 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).

Four 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 CESF. A brief characterization of these areas follows:

Sensitive Viewing Area and KOP No. 1: This image was taken from the front yard view of the closest residence to the north, approximately 0.3-mile from the northern perimeter of the CESF site (Figure 5.13-12, see also Figure 5.13-1 for KOP location). As this is the closest residence to the north, and has an unobscured view to the CESF site, it was chosen as a representative KOP. This view represents the "worst case" residential views from the north. In combination with KOP 2, this view has the longest viewing duration of the Project, as well as the highest degree of severity because of proximity. CESF, in the absence of screening, would be highly visible due to the flat, open viewing conditions. The viewshed has been modified with the presence of existing transmission lines, the existing PG&E substation, and existing/abandoned farm structures in the foreground. The ESIL from this area can be characterized as Class C (see Figure 5.13-8).

Sensitive Viewing Area and KOP No. 2: This image was taken from the closest residence to the west, approximately 0.2-mile from the western perimeter of the site (Figure 5.13-14, see also Figure 5.13-1 for KOP location). As this is the closest residence to the west, and has an unobscured view to the CESF site, it was chosen as a representative KOP. This view represents the "worst case" residential views from the west. In combination with KOP 1, this view has the longest viewing duration of the Project, as well as the highest degree of severity because of proximity. The Project, in the absence of screening, would be highly visible because of the flat, open viewing conditions. The viewshed has been modified with the presence of existing transmission and telephone lines/poles, existing/abandoned farm structures on the CESF site, and SR-58. The ESIL from this area can be characterized as Class C (see Figure 5.13-9).

Sensitive Viewing Area and KOP No. 3: These images were taken from the intersection of SR-58 and Tracy Lane (Figures 5.13-16 and 5.13-18, see also Figure 5.13-1 for KOP location), immediately adjacent to the southeast corner of the CESF site. The San Luis Obispo County General Plan noted that SR-58 is a study roadway to determine if a scenic corridor should be designated. However, SR-58 is not officially designated as a state or local scenic highway or route. Views from this roadway have therefore been considered potentially sensitive and are included as a KOP for CESF. The photo from this location represents "worst-case" traveler views from SR-58. As stated, farming and residential structures, area topography, vegetative screening adjacent to the road, and the zigzag or "Z" shape of the highway create intermittent traveler view obstructions in the vicinity of the site; however the Project, in the absence of screening, would be highly visible to travelers as the highway nears the southern boundary of the site. This view is consistent with short viewing durations (i.e., from traveler views focusing on the road) and is thus considered to have a moderate to low degree of severity. It should be noted that the most distinct visual characteristics along SR-58 are distant views to surrounding mountains and the patchwork of various grasslands and dry-faming/agricultural activities. The ESIL from this area can be characterized as Class C (see Figure 5.13-10).

Sensitive Viewing Area and KOP No. 4: This image was taken from approximately 2.5 miles west of the site along SR-58 (west of Bitterwater Road) to represent "worst-case" potential recreational user views from the Hubbard Hill-Freeborn Mountain open space/SRA area as well as elevated traveler views along SR-58 (Figure 5.13-20, see also Figure 5.13-1 for KOP location). This view illustrates the location from which the Project would be most visible from the Hubbard Hill-Freeborn Mountain area. Although the Hubbard Hill-Freeborn Mountain area is approximately 3.5 miles away; therefore, considered to have more distant views, potential recreational users are at an elevated viewing position, and would virtually have a direct line-of-site to the Project vicinity.

The main visual interest and/or draw for the area is essentially created by the open expanses of land and the panoramic view of grasslands; however, a persistent haze, characteristic of the air quality in the area, impairs clarity in distant views. Due to the open space/SRA designation for the Hubbard Hill-Freeborn Mountain area, the ESIL from this area can be characterized as borderline Class B (see Figure 5.13-11).

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 CESF.

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 backlight 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 5.13-12 through 5.13-21 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 CESF 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 camera locations corresponding to three-dimensional (3D) simulation viewpoints.

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. Locations of sensitive viewing areas are also input into GIS. The camera positioning information is then referenced to the 3D data set. The 3D massing models of both the proposed facility 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 6.1 megapixels digital camera set to take a 19.2-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 CESF 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. 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 Patch Services, LLC (the Project engineer) to remain consistent with general CESF development engineering. Once field KOP location photos and coordinates for photo locations were gathered, 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.

The visual simulations developed for CESF have been designed to be viewed 10 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 four most sensitive viewing areas within the VSOI, the degree of impact on each area was determined through the analysis of the following components:

- ESIL – The degree of existing disturbance within the natural setting.
- Viewer Sensitivity – All residential viewers were considered high sensitivity viewers, while recreational users and motorists are less sensitive (in this instance).
- 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 5.13-12, see also Figure 5.13-1 for KOP location) – from unobscured front yard view of adjacent residence to the north.	Low	High	Moderate/ High	Low	Moderate
Sensitive Viewing Area and KOP No. 2 (Figure 5.13-14, see also Figure 5.13-1 for KOP location) – from unobscured front yard view of adjacent residence to the west.	Low	High	High	Moderate	High
Sensitive Viewing Area and KOP No. 3 (Figures 5.13-16 and 5.13-18, see also Figure 5.13-1 for KOP location) – from intersection of SR-58 and Tracy Lane.	Low	Moderate/ Low	High	Moderate	Moderate/ Low
Sensitive Viewing Area and KOP No. 4 (Figure 5.13-20, see also Figure 5.13-1 for KOP location) – representative view from Hubbard Hill-Freeborn Mountain.	Moderate/ Low	Moderate/ Low	Low	Low	Moderate/ Low

5.13.2.1.3 Assessing Visual Impact Severity on Sensitive Viewers

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.

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.

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 5.13-12, see also Figure 5.13-13 for Simulation) – from unobscured front yard view of adjacent residence to the north.	Moderate/ Low	Moderate/ Low	Moderate	Moderate	Co-Dominant	Co-Dominant	Moderate/ Low	Low	Moderate
Sensitive Viewing Area and KOP No. 2 (Figure 5.13-14, see also Figure 5.13-15 for Simulation) – from unobscured front yard view of adjacent residence to the west.	High	High	High/ Moderate	High	Dominant	Dominant	Moderate/ High	Low	High
Sensitive Viewing Area and KOP No. 3 (Figures 5.13-16 and 5.13-18, see also Figures 5.13-17 and 5.13-19 for Simulations) – from intersection of SR-58 and Tracy Lane.	High	High	High	High	Dominant	Dominant	Moderate/ High	Moderate/ Low	High
Sensitive Viewing Area and KOP No. 4 (Figure 5.13-20, see also Figure 5.13-21 for Simulation) – representative view from Hubbard Hill-Freeborn Mountain SRA.	Low	Low	Low	Low	Subordinate	Subordinate	Low	Low	Low

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5.13.2.2 Visual Impact Assessment Results

This section discusses the affected visual resources for CESF. A description of the potential impacts on scenic attractiveness and on sensitive viewers is provided. A detailed description of the CESF is in Section 3.0, Facility Description and Location. Table 5.13-4, provided below, includes design characteristics of some of the more prominent Project features (due to height/size) related to the visual impact assessment. Additionally, important Project details taken into account as part of the visual impact assessment are as follows:

- Site access would be provided from Tracy Lane via a new gate located at the northeastern corner of the site.
- A security fence (a minimum 10-foot high chain link fence with three strands of barbwire on top) will enclose the entire 640-acre Project site.
- The property is largely vacant with previous onsite agricultural disturbance. Abandoned farm structures that currently exist onsite would be demolished.
- The proposed facility is immediately adjacent to the existing PG&E Carrizo Plain Substation. As such, CESF would virtually tie in directly with this site minimizing necessary transmission lines. The Project will require two new transmission poles and construction of approximately 850 feet of 230 kV transmission line. The CESF transmission line extends from the Project site switchyard to a point along PG&E's Morro Bay–Midway ROW. The overhead line begins at the dead-end structure in the switchyard and continues east along the northern edge of Section 28 for approximately 700 feet, then north for 150 feet to interconnect with the existing PG&E Morro Bay–Midway 230 kV transmission line (Line 1). The transmission line is within the Project site boundary except for a 90-foot long segment that connects to the PG&E tower. No other offsite linears are proposed. See Section 3.0, Facility Description and Location, Figures 3.4-2, 3.4-3, and 3.4-4.
- Surrounding site development includes an existing PG&E substation, a large transmission line corridor, property fencing, various farming/residential properties, a school, and SR-58.
- The property is relatively flat, sloping gently down to the southwest. Due to the existing grade of the site, site preparation earthwork includes surface grading to create terracing across the Project site.

  Selected areas would be covered with appropriate material, as conditions require (e.g., asphalt concrete for road base and gravel for other surfaces).

Table 5.13-4
Major Component Design Characteristics

Component	Height (feet)	Size (feet)	Color/Materials
Power Block			
Control and Administration Building	40	40 x 75	Corrugated steel; natural shades of beige and brown
Steam Turbine Generator (STG) Building	60	50 x 200	Corrugated steel; natural shades of beige and brown
Air Cooled Condensers	115	220 x 250	Corrugated steel; natural shades of beige and brown
Warehouse and Shop Building	20	75 x 150	Corrugated steel; natural shades of beige and brown
Take-Off, Dead End and Buss Structures	40	30 x 35	Corrugated steel
Transmission Line Steel Pole, In Line	100	8 DIA	Corrugated steel
Transmission Line Steel Pole, at 230 kV Connection	150	8 DIA	Corrugated steel
Raw Water-Fire Water Tank (450,000 Gallons)	28	56 DIA	Corrugated steel; natural shades of beige and brown
Demineralized Water Tank (40,000 Gallons)	28	17 DIA	Corrugated steel; natural shades of beige and brown
Solar Farm			
Reflector Line	8	90 x 1,268	Low iron glass with corrugated steel decking (backing)
Receiver	56	3 x 1,268	Corrugated steel
Steam Drum	12 DIA	60	Corrugated steel; natural shades of beige and brown
Steam Drum Support Structure	58	15 x 40	Corrugated steel; natural shades of beige and brown

5.13.2.2.1 Direct Impacts

The following sections describe direct impacts related to the Project.

Visual Impact Significance on Scenic Attractiveness: CESF would be highly visible from adjacent locations in the area. Given the large scale of the Project (640 acres), the lack of significant topographic features and the limited degree of existing landscape modification (e.g., SR-58, abandoned onsite farm structures, a substation, transmission lines, and adjacent residences) within the VSOI, potentially significant impacts on scenic attractiveness would be expected; however, landscapes inventoried within the VSOI are classified as retaining primarily low to borderline-moderate ESILs. Additionally, Project activities at the CESF site would occur in areas previously disturbed due to previous dry-farming activities and within areas classified as retaining low distinctive or diverse natural amenities or lacking substantial positive cultural modifications. While the Project would change the existing character of the site, significant scenic attractiveness of the VSOI area as a whole is not anticipated. Therefore, less than significant impacts would occur relative to existing scenic attractiveness.

Visual Impact Significance on Sensitive Viewing Areas: Figures 5.13-12 through 5.13-21 depicting existing and simulated views from each selected KOP, aided in verifying CESF 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 Project may look from specific key viewing locations. They also aided in assessing visual impact significance. Tables 5.13-2, 5.13-3, and 5.13-5 illustrate the visual impact susceptibility, visual impact severity, and resultant visual impact significance on sensitive viewing areas, respectively.

Significant visual impacts would occur only to adjacent residences to the west (represented by KOP 2). Less-than-significant impacts are anticipated for residences to the north (represented by KOP 1), for travelers along SR-58, and potential recreational users utilizing the Hubbard Hill-Freeborn Mountain area, and to the majority of other sensitive viewers within the region from with the construction, operation, maintenance, or long-term presence of the CESF.

Four 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 Project. A brief description of potential impacts for these areas is described below:

Sensitive Viewing Area and KOP 1: This KOP will have unobstructed direct front yard views to the CESF and to Project structures (e.g., air cooled condensers, solar reflectors and receivers, switchyard, transmission lines, etc.). The CESF, in the absence of screening, would be highly visible because of the flat, open viewing conditions; however, while Project facilities would alter foreground views from this residence, as shown in Figure 5.13-13, proposed structures would not extend beyond existing ridgelines created by distant mountains or obscure/block panoramic views.

In addition, the viewshed has already been modified with the presence of existing transmission lines, a substation, and property fencing in the immediate vicinity. Also, a previous solar facility was constructed within foreground views of this residence. In 1983, Atlantic Richfield Company (ARCO) Solar, Inc., built a 5 megawatt (MW) solar energy generating station in the section of land immediately adjacent to the CESF site (see Figure 5.13-2 for ARCO facility location).

The ARCO Carrisa Plain Solar Project facility (see Figure 5.13-22, Photo 3) had the potential to service 300 to 400 residential customers for PG&E. Unfortunately, the solar energy was not able to compete with lower-priced fossil fuel-based sources of energy, and the facility was dismantled in the late 1990s and the solar arrays were resold through the world; therefore, this KOP has had previous solar/energy-related development within foreground views and is not anticipated to be significantly visually impacted by similar development (e.g., the proposed CESF facility).

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Table 5.13-5
Visual Impact Significance – Sensitive Viewing Areas

Viewing Areas	Description	Visual Impact Susceptibility	Visual Impact Severity	Visual Impact Significance
Sensitive Viewing Area and KOP No. 1 (Figures 5.13-12 and 5.13-13, see also Figure 5.13-1 for KOP location) – from unobscured front yard view of adjacent residence to the north.	This KOP location represents the closest unscreened view to CESF from residents to the north. KOP 1 is located approximately 0.3-mile north of the Project site. This view is consistent with longer viewing durations (i.e., from residential views) of the CESF. The CESF, in the absence of screening, would be highly visible because of the flat, open viewing conditions. This KOP will have unobstructed direct front yard views to the CESF; however, it should be noted, the viewshed has already been modified with the presence of former solar facilities, existing transmission lines, a substation, and property fencing in the immediate vicinity.	Moderate	Moderate	Less than Significant
Sensitive Viewing Area and KOP No. 2 (Figures 5.13-14 and 5.13-15, see also Figure 5.13-1 for KOP location) – from unobscured front yard view of adjacent residence to the west.	This KOP location represents the closest unscreened view to the CESF from residents to the west. KOP 2 is located approximately 0.2 mile west of the Project site. This KOP will have unobstructed direct front yard views to the CESF. Like KOP 1, this view is also consistent with longer viewing durations of the CESF, as well as the highest degree of severity because of the close distance. The CESF, in the absence of screening, would be highly visible because of the flat, open viewing conditions. The Project would create a strong visual contrast to the existing setting and significantly alter foreground views from this residence and partially obscure distant views to surrounding mountains. It should be noted, the viewshed has been slightly modified with the presence of existing transmission lines, telephone poles/lines, and property fencing in the immediate vicinity.	High	High	Significant Impact
Sensitive Viewing Area and KOP No. 3 (Figures 5.13-15, 5.13-17, 5.13-18, and 5.13-19 see also Figure 5.13-1 for KOP location) – from intersection of SR-58 and Tracy Lane.	This KOP location represents the closest unscreened view (foreground view) to the CESF from travelers along SR-58. As this highway borders the southern boundary of the Project site, to travelers along SR-58, the Project would create a significant change to the existing character of the site and represent a dominant scale, form, and line contrast to the existing setting. However, SR-58 is not officially designated as a state or local scenic highway or route. Therefore, views along SR-58 are considered to have a moderate to low sensitivity and less than significant impacts are expected.	Moderate/ Low	High	Less than Significant

Table 5.13-5
Visual Impact Significance – Sensitive Viewing Areas
(Continued)

Viewing Areas	Description	Visual Impact Susceptibility	Visual Impact Severity	Visual Impact Significance
Sensitive Viewing Area and KOP No. 4 (Figures 5.13-20 and 5.13-21, see also Figure 5.13-1 for KOP location) – representative view from Hubbard Hill-Freeborn Mountain SRA.	This KOP location represents the closest unscreened view to the CESF for recreational users within the Hubbard Hill-Freeborn Mountain area. This KOP was selected due to the open space/SRA designation of the area as well as the panoramic visual appeal of the existing views. This view is consistent with a low degree of severity because of the distance from the site and the various cultural modifications that lie within middleground/ background which distract from views of the Project area. Additionally, Project features appear small in the broad context of the Carrizo Plains and the air cooled condensers within the power block are the only Project feature that breaks the low horizontal line of the proposed facility. The CESF is not anticipated to create a significant visual impact to the low numbers of potential recreational users within the area.	Moderate/ Low	Low	Less than Significant

Visual impact susceptibility from this location is characterized as moderate (see Table 5.13-2). Visual impact severity from this location is characterized as moderate (see Table 5.13-3). Thereby, aesthetic impact significance from this location is classified as less than significant (see Table 5.13-5).

Sensitive Viewing Area and KOP 2: Existing views across the CESF site from this KOP virtually consist of an open expanse of land (640 acres) with panoramic views to distant mountains. This KOP will have unobstructed direct front yard views to CESF and to Project structures (e.g., air cooled condensers, solar reflectors and receivers, switchyard, transmission lines, etc.). CESF, in the absence of screening, would be highly visible because of the flat, open viewing conditions. The Project would create a strong visual contrast to the existing setting, significantly alter foreground views from this residence, and would partially obscure distant/panoramic views from this KOP of the mountains to the east.

As stated, viewer sensitivity is a measure of the degree of concern for change in the visual character of a landscape and considers user attitude and adjacent land use. Residential views are for long durations and residents are generally highly aware of changes to their immediate visual environment. While the landscape surrounding this residence is classified as retaining a low ESIL, the community in which these residents live specifically appeals to those who wish to live in a remote rural setting. Thus, contingent on resident reaction to the CESF, significant visual impacts on these sensitive viewers due to the construction/operation of the CESF may occur.

Visual impact susceptibility from this location is characterized as high (see Table 5.13-2). Visual impact severity from this location is characterized as high (see Table 5.13-3). Thereby, aesthetic impact significance from this location is classified as significant (see Table 5.13-5).

Sensitive Viewing Area and KOP 3: The CESF would be clearly visible from SR-58. As shown in Figures 5.13-17 and 5.13-19, the Project would create a significant change to the existing view towards the site from the highway representing a dominant scale, form, and line contrast to the existing setting. However, SR-58 has a low number of daily travelers (approximately 350 travelers/ADTs), and generally, travelers are considered less sensitive as they are focused on driving-related activities and have short viewing durations. While SR-58 borders the southern boundary of the Project site and is identified as a County study roadway, it is not an officially designated state or local scenic highway or route. Therefore, from a regional perspective, views along SR-58 are considered to have a moderate to low sensitivity.

Visual impact susceptibility from this location is characterized as moderate (see Table 5.13-2). Visual impact severity from this location is characterized as high (see Table 5.13-3). Thereby, per the Visual Impact Significance Matrix, Table 5.13-1, aesthetic impact significance from this location is classified as less than significant (see Table 5.13-5).

It should be noted that CESF may draw positive visual interest to the area. As one of the first projects of its kind in California, the solar technology has the potential to become a tourist attraction, drawing visitors from the energy industry, environmental community, and government/political figures who seek direct personal experience of progressive renewable energy solutions. For example, since its development, the wind farm of approximately 4,000 wind turbine generators/windmills in the San Gorgonio Pass area (which includes portions of Palm Springs, Desert Hot Springs, and Coachella Valley) have become somewhat of a symbol of the area. The technology as well as the total size and number of windmills creates a spectacle that attracts tourists and there are numerous companies that offer tours to

view the area; however, prior to its development the proposed wind farm was seen as a potentially immitigable significant visual impact for travelers through the area.

Sensitive Viewing Area and KOP 4: Hubbard Hill-Freeborn Mountain area is approximately 3.5 miles away, and therefore considered to have more distant views. Persons utilizing wilderness areas generally have an expectation of a high quality visual environment. In addition, potential recreational users are at an elevated viewing position, and would virtually have a direct line-of-site to the Project vicinity. However, this view is consistent with a low degree of severity because of the low number of potential viewers (viewer exposure), the distance from the site, and the various cultural modifications that lie within middleground/background which distract from views of the Project area. Project features appear small in the broad context of the Carrizo Plains and the air cooled condensers within the power block are the only Project feature that breaks the low horizontal line of the proposed facility (see Figure 5.13-21). Additionally, a persistent haze, characteristic of the air quality in the area, impairs clarity in distant views.

Visual impact susceptibility from this location is characterized as moderate/low (see Table 5.13-2). Visual impact severity from this location is characterized as low (see Table 5.13-3). Thereby, aesthetic impact significance from this location is classified as less than significant (see Table 5.13-5).

5.13.2.2.2 Lighting

Lighting will be required for safe and efficient operation of CESF and will be limited to the following areas.

- Exterior area lighting will be limited to the power block.
- Emergency/Critical lighting.

The lighting system is intended to provide personnel with illumination for plant operation under normal conditions, means of egress under emergency conditions, and emergency lighting to perform manual operations during a power outage of the normal power source. The proposed lighting system would be designed and installed to meet Occupational Safety and Health Administration (OSHA) minimum standards, to offer maximum illumination of operating work areas while minimizing offsite illumination. Lighting will be directed on site to avoid backscatter, and shielded from public view to the extent practicable. See Section 3.0, Facility Description and Location, specifically, Section 3.4.10.1, Lighting, for further description of lighting fixtures.

Under certain conditions during construction-related activities, slightly higher amounts of backscatter lighting may be apparent to viewers immediately adjacent to the Project site. This condition is due to providing for safety of construction workers during this phase of the Project. In addition, while heavy construction will be scheduled to occur between 7:00 am and 7:00 pm, Monday through Friday, additional hours may be necessary to make up schedule deficiencies or to complete critical construction activities. Some activities will continue 24 hours per day, 7 days per week. These activities include, but are not limited to, refueling equipment, staging material for the following day's construction activities, quality assurance/control, and commissioning. Upon completion of construction, night lighting at the site will be substantially reduced and less noticeable to surrounding viewers; therefore, visual impacts related to lighting for construction activities would be temporary and are considered less than significant. Lighting design for the CESF would be consistent with CEC lighting requirements and local LORS.

Currently, little nighttime lighting is produced within the VSOI, and consists mainly of external lighting of residences in the area. While the CESF may slightly add to existing lighting, the Project would not significantly increase the existing night lighting in the Project area. Overall, the addition of the CESF is not anticipated to create significant night lighting impacts from backscatter light and/or night lighting a nearby viewer may experience when looking toward the site.

Federal Aviation Agency (FAA) Advisory Circular 70/7460-1K requires that all airspace obstructions over 200 feet in height or in close proximity to an airfield have obstruction lighting. The tallest structure proposed onsite is 150 feet high (two transmission poles). Since the transmission poles are below the 200 feet limit and there is no airfield in close proximity to the site (California Valley Airfield approximately 4.0 miles southwest of the Project site), the poles will not require obstruction lighting. Further, as the proposed transmission poles will be immediately adjacent to the existing Morro Bay–Midway transmission system, no impacts to aircraft operation are expected.

5.13.2.2.3 Glint/Glare

As described in Section 3.0, Facility Description and Location, solar reflectors (mirrors) focus the sun's rays on a receiver of the solar array system, which is an insulated cavity used to produce saturated steam located approximately 50 feet above the reflectors (total height 56 feet). The CESF reflectors and receivers are similar to the design in use at Liddell Power Station near Singleton, New South Wales, Australia (see Figure 5.13-22, Photo 4). The reflectors/receivers are designed so that sun rays from the mirrors would be reflected directly at the receiver. Flat glass is attached to corrugated steel backing sheet that is supported by a weldment structure with the desired curvature.

The sun's position in the sky is dependent upon the time of day as well as time of year. Because of the way reflector rows are oriented within the solar field, the amount of rotation during operation each day is minimal, ranging through the course of the year from 3°-10° from starting position to noon and then back to starting position (see Section 3.0, Facility Description and Location, Figure 3.4-9). The reflectors do not track the sun in the east/west direction, but track based on sun angle above the horizon that varies with the season (higher in summer, lower in winter).

Additionally, reflectors are stowed with the mirror aimed down at the ground during the night, and rotate out of the stow position at the beginning of operating hours to direct the incident sunlight onto the receiver (process takes approximately 4 minutes). During this 4 minute period, potential glint/glare from the mirrors may be visible to areas to the north; however as this would occur in the early hours of the morning, sunlight is not strong and glint/glare from the mirrors is not anticipated to be significant. In addition, as this operation would occur within 4 minutes, and is considered temporary, less than significant glint/glare impacts are anticipated. As the residents represented by KOP 1 have had previous solar/energy-related development within foreground views, they are not anticipated to be significantly visually impacted by similar development. Potential glint/glare impacts to sensitive viewers within the CESF area are anticipated to be an infrequent event based on the position of the orientation of the mirrors onsite. During final design, if design analysis indicates that significant glint/glare impacts would occur, potential mitigation should be proposed.

<u>California Valley Airfield</u>: The California Valley Airfield is only used by local residents with small planes, and currently supports very little air traffic. Aircraft utilizing the California Valley Airfield are

unlikely to be impacted by glint/glare from the CESF. Each solar reflector is designed to focus light falling on it into a receiver positioned above it, thus limiting the potential for stray reflections. Views and/or potential glint/glare from the CESF is anticipated to be similar to a body of water to pilots in aircraft flying over the site. As the airfield is approximately 4.0 miles southwest of the CESF site, potential glint/glare from the solar reflectors is not expected to distract and/or affect pilots during landing or take-off operations. The conclusion of this analysis is supported by real world experience under similar conditions at the Kramer Junction Solar Electric Generating Station located in Barstow, California. The Kramer Junction facility is located within the flight path of Edwards Air Force Base. According to CEC staff, pilots flying into the base have not reported any glare distraction from the nearby solar facility impacting their flight/landing operations.

In addition, the AFC prepared for the Victorville 2 Hybrid Power Project (07-AFC-1), identified that the US Air Force conducted overflights over an existing solar energy facility (the solar energy generating station power plant in the Mojave Desert at Harper Lake) to determine if the facility produced visual distractions for pilots. It was documented that no significant visual distractions were observed during the overflights. Given CEC staff accounts and documentation reviewed within the Victorville 2 Hybrid Power Project AFC (07-AFC-1), it is not expected that the CESF solar array would cause adverse effects to aviation operations at California Valley Airfield.

5.13.2.2.4 Landscaping

Landscaping is included as part of the CESF project; however, a landscaping/screening plan has not been prepared and the extent and location of proposed landscaping is not known at this time. It is anticipated that landscaping will be incorporated into the Project so as not to add incrementally to the overall change in viewsheds. A Landscape/Screening Plan will be prepared during final Project design, to reduce potential visual impacts.

5.13.2.2.5 Indirect and Construction-related Impacts

The 380-acre construction laydown area will include construction lay down for the solar farm site, staff parking, equipment storage, a fueling station, and construction offices. Construction access to the CESF site will be from SR-58 as well as from Tracy Lane.

Project site preparation includes site grading and slight terracing (due to the slope of the site to the southwest) to accommodate the Project on the existing landscape; however, major cuts and fills are not anticipated. Excavation work will consist of the removal, storage, and/or disposal of earth, sand, gravel, vegetation, organic matter, loose rock, and debris to the lines and grades necessary for construction. The construction laydown area is relatively flat and thus requires little grading. Geotech fabric and gravel will be removed and shallow swales and/or depressions will be created for revegetation. Within the laydown area, two permanent crossings will be required along the access road as shown in Section 3.0 Facility Description and Location, Figure 3.1-1. Permanent crossings will consist of culverts able to support the large construction machinery associated with the Project. See also Section 3.0, Facility Description and Location, for more information relating to crossings and earthwork.

The construction period is expected to last 35 months. The workforce is expected to average roughly 290 construction workers, with 396 workers in the peak month. The workforce is expected to come from the San Luis Obispo and Kern County area.

During the CESF construction period, construction activities and construction materials, equipment, trucks, temporary structures, and vehicles, would be highly visible to surrounding areas due to the flat, open viewing conditions on the Project site and construction laydown area. As the CESF site and laydown area are largely undeveloped, such construction activities at the Project site and within the laydown area will contrast significantly with the existing natural character of the area; however, construction activities within/adjacent to the existing transmission line ROW along the northern boundary of the site are not anticipated to contrast significantly with maintenance and other operational activities that occur periodically in this ROW. While, visual changes associated with construction activities at both the CESF site and the construction laydown area would create potentially significant visual impacts to sensitive viewers within the nearby Project vicinity, construction activities would be conducted within a three year period (35 months); therefore, visual impacts are considered temporary and thus, less than significant. Permanent crossings within the laydown area are low profile and are not expected to be visible from adjacent areas.

Indirect impacts associated with the construction, operation, and long-term presence of the CESF and ancillary facilities may include impacts associated with fugitive dust, night lighting, and presence of construction equipment. Construction activities will be conducted in a manner that minimizes (visible) dust emissions. These impacts were considered temporary and insignificant.

5.13.3 Cumulative Impacts

The CESF and other projects in the vicinity are not expected to result in significant cumulative impacts to environmental resource areas, including, but not limited to, air quality, land use, cultural resources, water resources, or traffic during the construction or operation phases. All existing and proposed projects can be characterized primarily as residential development (i.e., new single-family dwellings and mobile homes). Of the 41 projects with permit applications submitted since January 2000, only 6 projects proposed new residential construction (i.e., single-family dwellings). The remaining 35 projects include minor construction projects such as manufactured and mobile home permits, mobile home foundations, carport additions, roof replacements, deck additions, and residential renovations. Further, some of the listed projects have permits that have expired since their issuance and thus, can be dismissed from this cumulative impact analysis.

The areas within the VSOI are generally characterized by open expanses of grasslands, agricultural/dry-farming activities, and mountain ranges supported by small communities and other sparsely populated areas. Accordingly, size and scale of cumulative projects in the area are substantially less than in other more-urbanized portions of California.

The closest permitted project is located approximately 0.5-mile to the west of the CESF site and includes the addition of a mobile home. In addition, all permitted projects within 2.0-miles of the CESF site include manufactured and mobile home permits and/or mobile home foundations. All other proposed projects are located over 2.0-miles from the Project site. Thus, as mentioned above, no significant cumulative impacts have been identified as a result of the construction, operation, maintenance, or long-

term presence of the CESF and other projects in the area. For further discussion of cumulative impacts, see Section 5.18, Cumulative Impacts.

5.13.4 Mitigation Measures

The CESF design inherently includes mitigation measures. For example, one reason the site location was chosen is because of its proximity to the existing PG&E Carrizo Plain Substation, existing transmission line system, and an open expanse of area with very little existing development. By locating the CESF immediately adjacent to the existing substation, the Project can virtually tie directly in via the proposed switchyard (only two new transmission poles are required). This will limit unnecessary transmission lines and numerous additional transmission poles traversing the area. In addition, by placing CESF on a site with an existing groundwater well, the CESF can take advantage of routing water from the existing well; thereby, negating the need for offsite water supply lines and minimizing impacts relating to water transmission line impacts. The raw water supply line will be buried with a minimum of 3 feet of cover. This will prevent glint from aboveground pipelines. 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 other than solar reflector mirrors (see Table 5.13-4).

While CESF includes features that reduce visual impacts from the construction/operation of the facility, potentially significant visual impacts on adjacent sensitive residential viewers may still occur. Suggested visual resources mitigation measures (VRMM) to reduce potentially significant visual impacts to less than significant levels are provided below:

VRMM-1: Prepare Conceptual Landscaping Plan at a 1:40 scale per CEC requirements for screening purposes. The plan shall include information on the type of plant species proposed, their size, quantity, and spacing at planting, expected heights at 5 years and maturity, and expected growth rates. Proposed landscaping should also include:

- Use of native limited height landscaping materials around facility perimeter to ensure proposed landscaping does not further obstruct views of distant hillsides.
  Suggested offsite planting on adjacent residential properties (if landowner is interested) to assist with screening.

VRMM-2: Prepare Lighting Mitigation Plan for CEC review/approval to include the following:

- External lighting design/installation incorporates commercially available fixture hoods/shielding, with light directed downward or toward the area to be illuminated.
- Light fixtures shall not cause obtrusive spill light beyond the Project boundary.
- All lighting shall be of minimum necessary brightness consistent with operational safety and security.
  Direct lighting does not illuminate the nighttime sky.

VRMM-3: Use of non-reflective or matted steel/metal for receiver hoods.

5.13.5 LORS Compliance

Applicable visual resources LORS are summarized in Table 5.13-6 and described below.

5.13.5.1 Federal

The CESF is located on property under the jurisdiction of San Luis Obispo County; however, BLM public domain lands within the mountain ranges approximately 3.5 to 4.0 miles to the southwest are within the VSOI and have distant views to the Project site; therefore, VRM guidelines were considered for this Project. VRM methodology is an effective assessment tool which 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.

5.13.5.2 State

No State-designated scenic highways or highways eligible for designation were identified within the VSOI. Further, no other area managed by the state for which CESF would be required to adhere to aesthetic LORS was identified; therefore, compliance with state aesthetic LORS is inapplicable.

5.13.5.3 Local

The CESF is located on unincorporated land within San Luis Obispo County. In addition, a small portion of Kern County dips into the 5-mile VSOI radius identified for the Project (see Figure 5.13-1) and may have distant views to the Project site. Santa Barbara, Kings, and Monterey counties also border San Luis Obispo County; however, these counties are located more than 5 miles from the Project, and have no views to the Project site; therefore, local LORS were only considered for San Luis Obispo County and Kern counties.

The property is zoned AG with a secondary zoning as a flood hazard area by San Luis Obispo County. Allowable uses within AG zone include electricity generation, subject to the land use permit required by the specific use standards identified in Title 22.30 and 22.32 of the County Land Use Ordinance.

The San Luis Obispo County General Plan contains several goals and policies relating specifically to minimizing impacts to scenic areas and visual resources within the County. In addition, the Kern County General Plan (1980) has a several objectives and policies outlined relating to the preservation of scenic resources (Public Facilities and Services Element and Light and Glare Policies). The Project site is located within the Shandon-Carrizo inland area; however, there are no goals/policies relating to scenic areas and visual resources within the planning area.

Table 5.13-6 provides a list of local LORS, as well as the section number in which the Project's conformance/applicability to these LORS is discussed during construction and operation phases.

The San Luis Obispo County General Plan Agricultural and Open Space Element defines scenic resources as "Visually unique or outstanding features of the landscape, such as unusual landforms, scenic vistas, and view sheds that are viewed from public places such as a street, highway, park, or the coastline."

Additionally, open space lands are defined as "resources or features of the landscape with unique or sensitive habitat for plants and animals; recreational opportunities; or distinctive scenic values."

According to the Energy Element of the General Plan for San Luis Obispo, "a solar energy conversion facility in the Carrizo Plains could minimize the county's reliance on imported electricity," and have other positive benefits both locally and county-wide. While "the two primary fuels used to power California are petroleum and natural gas," the current energy policy calls for more development of solar energy within the mainly agricultural Shandon-Carrizo Plains, promotion of sustainable business, and greater use of renewable forms of energy. The location of the Project at this site is directly supported by the goals and policies of the Energy Element of the San Luis Obispo General Plan.

Guideline 39.3 states: "The applicant shall submit a complete description of the type of solar facility that will be employed, including an analysis of the tracking system (if appropriate) showing that no concentrated reflections are directed at occupied structures, recreation areas, or roads" (Energy Element, pg. 4-20). Guideline 29.8 states: "If the proposed location visually impacts a home site, prepare a screening plan to minimize visual impacts" (Energy Element, pg. 4-8). Guideline 29.9 states: "All exterior lighting should be energy efficient and shielded to not extend beyond the site."

The CESF 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 scenic value were not identified within the VSOI. Therefore, compliance with local aesthetic LORS will be maintained.

Table 5.13-6
Summary of LORS

Jurisdiction	LORS	Requirements	Conformance Section	Administering Agency	Agency Contact
Federal					
	Visual Resource Manual	To manage public lands in a manner which will protect the quality of the scenic (visual) values of these lands.	5.13.1.3.1, 5.13.5.1	BLM	1
State					
	Application for Certification Requirements	Rules of Practice and Procedure & Power Plant Site Certification Regulations, Appendix B.	See Data Adequacy Worksheet	CEC	2
	State Scenic Highway Requirements	Requirements are applicable to state designated scenic highways.	5.13.1.3.3, 5.13.1.4.3 There are none in the Project area.	Caltrans	3

Table 5.13-6
Summary of LORS
(Continued)

Jurisdiction	LORS	Requirements	Conformance Section	Administering Agency	Agency Contact
Local					
	San Luis Obispo County General Plan Agriculture and Open Space Element Agricultural Policy AGP30 – Scenic Resources (b)	In designated scenic corridors, new development requiring a discretionary permit and land decisions shall address the protection of scenic vistas.	5.13.1.3.3, 5.13.1.4.3 There are none in the Project area.	San Luis Obispo County	4
	San Luis Obispo County General Plan Agriculture and Open Space Element Open Space Goals OSG1 - Identify and Protect Open Space	Identify, protect, sustain, and where necessary, restore and reclaim areas with the following characteristics: (1) Recreation areas; (2) Ecosystems and environmentally sensitive resources (streams and riparian vegetation); (3) Scenic areas; and (4) Rural character.	5.6, 5.13.2.2.5, 5.13.4	San Luis Obispo County	4
	San Luis Obispo County General Plan Agriculture and Open Space Element Policy Open Space Policy OSP24 – Scenic Corridors	Designated study corridor along SR-58 and Soda Lake Rd. No current or future work planned for the corridor.	5.13.1.3.3, 5.13.1.4.3	San Luis Obispo County	4
	San Luis Obispo County General Plan Energy Element Guideline 29.5	Route of existing and proposed transmission lines serving the project to follow the guidelines for transmission lines established under Policy 51.	5.13.2.2.5	San Luis Obispo County	4

Table 5.13-6
Summary of LORS
(Continued)

Jurisdiction	LORS	Requirements	Conformance Section	Administering Agency	Agency Contact
	San Luis Obispo County General Plan Energy Element Policy 51	Existing access roads used wherever possible to avoid unnecessary disturbance of vegetation. If new roads are constructed, existing contours should be followed to minimize ground disturbance and shall be constructed in a way that minimizes vegetation removal. Include a restoration plan as part of the application to restore the area to pre-construction conditions.	5.13.2.2.5	San Luis Obispo County	4
	San Luis Obispo County General Plan Energy Element Policy Guideline 29.7	Within a sensitive view corridor, scenic, or recreational area, employ the best available techniques to mitigate impacts related to these resources consistent with guideline 29.6.	5.13.2.2.4, 5.13.4	San Luis Obispo County	4
	San Luis Obispo County General Plan Energy Element Policy Guideline 29.8	If the proposed location visually impacts a home site, prepare a screening plan to minimize visual impacts.	5.13.2.2.4, 5.13.4	San Luis Obispo County	4
	San Luis Obispo County General Plan Energy Element Policy Guideline 29.9	All exterior lighting should be energy efficient and shielded to not extend beyond the site.	5.13.2.2.2, 5.13.4	San Luis Obispo County	4
	San Luis Obispo County General Plan Energy Element Policy Guideline 29.12	Minimize the removal of mature trees and overall surface disturbance. The removal of natural vegetation during construction should be kept to a minimum.	5.13.2.2.5	San Luis Obispo County	4

Table 5.13-6
Summary of LORS
(Continued)

Jurisdiction	LORS	Requirements	Conformance Section	Administering Agency	Agency Contact
	San Luis Obispo County General Plan Energy Element Policy Guideline 29.13	Revegetation planting shall be required and maintained after construction to curtail soil erosion on sloping sites and should occur prior to the winter rainy season. Native species should be utilized.	5.13.2.2.4, 5.13.2.2.5, 5.13.4	San Luis Obispo County	4
	San Luis Obispo County General Plan Energy Element Policy Guideline	Proposed electricity facilities must provide a sufficient buffer zone from existing or proposed human populations.	5.13.1.1	San Luis Obispo County	4
	San Luis Obispo County General Plan Energy Element Policy Guideline 39	Encourage and support the development of solar power systems as commercial energy enterprises where visual and environmental impacts can be mitigated. The following guidelines should be applied to solar facilities over 10 kilowatt.	5.13.1, 5.13.2, 5.13.4	San Luis Obispo County	4
	San Luis Obispo County General Plan Energy Element Policy Guideline 39.1	Solar facility development shall be subject to the guidelines under Policy 29.	5.13.1, 5.13.2, 5.13.4	San Luis Obispo County	4
	San Luis Obispo County General Plan Energy Element Policy Guideline 39.3	The applicant shall submit a complete description of the type of solar facility that will be employed, including an analysis of the tracking system (if appropriate) showing that no concentrated reflections are directed at occupied structures, recreation areas, or roads.	Project AFC, and 5.13.2.2.3	San Luis Obispo County	4
	San Luis Obispo County General Plan Energy Element Policy Guideline 49	Proposals for new transmission lines shall be evaluated for alternatives that significantly reduce their visibility and impacts to sensitive environmental resources.	Section 4.0, Alternatives	San Luis Obispo County	4

Table 5.13-6
Summary of LORS
(Continued)

Jurisdiction	LORS	Requirements	Conformance Section	Administering Agency	Agency Contact
	San Luis Obispo County General Plan Energy Element Policy 51	Guidelines or equivalent alternatives should be considered by the review authority for all transmission lines (51.1, 51.2, 51.3, 51.4, 51.5, and 51.14).	All listed guidelines within Policy 51 are identified within Sections 3.0, 5.13.1.1, and 5.13.4	San Luis Obispo County	4
	San Luis Obispo County General Plan Energy Element Guideline 58.4	No direct beams of exterior light should be visible beyond the boundaries of the parcel. Low intensity, shielded, and highly efficient fixtures used for outdoor lighting facility.	5.13.2.2.2, 5.13.2.2.3, 5.13.4	San Luis Obispo County	4
	San Luis Obispo County General Plan Energy Element Policy Guideline 58.5	Proposed facilities shall be screened or fenced from view to reduce visual impacts identified during the environmental review process.	5.13.2.2.4, 5.13.4	San Luis Obispo County	4
	San Luis Obispo County General Plan Energy Element Guideline 58.7	Screen facilities from public view through height limitation, careful site design, artificial contoured banks and mounding, extensive landscaping, and decorative walls and fences.	5.13.2.2.4, 5.13.4	San Luis Obispo County	4
	San Luis Obispo County General Plan Energy Element Guideline 58.8	Any part of the facility that cannot effectively be screened shall be painted with non-reflective paint and color which blend with the natural landscape.	Table 5.13-4	San Luis Obispo County	4
	San Luis Obispo County Code-Title 22, Land Use Ordinance. 22..32.030. C.	The land area exposed and the vegetation removed during construction shall be the minimum necessary to install and operate the facility. Top soil must be stripped and stored separately. Disturbed areas no longer required for operation will be regarded, covered in topsoil and replanted during the next appropriate season.	Section 3.0, 5.13.2.2.5	San Luis Obispo County	4

Table 5.13-6
Summary of LORS
(Continued)

Jurisdiction	LORS	Requirements	Conformance Section	Administering Agency	Agency Contact
	San Luis Obispo County Code-Title 22, Land Use Ordinance. 22..32.060. A.1	No concentrated reflections will be directed at occupied structures, recreation areas or roads.	5.13.2.2.3	San Luis Obispo County	4
	San Luis Obispo County Code-Title 22, Land Use Ordinance. 22..10.060. B	Light sources shall be designated and adjusted to direct light away from any road/street/dwelling outside the ownership of the applicant.	5.13.2.2.2, 5.13.4	San Luis Obispo County	4
	San Luis Obispo County Code-Title 22, Land Use Ordinance. 22..10.060. C	No light or glare shall be transmitted or reflected in a concentration or intensity that is detrimental or harmful to persons or that interferes with surrounding properties or streets.	5.13.2.2.2, 5.13.2.2.3, 5.13.4	San Luis Obispo County	4
	San Luis Obispo County Code-Title 22, Land Use Ordinance. 22..10.060. D.1	Any light source used for ground illumination (except incandescent lamps of 150 watts or less) and light produced from combustion of fuels shall be shielded from above so that the edge of the shield if level or below the lowest edge of the light source. Where any light source is located higher than eight feet, the required shielding shall extend below the lower edge of the light to such a distance that blocks the light source from the view of any residential use within 1,000 feet of the light fixture.	5.13.2.2.2, 5.13.4	San Luis Obispo County	4
	San Luis Obispo County Code-Title 22, Land Use Ordinance. 22..10.060. D.2	Where lights are used to illuminate walls, signs, flags, landscaping, etc. The light source should be shielded so as not to be directly visible from offsite.	5.13.2.2.2, 5.13.4	San Luis Obispo County	4

Table 5.13-6
Summary of LORS
(Continued)

Jurisdiction	LORS	Requirements	Conformance Section	Administering Agency	Agency Contact
	San Luis Obispo County Code-Title 22, Land Use Ordinance. 22..10.060. E	Freestanding outdoor light fixtures shall not exceed the height of the tallest building on the site.	5.13.2.2.2, 5.13.4	San Luis Obispo County	4
	San Luis Obispo County Code-Title 22, Land Use Ordinance. 22..10.090. C.1 (8)	The maximum allowable height for agriculture land use is 35 feet. Solar collectors may not go more than five feet above the height limit.	3.0, Table 5.13-4	San Luis Obispo County	4
	Kern County General Plan, 1.10.7 Light and Glare Policy (47)	Ensure that light and glare from discretionary new development projects are minimized in rural as well as urban areas.	5.13.2.2.2, 5.13.2.2.3, 5.13.4	Kern County	5
	Kern County General Plan, 1.10.7 Light and Glare Policy (48)	Encourage the use of low-glare lighting to minimize nighttime glare effects on neighboring properties.	5.13.2.2.2, 5.13.4	Kern County	5
	Kern County General Plan, 1.8 Industrial	Require that industrial uses provide design features such as screen walls, landscaping, increased height and/or setbacks, and lighting restrictions between the boundaries of residential land use designation so as to reduce impacts on residences due to light, noise, sound, and vibration.	5.12, 5.13.2.2.2, 5.13.2.2.3, 5.13.2.2.4, 5.13.4	Kern County	5

5.13.5.4 Agencies and Agency Contacts

Agencies with jurisdiction to enforce LORS related to visual resources are shown in Table 5.13-7.

Table 5.13-7
Agency Contact List for LORS

	Agency	Contact	Address	Telephone
1	BLM Bakersfield Field Office	Tim Smith, Field Office Manager	3801 Pegasus Drive Bakersfield, CA 93308	(661) 391-6000
2	CEC Energy Facilities Siting Division Community Resources Unit	Eric Knight, Senior Planner/Supervisor	1516 9th Street, MS 40 Sacramento, CA 95814-5512	(916) 653-1850
3	Caltrans Guidelines for the Official Designation of Scenic Highways, Office of Landscape	Senior Landscape Architect	2800 Gateway Oaks Drive, Suite 100, Sacramento, CA 95833	(916) 274-6138
4	San Luis Obispo County, Department of Planning and Building	Planner John Busselle	976 Osos Street, Room 200 San Luis Obispo, CA 93408 jbusselle@co.slo.ca.us	(805) 781-5154
5	Kern County Planning Department	Rob Mendiola, Director of Planning	Public Services Building 2700 "M" Street., Suite 100 Bakersfield, CA 93301-2370	(661) 862-8600

5.13.5.5 Permits Required and Permitting Schedule

As shown in Table 5.13-8, no permits are required pertaining to visual resources.

Table 5.13-8
Applicable Permits

Responsible Agency	Permit/Approval	Schedule
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A

5.13.6 References

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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 Carrizo Energy Solar Farm (CESF or Project). 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 CESF Site

The CESF includes the construction and operation of a central solar thermal electric generating facility and its ancillary systems and will consist of approximately one hundred ninety-five Compact Linear Fresnel Reflector (CLFR) solar concentrating lines, and associated steam drums, steam turbine generators (STGs), air cooled condensers (ACCs), and infrastructure, producing up to a nominal 177 megawatts (MW) net. The CESF site will encompass approximately 640 acres of fenced area on Section 28 adjacent to California State Route 58 (SR-58)/Carrisa Highway. The Project and surrounding area is depicted in Section 3.0, Facility Description and Location (see Figure 3.1-1). The area is zoned agricultural, and is primarily composed of disturbed ranchland. The area adjoining the proposed CESF site is primarily open, undeveloped land.

A Phase I Environmental Site Assessment (ESA) of the proposed CESF has been prepared in accordance with ASTM Practice E 1527-05 (see Appendix Q, Phase I Environmental Site Assessment). The objective of the Phase I ESA was to identify Recognized Environmental Conditions (RECs) that may exist on the CESF site. A site reconnaissance was conducted on June 21 and 22, 2007. No RECs were identified on the CESF site. A detailed description of the subject property is included in the Phase I ESA. Additional investigation was not recommended. An environmental database review was conducted to identify sites within a 1-mile radius of the CESF for potential environmental concerns. No surrounding properties of potential concern were noted.

As described in more detail below in Section 5.14.2, the CESF will generate hazardous and non-hazardous wastes during the construction and operational phases of the Project typical of a solar thermal electric power plant.

5.14.1.2 Construction Laydown Area

Worker parking, material and equipment storage, and a staging area will be required during the construction period. The construction laydown and parking area will be approximately 380 acres adjacent to the Project site, located south of SR-58 on Section 33. The construction laydown area will consist of site offices, restroom facilities, meal rooms, parking areas, vehicle-marshalling areas, and construction material/equipment areas. Construction power to the temporary site facilities will be provided by mobile-driven generator sets. The soil in the laydown area will be covered with protective gravel along the access roadways, parking area, vehicle marshalling area, and material storage areas. A temporary fueling

station will be constructed in the laydown area. Refueling operations will be conducted in a designated location as shown in Section 1.0, Executive Summary (see Figure 1.1-4). For those vehicles unable to traverse to the designated refueling location, a refueling truck will be used. The refueling truck will be equipped with appropriate spill prevention and cleanup equipment.

5.14.1.3 Non-hazardous Solid Waste Disposal

Existing non-hazardous solid waste disposal facilities (Class III landfills) in the general area of the CESF 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 California Code of Regulations (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 CESF 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: Safety Kleen's 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 CESF is not expected to affect 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 facility.

Table 5.14-1
Waste Recycling/Disposal Facilities

	Title 23 Class	Permitted Capacity	Operating Capacity	Remaining Capacity	Estimated Closure Date	Enforcement Action Taken?
Solid Recycling/Waste Disposal Site						
Cold Canyon Landfill	Class III	10.9 million cubic yards per year	1,200 tons per day	2.8 million cubic yards	2012	Notice and Order for enforcement action for explosive gas control in Years 2005, 2006
Chicago Grade Landfill	Class III	2.7 million cubic yards per year	500 tons per day	2.3 million cubic yards	2042	No
City of Paso Robles Landfill	Class III	6.5 million cubic yards per year	250 tons per day	4 million cubic yards	2034	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
Waste Recycling/Disposal Facilities
(Continued)

	Title 23 Class	Permitted Capacity	Operating Capacity	Remaining Capacity	Estimated Closure Date	Enforcement Action Taken?
Safety Kleen Buttonwillow Landfill (Solids Disposal) Lokern Road Kern County, CA	Class I	13.25 million cubic yards per year	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

5.14.2 Environmental Consequences

The analysis of impacts related to waste management from the CESF is based on significance criteria summarized as follows:

- 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 CESF, and how non-hazardous solid waste, wastewater, and hazardous solid and liquid wastes will be disposed.

5.14.2.1 Construction

5.14.2.1.1 Plant Construction

The CESF will generate wastes typical for the construction of a solar thermal electric power plant. Table 5.14-2 summarizes the anticipated waste streams generated during construction, along with appropriate management methods for treatment or disposal.

Table 5.14-2
Summary of Construction Waste Streams and Management Methods

Waste Stream and Classification	Origin and Composition	Estimated Amount	Estimated Frequency of Generation	Onsite Treatment	Waste Management Method
Construction waste - non-hazardous	Scrap wood, steel, glass, plastic, or paper	39 cubic yards	Intermittent	None	Dispose to landfill
Construction waste - hazardous	Empty hazardous material containers	1.3 cubic yards	Intermittent	Store for <90 days	Return to vendor or dispose to hazardous waste disposal facility
Construction waste - hazardous	Solvents, used oils, paint, oily rags, or adhesives	176 gallons	Every 90 days	Store for <90 days	Dispose to hazardous waste disposal facility or recycle

Table 5.14-2
Summary of Construction Waste Streams
and Management Methods
(Continued)

Waste Stream and Classification	Origin and Composition	Estimated Amount	Estimated Frequency of Generation	Onsite Treatment	Waste Management Method
Spent batteries – hazardous	Lead acid, alkaline type	40 in 4 years	Intermittent	Store for <90 days	Dispose to recycling facility
Stormwater from construction area – non-hazardous	Surface runoff (water, inert material, dirt, and concrete particles)	13 gallons	Intermittent	None	Water will percolate into onsite soils
Sanitary waste – non-hazardous	Portable chemical toilets sanitary waste	200 gallons per day	Periodically pumped to tanker truck by licensed contractors	None	Ship to sanitary water treatment plant
Pipeline pressure testing – non-hazardous	Raw water from raw water storage	< 237,755 gallons	Four times at end of construction	None	Return to raw water tank

Notes:
All numbers are estimates.
Under California regulations.

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. When managed and disposed of properly, 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 affect 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: Small amounts of non-hazardous and hazardous wastes as discussed above may be generated at the construction laydown area.

5.14.2.2 Operations and Maintenance

Plant Operations: Operation of the facility will generate wastes resulting from processes, routine facility maintenance, and office activities typical of solar power generation operations. The operating waste streams and management methods are summarized in Table 5.14-3 and are described in more detail below. 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. The types of waste and their estimated quantities are shown in Table 5.14-3.

Table 5.14-3
Summary of Operation Waste Streams and Management Methods

Waste Stream and Classification	Origin and Composition	Estimated Amount	Estimated Frequency of Generation	Onsite Treatment	Waste Management Method
Used hydraulic fluid, oils and grease, oily filters – hazardous, recyclable	STG and other users of hydraulic actuators and lubricants	5.3 gallons/ day	Intermittent	Store <90 days	Dispose to authorized waste recycle facility
Spent batteries – hazardous, recyclable	Lead acid, alkaline	5/year, 400/year	Intermittent	Store <90 days	Recycle
Oily rags – non-hazardous	STG and other users of hydraulic actuators and lubricants	55 gallons/ month	Intermittent	Store <90 days	Launder at authorized facility
Oily absorbent – hazardous	STG and other users of hydraulic actuators and lubricants	55 gallons/ month	Intermittent	Store <90 days	Dispose to authorized waste disposal facility
Waste oil/sludge – hazardous, recyclable	Oil/water separator (OWS)	500 gallons	Intermittent	Store <90 days	Dispose to authorized waste recycle facility

Notes:
All numbers are estimates.
Under California regulations.

Non-hazardous Solid Waste: The CESF will produce maintenance and plant wastes typical of solar power generation operations. The following types of non-hazardous solid waste may be generated: paper, wood, plastic, cardboard, deactivated equipment and parts, defective or 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: The design of the Project provides for the recovery of process water. Sources of process wastewater include steam turbine blowdown, solar thermal system washdown, air cooled condenser washdown and OWS clear water discharge. Process wastewater is recovered and recycled back to the water treatment system. Stormwater will be collected onsite and directed to swales and detention ponds. The sanitary system will consist of a buried sanitary leach field.

The CESF is designed with one OWS. All drains from transformers, turbine skid, and other mechanical equipment and potential oily "contact" areas will be routed to the OWS, which separates out any oil before the effluent is recovered in the water treatment system. The oil-contaminated fluid will be pumped out by a vacuum truck on an as-needed basis and disposed at a facility specifically qualified to handle such waste.

Hazardous materials 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 materials are present.

A stormwater drainage system designed to match existing drainage patterns and meet all local regulations, will collect and direct all rainwater from the 640-acre Project site, managed using swales, ditches, culverts, and site grading, to locations away from the facility. In the power block area, a combination of series of stormwater catch basins are interconnected to a catch basin lift station. The water is then pumped from the sump basin to an existing stormwater basin. Final elevation and location of this sump basin will be determined during detailed engineering.

Stormwater runoff for the CESF is collected from the paved (roads and parking lots) and non-paved areas to local collection ponds/swales and allowed to percolated and evaporate. Area grading and the use of swales guide the rainwater into the stormwater collection tanks. Rainwater collected from active area (i.e., potentially contaminated by oil) is routed to the OWS.

The 50-year, 24-hour storm event produces a rainfall of 0.17 inches per hour for a total rainfall of 4 inches. Calculations for this storm event frequency would produce 213 acre-feet of rainwater across the entire one square mile solar field. Given its desert nature and the very limited rainfall that occurs on the Carrizo Plain, the majority of the water from this low intensity rainfall will be absorbed into the ground. A small series of detention basis, integrated with local swales, will be strategically located around the solar field to collect any excess rainwater that is not absorbed into the ground. Release of water from the detention basins will be to the established watercourses in the area.

The sanitary system will consist of a buried 1,000-gallon septic tank and leach field for all sanitary wastes including toilets, sinks, and showers.

Hazardous Wastes: Hazardous wastes generated will include used oils from equipment maintenance, and oil-contaminated materials such as spent oil filters, rags, or other cleanup materials. 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. Table 5.14-3 summarizes the hazardous waste to be generated from operation of the facility.

Hazardous wastes will be collected by a licensed hazardous waste hauler and disposed of at a licensed hazardous waste facility. Hazardous wastes will be transported offsite using a hazardous waste manifest. Copies of manifest reports, waste analysis, exception reports, or destruction certifications will be kept onsite and accessible for inspection for 3 years. Land disposal restriction notices/certificates will be kept onsite and accessible for inspection for 5 years.

5.14.2.3 Abandonment/Closure

Premature closure or unexpected cessation of facility 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 HMBP 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 station's 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.

5.14.3 Cumulative Impacts

The Class I and Class III landfills and soil and water recycling facilities in the CESF site area have adequate recycling and disposal capacities for the CESF; therefore, cumulative impacts from the Project site and other projects in the region are not expected to be significant.

5.14.4 Mitigation Measures

5.14.4.1 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 CESF. The waste management plan 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 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 3 years. Land disposal restriction notices/certificates will be kept onsite and accessible for inspection for 5 years.

WM-5: Spill control and management procedures will be included in the emergency response procedures developed for the proposed CESF 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 discussed further 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 CESF. 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 construction-related impacts to a less than significant level. No further mitigation is proposed.

5.14.4.2 Operations and Maintenance Phase Mitigation

WM-8: The Applicant will update the waste management procedures for construction of the site and implement them for operations at the CESF. 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.

5.14.4.3 Monitoring Program

Environmental impacts related to waste management issues caused by construction and operations of the CESF 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 CESF will be conducted in accordance with monitoring and reporting requirements in the appropriate permits that will be obtained for construction and operation.

5.14.5 LORS Compliance

The following summarizes the applicable LORS that govern the handling of non-hazardous and hazardous wastes. The LORS applicable to the handling of waste at the Project are also summarized in Table 5.14-4.

5.14.5.1 Federal

The Resource Conservation Recovery Act (RCRA), 42 United States Code (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 (U.S.) Environmental Protection Agency (EPA) is responsible for implementing the law, and the implementing regulations are set forth in 40 Code of Federal Regulations (CFR) 260, *et seq*. The law allows U.S. EPA to delegate the administration of the RCRA programs to the various states if the state programs meet the federal requirements. California's program was authorized by U.S. EPA on August 1, 1992, and the California U.S. EPA'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. The U.S. EPA 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.

5.14.5.2 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 San Luis Obispo County Public Works Department has the authority to assure the proper storage and disposal of solid waste in San Luis Obispo 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 Resourced Control Board (SWRCB) and the nine Regional Water Quality Control Boards (RWQCBs) 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 CESF 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 (CHSC), §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 San Luis Obispo County, Department of Environmental Health Services (DEHS), provides most regulatory functions covering those who generate hazardous waste.

5.14.5.3 Local

For hazardous waste, the designated Certified Unified Program Agency (CUPA) for the CESF site area is the San Luis Obispo County DEHS. They have delegated authority to administer state and federal programs. In addition, the DEHS regulates the storage of hazardous materials in underground storage tanks and cleanup of petroleum releases from underground storage tanks (UST). The DEHS will be contacted in the event of a release of hazardous wastes or materials to the environment. The DEHS

assumes enforcement responsibility for the implementation of Title 23 of the CCR and regulates the generation and storage of hazardous waste for the CESF area.

Table 5.14-4
Summary of LORS

Jurisdiction	LORS	Requirements	Conformance Section	Administering Agency	Agency Contact
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.	5.14.5.1	DTSC	DTSC Duty Officer Clovis Field Office (559) 297-3901
	40 CFR 260, *et seq.*	Implementing regulations for RCRA Subtitle C law. Implemented by U.S. EPA by delegating to the state.	5.14.5.1	DTSC	DTSC Duty Officer Clovis Field Office (559) 297-3901
	Federal CWA, 33 USC § 1251 *et seq.*	Regulates wastewater discharges to surface waters of the U.S. The NPDES program is administered at the state level.	5.14.5.1	Central Coast RWQCB	General Information (805) 549-3147
State					
	California Integrated Waste Management Act, Public Resources Code § 40000 *et seq.*	Implements RCRA regulations for non-hazardous waste.	5.14.5.2	San Luis Obispo County Public Works Department	Solid Waste Coordinator (805) 781-5252
	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.	5.14.5.2	Central Coast RWQCB	General Information (805) 549-3147
	22 CCR § 66262.34	Regulates accumulation periods for hazardous waste generators. Typically, hazardous waste cannot be stored onsite for more than 90 days.	5.14.5.2	DTSC	DTSC Duty Officer Clovis Field Office (559) 297-3901
	California Hazardous Waste Control Law, CHSC § 25100 *et seq.*	Regulates hazardous waste handling and storage.	5.14.5.2	San Luis Obispo County DEHS	Jeff Poel Supervising Environmental Health Specialist (805) 781-5544

Table 5.14-4
Summary of LORS
(Continued)

Jurisdiction	LORS	Requirements	Conformance Section	Administering Agency	Agency Contact
Local					
	San Luis Obispo County DEHS	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.	5.14.5.3	San Luis Obispo County DEHS	Jeff Poel Supervising Environmental Health Specialist (805) 781-5544
	San Luis Obispo County DEHS	Regulates hazardous waste generator permitting, and hazardous waste handling and storage.	5.14.5.3	San Luis Obispo County DEHS	Jeff Poel Supervising Environmental Health Specialist (805) 781-5544
	San Luis Obispo County General Plan Public Facilities Element	Will ensure all new development complies with applicable provisions of County Integrated Solid Waste Management Plan.	5.14.5.3	San Luis Obispo County Planning and Building Department	(805) 781-5600

5.14.5.4 Agencies and Agency Contacts

Agencies with jurisdiction to issue applicable permits or enforce LORS related to waste management are shown in Table 5.14-5.

Table 5.14-5
Agency Contact List for LORS

	Agency	Contact	Address	Telephone
1	DTSC	Noel Laverty DTSC Duty Officer Clovis Field Office	1515 Tollhouse Road Clovis, CA 93611	(916) 255-3618 (559) 297-3901
2	San Luis Obispo County DEHS	Jeff Poel Supervising Environmental Health Specialist	San Luis Obispo County CUPA 2156 Sierra Way San Luis Obispo, CA 93406	(805) 781-5544
3	San Luis Obispo County Public Works Department	Solid Waste Coordinator	County Government Center Room 207 San Luis Obispo, CA 93408	(805) 781-5252

5.14.5.5 Permits Required and Permitting Schedule

The CESF facility will apply for a U.S. EPA hazardous waste generator identification number from the DTSC and a hazardous waste generator permit from the San Luis Obispo County DEHS. The facility will be required to develop a hazardous materials business plan for the DEHS. A summary of applicable permits is presented in Table 5.14-6.

Table 5.14-6
Applicable Permits

Responsible Agency	Permit/Approval	Schedule
DTSC	U.S. EPA Hazardous Waste Generator Identification Number	30 days prior to the generation of hazardous waste
San Luis Obispo County DEHS	Hazardous Waste Generator Program Permit	30 days prior to the generation of hazardous waste
San Luis Obispo County DEHS	HMBP	30 days prior to the storage and use of hazardous materials

5.14.6 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, July 2007.

Office of the Federal Register, 1997. Code of Federal Regulations, Title 40, Parts 260 to 265, Revised July 1.

URS, 2007. Phase I Environmental Site Assessment.

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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 Carrizo Energy Solar Farm (CESF or Project). The CESF has been designed and will be operated in a manner that will minimize potential impacts from the use of hazardous materials. Hazardous waste generation and management are 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 CESF; cumulative impacts; mitigation measures; and applicable laws, ordinances, regulations, and standards (LORS).

5.15.1 Affected Environment

The CESF is located in an area zoned for agricultural uses as specified in the San Luis Obispo County General Land Use Plan; however, electrical generation is listed in the San Luis Obispo County Land Use Ordinance as an allowed use within the agricultural zone. The area adjoining the Project is primarily open, undeveloped land. Sensitive receptors were identified in the vicinity of the CESF. See Section 5.16, Public Health and Safety, and Figure 5.16-1 for additional information on sensitive receptors.

The CESF includes the construction and operation of a solar power generating facility and its ancillary systems and will consist of approximately one hundred ninety-five Compact Linear Fresnel Reflector (CLFR) solar concentrating lines, and associated steam drums, steam turbine generators (STGs), air cooled condensers (ACCs), and infrastructure producing, up to a nominal 177 megawatts (MW) net. The CESF site will encompass approximately 640 acres of fenced area on Section 28 adjacent to California State Route 58 (SR-58)/Carrisa Highway. A fueling station will be constructed in the power block area. Refueling operations will be conducted in the designated location as shown in Section 3.0, Facility Description and Location (see Figure 3.4-4).

Worker parking and material and equipment staging areas will be required during the construction period. The construction laydown and parking areas will be approximately 380 acres adjacent to the Project site, located south of SR-58 on Section 33. The construction laydown area will consist of site offices, restroom facilities, meal rooms, a parking area, vehicle marshalling areas, and construction material/equipment areas. Construction power to the temporary site facilities will be provided by mobile-driven generator sets. The soil in the laydown area will be covered with protective gravel along the access roadways, parking and vehicle marshalling areas, and material storage areas. A temporary fueling station will be constructed in the laydown area. Refueling operations will be conducted in a designated location as shown in Section 1.0, Executive Summary (see Figure 1.1-4). For those vehicles unable to traverse to the designated refueling location, a refueling truck will be used. The refueling truck will be equipped with appropriate spill prevention and cleanup equipment.

A summary of hazardous materials to be used and stored for construction of the CESF is provided in Table 5.15-1. A summary of hazardous materials to be used and stored onsite for operation of the CESF is provided in Table 5.15-2.

Table 5.15-1
Hazardous Materials and Wastes Usage and Storage During Construction[1]

Material	Purpose	Storage Location	Maximum Stored	Storage Type
Diesel fuel	Refueling construction vehicles and equipment	Laydown area	1,000 gallons	Tank
Diesel fuel	Refueling truck	Laydown area/mobile	1,320 gallons	Truck
Lubricating oil	Lubricating equipment parts	Contained in storage tanks on equipment skids	3,000 gallons	Tanks and containers on equipment skids
Gasoline	Refueling construction vehicles and equipment	Laydown area	1,000 gallons	Tank
Cleaning chemicals/deter-gents	Periodic cleaning	Warehouse/ Shop area	132 gallons	Tanks

Note: [1] All numbers are approximate.

Table 5.15-2
Hazardous Materials and Wastes Usage and Storage During Operations[1]

Chemical	Use	Storage Location	State	Storage Quantity
Diesel fuel	Firewater pump driver	Firewater skid	Liquid	300 gallons for initial fill. Maintain full diesel tank
Diesel fuel	Refueling station service vehicles	Power block refueling station	Liquid	1,000 gallons Maintain full diesel tank
Gasoline	Refueling station service vehicles	Power block refueling station	Liquid	1,000 gallons Maintain full gasoline tank
Cleaning chemicals/detergents	Periodic cleaning	Warehouse/Shop area	Liquid	132 gallons
CORTOL OS5300	Oxygen scavenger	Water treatment building	Liquid	925 gallons for initial fill
Lubricating oil	Lubricated rotating equipment (e.g., STG lube oil systems)	Contained in storage tanks on equipment	Liquid	3,170 gallons total
Laboratory reagents	Water laboratory analysis	Water treatment building	Liquid and granular solid	<1 gallon

Table 5.15-2
Hazardous Materials and Wastes Usage
and Storage during Operations[1]
(Continued)

Chemical	Use	Storage Location	State	Storage Quantity
Mineral transformer insulating oil	Generator step-up (GSU) transformers	Contained within transformers and electrical switches	Liquid	11,000 gallons each
Mineral transformer insulating oil	Standby transformer	Contained within transformers and electrical switches	Liquid	4,000 gallons
Mineral transformer insulating oil	Auxiliary transformers	Contained within transformers and electrical switches	Liquid	3,000 gallons each
Propylene glycol	Coolant antifreeze	Power block	Liquid	55 gallons

Note: [1] All numbers are approximate.

5.15.2 Environmental Consequences

5.15.2.1 Construction Phase

Hazardous materials to be used during construction include gasoline, diesel fuel, oil, small amounts of lubricants, and small amounts of cleaners, 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 or laydown area.

In general, construction contractors will utilize fuel, lubricating oils, and other hazardous materials during construction of the CESF. 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 either provided by separate contract or incorporated into individual construction subcontracts for the CESF:

- Environmental health and safety training.
- Site security.
- Site first aid.
- Construction testing (e.g., soil).
- 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 lubricant/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 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 (TSD) 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 San Luis Obispo County Department of Environmental Health Services (DEHS) will be notified. The California Department of Forestry and Fire Protection (CDF)/San Luis Obispo County Fire Department (SLOCFD) 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 less than significant as a result of the Applicant implementing the above procedures.

5.15.2.2 Operations Phase

The major hazardous materials to be stored and/or used at the site during CESF site operations are included in Table 5.15-2. The chemicals proposed for use at the CESF site are not regulated substances subject to the requirements of the California Accidental Release Prevention (CalARP) Program and Process Safety Management (PSM). No adverse environmental impacts related to other hazardous materials used at the facility are anticipated. Material safety data sheets (MSDS) for the hazardous materials will be kept onsite as required by 29 CFR 1910 OSHA Hazard Communication rules and regulations.

The CESF will maintain and implement an HMBP. The CESF will implement Best Management Practices (BMP) consistent with the hazardous materials handling, emergency spill response, and reporting as specified in the HMBP. If there is a spill or release of hazardous materials during operations, the spill area will be bermed or controlled as quickly as 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 TSD 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 San Luis Obispo County DEHS will be notified. The CDF/SLOCFD will also be called in the event of a fire or injury.

In addition, the CESF is designed with one oil/water separator (OWS). All drains from transformers, turbine skid, and other mechanical equipment and potential oily “contact” areas will be routed to the OWS, which separates out any oil before the effluent is recovered in the water treatment system. 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.

The CESF does not plan on storing or using natural gas or other gases as part of the proposed Project; therefore, there will be no significant fire or explosion risk associated with the proposed Project.

Long-term or cumulative impacts will be avoided by cleaning up any accidental leaks or spills of these materials as soon as they occur.

5.15.2.3 Abandonment/Closure

Premature closure or unexpected cessation of facility 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 HMBP 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.

5.15.3 Cumulative Impacts

The CESF and other projects in the vicinity are not expected to result in significant cumulative impacts to environmental resource areas, including, but not limited to, air quality, land use, cultural resources, water resources, or traffic during the construction or operation phases. All existing and proposed projects can be characterized primarily as residential development (i.e., new single-family dwellings and mobile homes). Of the 41 projects with permit applications submitted since January 2000, only 6 projects proposed new residential construction (i.e., single-family dwellings). The remaining 35 projects include minor construction projects such as manufactured and mobile home permits, mobile home foundations, carport additions, roof replacements, deck additions, and residential renovations. Further, some of the listed projects have permits that have expired since their issuance and thus, can be dismissed from this cumulative impact analysis.

The closest permitted project is located approximately 0.5-mile to the west of the CESF site and includes the addition of a mobile home. In addition, all permitted projects within 2.0-miles of the CESF site include manufactured and mobile home permits and/or mobile home foundations. All other proposed projects are located over 2.0-miles from the Project site. Thus, as mentioned above, no significant cumulative impacts have been identified as a result of the construction, operation, maintenance, or long-term presence of the CESF and other projects in the area. For further discussion of cumulative impacts, see Section 5.18, Cumulative Impacts.

5.15.4 Mitigation Measures

The proposed conditions of certification described below provide appropriate mitigation and compliance conditions that ensure that the CESF utilizes hazardous materials in compliance with all applicable LORS, in a manner that ensures no significant environmental impacts.

5.15.4.1 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 material, 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 CESF 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.
- Catch pans 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.

HAZMAT-2: 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.

HAZMAT-3: Emergency telephone numbers will be available onsite for the fire department, police, local hospitals, ambulance service(s), and environmental regulatory agencies.

HAZMAT-4: 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.

5.15.4.2 Operational Phase

A listing of anticipated hazardous materials to be used onsite can be found in Table 5.15-2 and are detailed below.

5.15.4.3 General Mitigation Measures

HAZMAT-5: Hazardous Materials Storage. Hazardous materials storage will typically consist of storage of oil within equipment, aboveground storage tanks, 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, e.g., the Uniform Fire Code (UFC).
- 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.
- 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: Personnel Training and Equipment. Personnel working with hazardous materials will be trained in proper handling and emergency response to chemical spills or accidental releases. Additionally, designated personnel will be trained as a facility 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-7: 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 health & 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.

HAZMAT-8: Spill Response Procedures. The following describes the general spill response procedures for the CESF. 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.

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 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 (CESF), date of start of accumulation, name of the spilled material, and hazardous waste identification language from California Code of Regulations (CCR) 22 66262.32, and the established Department of Transportation (DOT) shipping name, as needed.

Collected waste will 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.

5.15.5 LORS Compliance

Construction and operation of the proposed Project will be in accordance with all applicable LORS pertaining to hazardous materials. 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. Federal, state, and local LORS applicable to hazardous materials handling are summarized in Table 5.15-3 and discussed briefly below.

5.15.5.1 Federal

The Superfund Amendments and Reauthorization Act (SARA) of 1968 Title III (Sections 302, 304, 311, and 313) and regulations pursuant to the Clean Air Act (CAA) of 1990 (40 Code of Federal Regulation (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 (CHSC) Section 25531, *et seq*. The proposed Project will comply with these requirements as discussed below in Section 5.15.5.2.

The Risk Management Program under 40 CFR Part 68 requires the preparation of a Risk Management Plan (RMP) if certain listed toxic or flammable substances are used in excess of the listed threshold quantity. The RMP addresses in detail the emergency prevention implemented at the facility and the response action planned by the facility in the event of a hazardous material release. California has developed its own program (California Accidental Release Prevention Program) that generally mirrors the federal program as discussed below.

The Spill Prevention Control and Countermeasures (SPCC) regulations codified under 40 CFR Part 112 place restriction on the management of petroleum products.

Title 49, CFR, Parts 171-177, govern the transportation of hazardous materials, the types of materials defined as hazardous, and the marking of the transportation vehicles.

5.15.5.2 State

The CHSC Section 25500, requires companies that handle hazardous materials in sufficient quantities to develop an 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, and an emergency response plan that identifies the business representative able to assist emergency personnel in the event of a release of hazardous materials.

An HMBP will be developed prior to construction and operation of the proposed Project.

The CHSC, Section 25531, directs facility owners storing or handling acutely hazardous materials in reportable quantities to develop a Risk Management Plan (RMP) and submit it to appropriate local authorities, U.S. 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 recently developed program supersedes the California Risk Management and Prevention Plan and is known as the CalARP. The CESF is not required to prepare an RMP as part of the proposed Project.

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 CHSC 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.

5.15.5.3 Local

The designated certified unified program agency for the proposed Project site is the San Luis Obispo County DEHS 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 DEHS will be contacted in the event of a release of hazardous wastes or materials to the environment.

5.15.5.3.1 Industry Standards

The 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 CHSC 25531, *et seq*. However, the UFC does 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.

The 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.

A variety of private and industrial organizations have established internal standards regarding the design and operation of industrial facilities and equipment. These include the American National Standards Institute (ANSI), and the American Society of Mechanical Engineers (ASME). Many of these standards have been incorporated into federal and state regulations and into building codes.

The applicable LORS related to hazardous materials handling are summarized in Table 5.15-3 below.

Table 5.15-3
Summary of LORS

Jurisdiction	LORS	Requirements	Conformance Section	Administering Agency	Agency Contact
Federal					
	Clean Air Act (40 CFR 68)	Requires an RMP if listed hazardous materials are stored above threshold quantities (TQ).	5.15.5.1	San Luis Obispo County DEHS	Jeff Poel Supervising Environmental Health Specialist (805) 781-5544
	40 CFR 112	Requires Spill Prevention Control and Countermeasures Plan.	5.15.5.1	EPA	SPCC Oil Program (800)-424-9346
	SARA Title III, Section 302	Requires certain planning activities when hazardous materials are present in excess of TQ.	5.15.5.1	San Luis Obispo County DEHS	Jeff Poel Supervising Environmental Health Specialist (805) 781-5544
	SARA Title III, Section 304	Requires notification if there is a release of hazardous materials in excess of TQ.	5.15.5.1	San Luis Obispo County DEHS	Jeff Poel Supervising Environmental Health Specialist (805) 781-5544
	SARA Title III, Section 311	MSDSs to be kept onsite for each hazardous material. Required to be submitted to the Fresno County Fire Department District, Mendota Station 96.	5.15.5.1	San Luis Obispo County DEHS	Jeff Poel Supervising Environmental Health Specialist (805) 781-5544

Table 5.15-3
Summary of LORS
(Continued)

Jurisdiction	LORS	Requirements	Conformance Section	Administering Agency	Agency Contact
	SARA Title III, Section 313	Requires annual reporting of releases of hazardous materials.	5.15.5.1	San Luis Obispo County DEHS	Jeff Poel Supervising Environmental Health Specialist (805) 781-5544
	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.	5.15.5.1, 5.15.5.2	Department of Industrial Relations (DIR) Division of Occupational Safety and Health (DOSH)	Public Information (415) 703-5070 DOSH Consultation Services (800) 963-9424
	U.S. DOT Regulations, 49 CFR 171-177	Governs the transportation of hazardous materials, including the marking of the transportation vehicles.	5.15.5.1	DOT Federal Motor Carrier Safety Administration (FMCSA)	California Division (916) 930-2760
State					
	CHSC Section 25500, *et seq.* (Waters Bill)	Requires preparation of an HMBP if hazardous materials are handled or stored in excess of threshold quantities (TQ).	5.15.5.2	San Luis Obispo County DEHS	Jeff Poel Supervising Environmental Health Specialist (805) 781-5544
	CHSC Section 25531, *et seq.* (La Follette Bill)	Requires registration of the facility with local authorities and preparation of an RMP if hazardous materials stored or handled in excess of TQ.	5.15.5.2	San Luis Obispo County DEHS	Jeff Poel Supervising Environmental Health Specialist (805) 781-5544
	CCR, Title 8, Section 5189	Facility owners are required to implement safety management plans to ensure safe handling of hazardous materials.	5.15.5.2	San Luis Obispo County DEHS	Jeff Poel Supervising Environmental Health Specialist (805) 781-5544
	California Uniform Building Code	Requirements regarding the storage and handling of hazardous materials.	5.15.5.2	San Luis Obispo County Planning and Building Department	(805) 781-5600

Table 5.15-3
Summary of LORS
(Continued)

Jurisdiction	LORS	Requirements	Conformance Section	Administering Agency	Agency Contact
	California Government Code Section 65850.2	Restricts issuance of commercial operating date (COD) until the facility has submitted an RMP.	5.15.5.2	San Luis Obispo County DEHS	Jeff Poel Supervising Environmental Health Specialist (805) 781-5544
Local					
	The San Luis Obispo County DEHS	Requires new/modified businesses to complete a hazardous materials business plan prior to final plan/permit approval.	5.15.5.3	San Luis Obispo County DEHS	Jeff Poel Supervising Environmental Health Specialist (805) 781-5544
Industry Standards					
	UFC (Articles 79 and 80)	Requirements for secondary containment, monitoring, etc., for extremely hazardous materials.	5.15.5.4	CDF/SLOCFD	Fire Chief Matt Jenkins (805) 543-4244
	NFPA	Meet standards necessary to establish a reasonable level of safety and property protection from the hazards created by fire and explosion.	5.17.5.1	California Department of Forestry and Fire Protection (CDF)/San Luis Obispo County Fire Department	Fire Chief Matt Jenkins (805) 543-4244
	American National Standards Institute (ANSI) and American Society of Mechanical Engineers (ASME)	Provide internal standards regarding design and operations of industrial facilities and equipment.	5.17.5.4	N/A	ANSI Headquarters (202) 293-8020 ASME Customer Service (800) 843-2763

5.15.5.4 Agencies and Agency Contacts

There are a number of federal and state agencies that regulate hazardous materials, including the United States Environmental Protection Agency (EPA) 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 CESF site, the local agency is the San Luis Obispo County DEHS as shown in Table 5.15-4.

Table 5.15-4
Agency Contact List for LORS

	Agency	Contact	Address	Telephone
1	San Luis Obispo DEHS	Jeff Poel Supervising Environmental Health Specialist	San Luis Obispo County CUPA 2156 Sierra Way San Luis Obispo, CA 93406	(805) 781-5544
2	CDF/SLOCFD	Matt Jenkins Fire Chief	635 North Santa Rosa Street San Luis Obispo, CA 93401	(805) 543-4244
3	DTSC	Noel Laverty DTSC Duty Officer Clovis Field Office	1515 Tollhouse Road Clovis, CA 93611	(916) 255-3618 (559) 297-3901

5.15.5.5 Permits Required and Permitting Schedule

Environmental permits are not required for hazardous materials handling for the proposed Project. However, the CESF will develop an HMBP prior to construction activities as indicated in Table 5.15-5 below.

Table 5.15-5
Applicable Permits

Responsible Agency	Permit/Approval	Schedule
Federal	No permits required	N/A
State	No permits required	N/A
Local	HMBP	30 days prior to storage of hazardous materials onsite

5.15.6 References

American Governmental Industrial Hygienists, 1997. Chemical Hazard Handbook

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.

NFPA, 1991. Fire Protection Guide on Hazardous Materials.

Uniform Fire Code, 1997. Prepared by the International Fire Code Institute.

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 Carrizo Energy Solar Farm (CESF or Project). 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, nitrogen dioxide (NO_2), sulfur dioxide (SO_2), carbon monoxide (CO), volatile organic compounds (VOC), and particulate matter with an aerodynamic diameter less than 10 microns (PM_{10}) is examined in Section 5.2, Air Quality. A limited number of hazardous materials will be used during normal operations at CESF. These are discussed further in Section 5.15, Hazardous Materials Handling.

The details of the public health analysis are contained in the following sections: Section 5.16.1 describes the local environment surrounding the Project site. Sensitive receptors within a 3-mile radius of the Project site are identified on Figure 5.16-1. Section 5.16.2 discusses the potential public health consequences of the Project. The Project's emissions of toxic air contaminants are discussed, the HRA approach is described, 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 0.061 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) is 0.0002, which is well below the significance criteria of 1.0. Section 5.16.3 discusses the cumulative impact requirements of the California Energy Commission (CEC). Section 5.16.4 discusses mitigation measures to minimize the impacts of the Project's emissions of toxic air contaminants; Section 5.16.5 describes all applicable laws, ordinances, regulations, and standards (LORS) pertaining to the public health aspects of the Project; involved agencies and agency contacts consulted in conducting the HRA; and the permits required and the permitting schedule. Section 5.16.6 lists the references used to conduct the public HRA.

5.16.1 Affected Environment

The proposed CESF site will be a newly constructed solar power plant located west of the town of Simmler and northwest of the town of California Valley in San Luis Obispo County, California. The CESF will encompass approximately 640 acres of fenced area on Section 28 adjacent to California State Route 58 (SR-58)/Carrisa Highway. The CESF will consist of approximately one hundred and ninety-five Compact Linear Fresnel Reflector (CLFR) solar concentrating lines, and associated steam drums, steam turbine generators (STGs), air cooled condensers (ACCs), and infrastructure, producing up to a nominal 177 megawatts (MW) net. The northern portion of Section 33 immediately south of the CESF site will be used as a construction laydown area. The Project location is within a valley between the Temblor and Caliente mountain ranges, near Carrizo Plain National Monument, and 10 miles northwest of Soda Lake. The Carrizo Plain is an approximately 45 mile long by 15 mile wide native grassland of California, and follows the San Andreas Fault. The Project site is generally flat, gently sloping down in elevation to the southeast. Land use within 10 miles of the Project consists of wild grasslands and agricultural and is considered rural.

The CEC defines sensitive receptors as infants and children, the elderly, and the chronically ill, and any other member of the general population who is more susceptible to the effects of the exposure than the population at large. 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. Nearby residences are also included in the sensitive receptor analysis. Figure 5.16-1 shows the sensitive receptors located within 3 miles of the Project; however, the HRA approach treated all receptors as sensitive receptors.

Only two sensitive receptors were identified within 3 miles of the Project, the closest is the Carrisa Plains School located approximately 1,400 feet southeast of the Project and the Carrisa Plains Community Farm Center located approximately 2.7 miles southeast of the Project. The nearest resident is located approximately 400 feet northeast of the northeastern corner of the property line. The nearby residents are shown in Figure 5.16-1.

The San Luis Obispo County Public Health Department and the San Luis Obispo County Air Pollution Control District (SLOCAPCD) were consulted to determine if any health studies related to respiratory illnesses, cancers, or related diseases had been conducted within a 6-mile radius of the CESF Project site. An extensive internet search was also conducted. No such health studies were identified within a 6-mile radius of the CESF.

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. A potentially significant carcinogenic risk is indicated when the predicted maximum cancer risk is greater than 10 in one million if Toxic Best Available Control Technology (T-BACT) is applied or 1 in a million without T-BACT. Non-cancer risk is typically reported as a THI, which is a ratio calculated for each target organ. Specifically, the maximum predicted acute or chronic exposure due to the Project is expressed as a fraction of the corresponding maximum acceptable exposure level for a pollutant. The acceptable exposure level is the level at (or below) which no adverse health effects are expected. Thus, a non-cancer risk is considered significant when a chronic or acute THI above 1.0 is predicted if T-BACT is applied or 0.1 without T-BACT. The above thresholds are defined in SLOCAPCD Rule 219.

5.16.2.1 Public Health Risk Assessment Approach

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 HRA (OEHHA, 2003). 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 three steps by: 1) determining the toxic air containment (TAC) emitted from the Project; 2) calculating the ground level concentrations for each TAC; and 3) characterizing the health risks, based on the TAC emission rates, "unit" ground-level concentrations, and toxicological data.

The only toxic air contaminant emitted from the operations of the Project is diesel particulate from the testing of the emergency firewater pump. Emissions are calculated based on vendor guaranteed PM_{10} emission rates. Diesel particulate only has long-term health risk thresholds, thus only cancer risk and chronic non-cancer THI will be calculated in this HRA. There is no acute non-cancer reference exposure level (REL) for diesel particulate, thus no acute non-cancer THI will be calculated.

Dispersion modeling was performed using the SCREEN3 model to estimate the ground-level concentrations near the Project. The methods used in the dispersion modeling were consistent with the approach described in Section 5.2, Air Quality. The SCREEN3 model was run with the full meteorology option that examines a range of stability classes and wind speeds. The maximum concentration predicted by SCREEN3 occurs at specified distance from the source regardless of direction. The SCREEN3 model was run with a unit emission rate (1 g/s) for the source to calculate the χ/Q "unit" ground-level 1-hour concentration in $(\mu g/m^3)/(g/s)$. The 1-hour χ/Q concentration was converted to an annual concentration by multiplying it by 0.08, per the United States (U.S.) Environmental Protection Agency (EPA) Screening Procedures (EPA, 1992). This annual χ/Q concentration was then multiplied by the annual emission rate in g/s from the firewater pump to get the annual ground level particulate concentration. Diesel particulate only has health risk factors for cancer and chronic non-cancer risks, thus only annual ground-level particulate concentrations need to be calculated.

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 an Excel spreadsheet to estimate cancer and non-cancer chronic health risks for the Project. The chronic non-cancer risk is calculated by dividing the annual ground level particulate concentration by the diesel particulate matter chronic reference exposure level (REL) from OEHHA. The cancer risk is calculated by estimating the inhalation dose (mg/kg-day) from the annual ground level particulate concentration, and then multiplied by the diesel particulate inhalation cancer potency factor from OEHHA. For the calculation of cancer risk, the duration of exposure to Project's emissions was assumed to be 24 hours per day, 365 days per year, for 70 years, at all receptors.

Detailed descriptions of the model input parameters and results of the HRA are presented later in this section and in Appendix R, Public Health and Safety Data.

5.16.2.2 Construction-phase Emissions

Due to the relatively short duration of the Project's construction phase (i.e., approximately 35 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 only source of TAC emissions is the diesel emergency firewater pump. This firewater pump will normally be operated only for short periods in testing mode to ensure their operability if needed. The PM_{10} emissions were calculated based on a

vendor guaranteed emission factor and are presented in Table 5.16-1. Detailed emissions calculations can be found in Appendix R, Public Health and Safety Data.

Table 5.16-1
Emission Rates from Normal Operation of the Diesel Firewater Pump

Chemical Species	Emission Factor (g/hp-hr)	Maximum Hourly Emission Rate (lb/hr)	Annual Emission Rate (lb/yr)
Diesel particulate	0.14	0.05	1.20

5.16.2.4 Model Input Parameters

The HRA was conducted using worst-case annual emissions from the firewater pump. Stack parameters were obtained from the vendor. Dispersion modeling was performed using the SCREEN3 model with methods consistent with the approach (e.g., building downwash, meteorological data, etc.) described in Section 5.2, Air Quality. The diesel particulate cancer potency factors and chronic REL used in the HRA are 1.1 $(mg/kg\text{-}day)^{-1}$ and 5 ($\mu g/m^3$), respectively.

5.16.2.5 Calculation of Health Effects

Adverse health effects are expressed as cancer or non-cancer 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.

The cancer risk is calculated by estimating the inhalation dose (mg/kg-day) from the annual ground level particulate concentration, and then multiplied by the diesel particulate inhalation cancer potency factor from OEHHA. Inhalation dose is calculated using the following equation:

*Inhalation dose (mg/kg-day) = (Annual concentration ($\mu g/m^3$)) * DBR * A * EF * ED * 10^{-6} / AT*
DBR = daily breathing rate (L/kg-day), used 95th percentile = 393
A = Inhalation absorption factor (fraction of chemical absorbed), default = 1
EF = Exposure frequency (days/year) = 52
ED = Exposure duration (years), default = 70
AT = Averaging time period over which exposure is averaged (days), default = 25,550

Non-cancer 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 in this analysis is calculated for long-term (chronic) exposure only by dividing the annual ground level particulate concentration by the diesel particulate matter chronic REL.

Both the cancer and chronic non-cancer 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. Detailed health risk calculations can be found in Appendix R, Public Health and Safety Data.

5.16.2.6 Health Effects Significance Criteria

Various state and local agencies use different significance criteria for cancer and non-cancer 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}) if T-BACT is applied or 1 in a million without T-BACT. 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 1 if T-BACT is applied or 0.1 without T-BACT. The above thresholds are defined in SLOCAPCD Rule 219.

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 the firewater pump particulate emissions was estimated to be 0.061 in 1 million. The maximum cancer risk was predicted to occur 35 meters from the firewater pump, since the Project property line is approximately 32 meters north of the firewater pump and much greater distances in all other directions, the point of maximum impact would occur on the unpaved road located on the northern boundary of the Project site. Cancer risk was not calculated at any of the sensitive receptors since the risk at the point of maximum impact (PMI) was well below the significance threshold.

Table 5.16-2 presents the results of the HRA for Project operations for cancer and chronic health risks. All model files, along with all air quality modeling files are provided electronically on a CD that is supplied separately with this AFC.

Table 5.16-2
Estimated Cancer Risk and Chronic THI

Cancer Risk at Point of Maximum Impact	Chronic Risk at Point of Maximum Impact
0.061 excess risk in 1 million	0.0002 THI

The estimated cancer risk at all locations is well below both significance criteria of 10 in 1 million for T-BACT or 1 in 1 million without T-BACT. Thus, it is concluded that the Project's emissions from the firewater pump will not pose a significant cancer risk to any populations potentially exposed to these emissions.

5.16.2.8 Estimated Chronic and Acute THI

The maximum chronic THI resulting from the Project's emissions was estimated to be 0.0002. The location of the maximum predicted chronic THI is the same as the location of the maximum cancer risk since these risk calculations were both based on the maximum annual PM_{10} concentration. The chronic THI at any of the sensitive receptors was not calculated since the THI at the PMI was predicted to be well below the significance threshold.

Table 5.16-2 presents the detailed non-cancer results of the HRA for Project operations. The estimated chronic THI is well below the significance criterion of 1 for T-BACT or 0.1 without T-BACT. Thus, it is concluded the Project's emissions from the firewater pump 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 firewater pump annual PM_{10} emission rate was derived using vendor data assuming the anticipated testing schedule at a maximum load for a maximum number of annual operating hours requested in this application. Under actual operating conditions, the firewater pump may operate less and the actual load may be less than 100 percent of capacity. Consequently, the emissions used for this HRA may be higher than those that actually occur.

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 Project 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 from the firewater pump were modeled and an evaluation of their impacts on air quality is presented in Section 5.2, Air Quality. The National Ambient Air Quality Standard (NAAQS) and California Ambient Air Quality Standard (CAAQS) 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 CAAQS or NAAQS. 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. There are no other potential sources of TAC within 6 miles 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, thus no additional cumulative analysis will be conducted.

5.16.4 Mitigation Measures

The criteria pollutant and TAC emissions from the Project's only source, the diesel firewater pump, will be mitigated by the use of best available control technology (BACT). A complete discussion of these measures is included in Section 5.2, Air Quality.

The HRA presented in the foregoing subsections shows that the health effect impacts of the Project as proposed will be well below the significance thresholds identified in Section 5.16.2.6; therefore, no further mitigation of emissions from the Project is required to protect public health.

5.16.5 Laws, Ordinances, Regulations, and Standards (LORS) Compliance

The relevant federal, state, and local LORS that have been established to protect public health are identified in Table 5.16-3. This table also summarizes the agencies that are principally responsible for public health, as well as the general category 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 the next subsection.

Table 5.16-3
Summary of LORS

Authority	Administering Agency	Requirement	Project Compliance
Federal			
Clean Air Act (CAA)	U.S. EPA CARB San Luis Obispo County Air Pollution Control District	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 (Section 5.2, Air Quality).
State			
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.*	San Luis Obispo County Air Pollution Control District 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).
Local			
H&SC, Part 6, § 44300 *et seq.* (Air Toxics Hot Spots)	San Luis Obispo County Air Pollution Control District 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	San Luis Obispo County Air Pollution Control District 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.
San Luis Obispo County Air Pollution Control District Rule 218	San Luis Obispo County Air Pollution Control District	Requires T-BACT installation for major sources of HAPs incorporated in 40CFR63.	The Project will not be a major source of HAPs, as it does not emit any HAPs.
San Luis Obispo County Air Pollution Control District Rule 219	San Luis Obispo County Air Pollution Control District	Requires documentation for Toxics New Source Review, evaluating any potential toxic impacts.	Section 5.2, Air Quality, and the HRA in Section 5.16, Public Health and Safety satisfy these requirements.
San Luis Obispo County Air Pollution Control District Rule 308	San Luis Obispo County Air Pollution Control District	Requires annual fees for the Air Toxic "Hot Spots" (AB2588).	The HRA presented in Section 5.16, Public Health and Safety, gives exemption from State fees.

Table 5.16-3
Summary of LORS
(Continued)

Authority	Administering Agency	Requirement	Project Compliance
San Luis Obispo County Air Pollution Control District Rule 402	San Luis Obispo County Air Pollution Control District	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 (Section 5.16, Public Health and Safety) satisfy this requirement.

5.16.5.1 Agencies and Agency Contacts

Agency contacts regarding the public health assessment of the Project are listed in Table 5.16-4.

Table 5.16-4
Agency Contact List for LORS

	Agency	Contact	Address	Telephone
1	California Energy Commission	Keith Golden	Air Quality Specialist 1516 Ninth Street Sacramento, CA 95814	(916) 654-4287
2	California Air Resources Board	Mike Tollstrup	1001 I Street Sacramento, CA 95814	(916) 322-6026
3	San Luis Obispo County Air Pollution Control District	Gary Willey	3433 Roberto Court San Luis Obispo, CA 93401-7126	(805) 781-5937

5.16.5.2 Permits Required and Permitting Schedule

Under Regulation II, SLOCAPCD regulates the construction, alteration, replacement, and operation of new sources of air pollutants by issuance of Authorities to Construct (ATC) and Permits to Operate (PTO) (see Table 5.16-5). For power plants under the siting jurisdiction of the CEC, the SLOCAPCD issues a Determination of Compliance (DOC) in lieu of an ATC. The DOC is incorporated into the CEC license. When the proposed Project commences operation and demonstrates compliance with the DOC, SLOCAPCD will issue a PTO. The PTO specifies conditions that the air pollution source must comply with other air quality standards and will incorporate applicable DOC requirements. The final DOC should be issued within 6 months after receipt of a complete application.

Table 5.16-5
Applicable Permits

Responsible Agency	Permit/Approval	Schedule
San Luis Obispo County Air Pollution Control District (SLOCAPCD)	Authority to Construct/Permit to Operate	Application to be filed concurrent with AFC filing. 180-day application review period will be requested.

5.16.6 References

California Environmental Protection Agency (Cal/EPA) & Office of Environmental Health Hazard Assessment (OEHHA), 2003. Air Toxics Hot Spots Program Risk Assessment Guidelines - The Air Toxics Hot Spots Program Guidance Manual for EPA Preparation of Health Risk Assessments.

California Environmental Protection Agency (Cal/EPA) & Office of Environmental Health Hazard Assessment (OEHHA), 2003. Air Toxics Hot Spots Risk Assessment Guidelines, Part II: Technical Support Document for the Determination of Non-cancer Chronic Reference Exposure Levels.

California Environmental Protection Agency (Cal/EPA) & Office of Environmental Health Hazard Assessment (OEHHA), 2005. Air Toxics Hot Spots Risk Assessment Guidelines, Part II: Technical Support Document for Describing Available Cancer Potency Factors.

Office of Environmental Health Hazard Assessment (OEHHA), 2003. Air Toxics Hot Spots Program Risk Assessment Guidelines, August 2003.

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

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 Carrizo Energy Solar Farm (CESF or Project) 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), 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. 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 CESF includes the construction and operation of a central solar thermal power generating facility and its ancillary systems and will consist of approximately one hundred ninety-five Compact Linear Fresnel Reflector (CLFR) solar concentrating lines, and associated steam drums, steam turbine generators (STGs), air cooled condensers, and infrastructure, producing up to a nominal 177 megawatts (MW) net. Maps depicting the physical plant layout are presented in Section 3.0, Facility Description and Location (see Figures 3.1-1 and 3.4-4). Descriptions of the facility fire protection and safety features are presented in Section 3.0, Facility Description and Location, specifically in Sections 3.4.9 and 3.5.2 and Table 3.4.9. Descriptions of hazardous material and wastes to be used and stored on the CESF site are discussed in Section 5.14, Waste Management, and Section 5.15, Hazardous Materials Handling.

5.17.2 Environmental Consequences

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 throughout 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 Project site.

Table 5.17-1
Potential Worker Hazards During
Facility Construction and Operation

Activity	Potential Hazard
Facility Construction	
Elevated work	Slips/trips/falls.
Welding (Hot Work)	Flash burns, explosion, thermal burns, toxic welding fumes, eye injury from exposure to ultraviolet, and infrared radiation.
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.
Motor Vehicle and Heavy Equipment Use	Collisions between equipment, injury to operators and construction workers, and damage to construction and operation equipment.
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, and slips/trips/falls.
Powered hand tools	Noise, dust, flying particles, cuts, amputation, crushing.
Lifting heavy objects	Injury from improper lifting or carrying
Fueling/Working with Flammable and Combustible Liquids	Fire, explosion, environmental contamination.
Facility Operations	
Generation enclosure	High voltage.
Electrical equipment operation	Contact with hazardous energy sources (heat sources, electrical tools, and mechanical equipment).
Operations building	High voltage, noise exposure, repetitive trauma.
Transformer station	Electrocution, flash burns.
Lifting heavy objects	Injury from improper lifting or carrying
Fueling/Working with Flammable and Combustible Liquids	Fire, explosion, environmental contamination.
Motor Vehicle and Heavy Equipment Use	Collisions between equipment, injury to operators and construction workers, and damage to construction and operation equipment.
Chemical storage	Chemical splashes, burns, reactions, gases, vapors, fumes.
Machinery, general	Noise, temperature extremes, rotating equipment, electrocution.

5.17.2.1 Construction Health & Safety Program (CHSP)

To protect the health and safety of workers during construction, the Applicant (or construction contractor) will ensure compliance with the CHSP, and all federal, state, and local health standards that pertain to worker health and safety.

5.17.2.1.1 Construction Injury and Illness Prevention Program (IIPP)

The CHSP will meet the Cal-OSHA 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.
- A 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 required to work near known job site hazards, they will be instructed in the recognition of job site hazards, the procedures for protecting themselves from injury, and the first aid procedures in the event of injury.

5.17.2.1.2 Construction Written Health and 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
- Lockout/Tagout 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

5.17.2.1.3 Construction Personal Protective Equipment (PPE) Program

Employees will be required to use the required PPE during construction activities. Required PPE will be approved for use and distinctly marked to facilitate identification and 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.	Splash proof goggles and face shield.
	Welding - injurious light rays.	Welding hood with appropriate eye filter lenses.
Head/Ears	General wear, overhead rigging, material handling, maintenance, and general construction processes.	Hardhat.
	High noise level.	Earplugs 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.	Airline 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.
	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.

5.17.2.1.4 Fire Protection and Prevention Plan

The CESF 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 CESF site are described in Section 3.0, Facility Description and Location (see Section 3.4.9). 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)
- UFC Standards
- California Building Code Title 24, CCR (24 CCR Section 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 applicable regulations. 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 firefighting 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. Authorized storage areas and containers for flammable materials shall be used with adequate fire control services.

5.17.2.2 Plant Operational Safety

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.

5.17.2.2.1 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.
- 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.
- All operations personnel are provided with written safety guidance.

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.

Table 5.17-3
Location of Potential Worker Hazards at the CESF (Operational Phase)

Location	Flammable Material	Hazardous Material	High Voltage	Noise	Pressure Vessel	Pressurized Cylinders	Rotating Equipment	High Temperature
Control room			X					
Maintenance shop/Warehouse	X	X		X			X	
Turbine	X	X		X	X			
Switchyards		X	X					
Stacks						X		
De-areator								X
Solar array				X			X	X

5.17.2.2.1.1 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.

5.17.2.2.2 Operations Safety Training Programs

All CESF 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.
- 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 CESF 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 CESF 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.

5.17.2.2.3 Operations PPE 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 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 CESF.

5.17.2.2.4 Hazardous Materials Handling and Storage

Various hazardous materials will be stored and used during construction and operation of the CESF. The storage, handling, and use of all hazardous materials 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.

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. The 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 CESF 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 CESF Emergency Action Plan.

5.17.2.2.5 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 CESF will develop a site-specific Emergency Action Plan/Emergency Response Plan. A typical plan outline is provided in Table 5.17-4, Sample Emergency Action/Emergency Response Plan Outline. 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.

Table 5.17-4
Sample Emergency 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
	Facility Manager
	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

Table 5.17-4
Sample Emergency Action/Emergency Response Plan Outline
(Continued)

Section Number	Description
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
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

5.17.2.2.5.1 Fire Protection and Prevention Plan

Fire protection at the CESF 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 Protection and Prevention Plan provides for fire protection practices including routine inspections of the CESF plant by the designated safety representative. It requires prompt action to correct situations deemed to be a fire hazard and 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.
- System and equipment maintenance.
- Monthly inspections.
- Annual inspections.
- Firefighting demonstrations.
- Housekeeping practices.
- Training.

5.17.2.2.5.2 Fire Suppression

The fire protection system will be designed to protect personnel, limit property loss, and reduce plant downtime in the event of a fire. The fire protection system is summarized in Section 3.0, Facility Description and Location, Table 3.4-9. The complete fire protection system includes automatic detection and suppression systems installed in the steam turbine enclosures, automatic suppression systems installed for the control room, warehouse, etc. Transformer protection will be provided by separation and firewalls.

A fire water system is a packaged design system, which includes pumps (diesel and electric and electric jockey pump), distribution loop. The firewater system will be supplied with a dedicated 300,000 gallon

supply from the 450,000-gallon raw water/fire water tank. Raw water is supplied to the water treatment unit by an elevated nozzle to ensure adequate fire protection capacity is maintained.

Fire detection throughout the plant and in buildings will be interconnected to a fire detection panel located in the control room.

The plant administrative building and other buildings will be equipped with portable fire extinguishers as required by the California Department of Forestry and Fire Protection (CDF)/San Luis Obispo County Fire (SLOCFD).

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 CESF onsite fire suppression systems will be backed up by fire suppression support from the CDF/SLOCFD. Both fire and emergency service will be provided from the Simmler Fire Station 42, located at 13080 Soda Lake Road, California Valley, California, 93453, with an estimated response time of l0 minutes. Firewater will be supplied from the firewater distribution system as described in Section 3.0, Facility Description and Location (see Section 3.5.2.2).

5.17.3 Cumulative Impacts

As the various projects in the cumulative impact evaluation will be responsible for complying individually with applicable worker safety requirements, no cumulative impacts on worker safety are expected as a result of the CESF.

5.17.4 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 impacts worker safety.

5.17.5 LORS Compliance

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.

5.17.5.1 Federal

5.17.5.1.1 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 PPE.

Under the Operational Status Agreement of October 5, 1989, between the federal 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).

5.17.5.1.2 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).

5.17.5.1.3 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 CDF/SLOCFD.

5.17.5.1.4 National Fire Protection Association

The 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 CDF/SLOCFD.

5.17.5.1.5 Compliance

CESF will comply with all federal LORS by developing appropriate plans and policies as well as by measures described in Sections 5.17.2 and 5.17.3.

5.17.5.2 State

5.17.5.2.1 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. CESF will comply with applicable sections of 8 CCR, Chapter 4, Subchapter 7, and 24 CCR. Topics of concern are provided in 8 CCR §1509 (Construction) and §3203 (General Industry). These regulations make numerous changes designed to redirect the emphasis of Cal-OSHA toward 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. Although such requirements primarily provide for the protection of workers, they also indirectly improve public safety and are coordinated with the risk management plan process.

5.17.5.2.2 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 newly developed program supersedes the California Risk Management and Prevention Plan and is known as the California Accidental Release Program.

5.17.5.2.3 Compliance

The CESF will comply with all state LORS by developing appropriate plans and policies as well as by measures described in Section 5.17.2 and Section 5.17.3.

5.17.5.3 Local

5.17.5.3.1 San Luis Obispo County, Department of Environmental Health

The San Luis Obispo County, Department of Environmental Health, provides for the implementation of the HMBP.

5.17.5.3.2 Compliance

The CESF will comply with all local LORS and will develop an HMBP for construction and operation of the new facility. In addition, the CESF will continue compliance by updating the appropriate plans and policies as well as by the measures described in Section 5.17.2 and Section 5.17.3.

5.17.5.4 Industry Standards

A variety of private and industrial organizations have established internal standards regarding the design and operation of industrial facilities and equipment. These include the American National Standards Institute (ANSI), and the American Society of Mechanical Engineers (ASME). Many of these standards have been incorporated into federal and state regulations and into building codes.

Table 5.17-5
Summary of LORS

Jurisdiction	LORS	Requirements	Conformance Section	Administering Agency	Agency Contact
Federal					
	Occupational Health & Safety Act of 1970 (OSHA), 29 USC 651 *et seq.*; 29 CFR 1910 *et seq.*; and 29 CFR 1926 *et seq.*	Created OSHA, and provides federal regulations for worker safety. Meet employee health and safety standards for general industrial industry and the construction industry.	5.17.5.1	Department of Industrial Relations (DIR) Division of Occupational Safety and Health	Public Information (415) 703-5070 DOSH Consultation Services (800) 963-9424
	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.	5.17.5.1	Department of Industrial Relations (DIR) Division of Occupational Safety and Health (DOSH)	Public Information (415) 703-5070 DOSH Consultation Services (800) 963-9424
	Uniform Fire Code, Article 80	Addresses prevention, control and mitigation of dangerous conditions related to storage, dispensing, uses, and handling of various hazardous materials. Also identifies information needed by emergency response personnel.	5.17.5.1	California Department of Forestry and Fire Protection (CDF)/San Luis Obispo County Fire Department	Fire Chief Matt Jenkins (805) 543-4244

Table 5.17-5
Summary of LORS
(Continued)

Jurisdiction	LORS	Requirements	Conformance Section	Administering Agency	Agency Contact
	National Fire Protection Association	Meet standards necessary to establish a reasonable level of safety and property protection from the hazards created by fire and explosion.	5.17.5.1	California Department of Forestry and Fire Protection (CDF)/San Luis Obispo County Fire Department	Fire Chief Matt Jenkins (805) 543-4244
State					
	California Occupational Safety and Health Act 1970 California Code of Regulations, Title 8	Establishes minimum safety and health standards for workers. Meet requirements for a safe and hazard-free working environment. Categories of requirements include General Industry Safety Orders, General Construction Safety Orders, and Electrical Safety Orders.	5.17.5.2	Department of Industrial Relations (DIR) Division of Occupational Safety and Health	Public Information (415) 703-5070 DOSH Consultation Services (800) 963-9424
	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	San Luis Obispo County Air Pollution Control District	General Information (805) 781-5912
	California Public Resources §25523(a); 20 CCR §1752, 1752.5, 2300.2309, and Division 2, Chapter 5, Article 1, Appendix B, Part (I), CEC	Protect environmental quality and assure public health.	5.17.4.2	San Luis Obispo Planning and Building Department	(805) 781-5600
	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.	5.17.5.2	San Luis Obispo County Air Pollution Control District	General Information (805) 781-5912

Table 5.17-5
Summary of LORS
(Continued)

Jurisdiction	LORS	Requirements	Conformance Section	Administering Agency	Agency Contact
Local					
	San Luis Obispo County Zoning Ordinance	Provide safety setbacks as required by the SLOCFD.	5.17.5.3	San Luis Obispo Planning and Building Department	(805) 781-5600
	San Luis Obispo County DEHS Municipal Codes	Provide implementation of the Hazardous Materials Business Plan and Risk Management Plan.	5.17.5.3	San Luis Obispo County DEHS	Jeff Poel Supervising Environmental Health Specialist (805) 781-5544
Industry Standards					
	American National Standards Institute (ANSI) and American Society of Mechanical Engineers (ASME)	Provide internal standards regarding design and operations of industrial facilities and equipment.	5.17.5.4	N/A	ANSI Headquarters (202) 293-8020 ASME Customer Service (800) 843-2763

5.17.5.5 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 Contact List for LORS

	Agency	Contact	Address	Telephone
1	San Luis Obispo County DEHS	Jeff Poel Supervising Environmental Health Specialist	San Luis Obispo County CUPA 2156 Sierra Way San Luis Obispo, CA 93406	(805) 781-5544
2	CDF/San Luis Obispo County Fire Department	Matt Jenkins Fire Chief	635 North Santa Rosa Street San Luis Obispo, CA 93401	(805) 543-4244
3	California Occupational and Safety Administration (Cal-OSHA)	Consultation Services Compliance Division	464 West 4th Street, Room 339 San Bernardino, CA 92408	(909) 383-4567 (909) 383-4321

5.17.5.6 Permits Required and Permitting Schedule

The permits required for this Project are listed in Table 5.17-7. An HMBP will be developed prior to construction and will be updated prior to operation.

Table 5.17-7
Applicable Permits

Responsible Agency	Permit/Approval	Schedule
Federal	None required	N/A
State	None required	N/A
Local	Hazardous Materials Business Plan	30 days prior to storage of hazardous materials onsite

5.17.6 References

American Conference of Governmental Industrial Hygienists, 1996. Threshold Limit Values (TLV) for Chemical Substances and Physical Agents and Biological Exposure Indices.

California Code of Regulations, ND. Title 8. "General Industry Safety Orders, Construction Safety Orders, and High Voltage Electrical Safety Orders, and Pressure Vessel Safety Orders."

Code of Federal Regulations, ND. Title 29 Part 1910. "Construction Safety Orders."

Code of Federal Regulations, 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 Safety Council, 1992. Accident Prevention Manual. Volume 2, Chapter 6, Fire Protection. pp. 1324-1386.

5.18 CUMULATIVE IMPACTS

The cumulative impacts assessment for the proposed Project 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.

The purpose of this section of the Application for Certification (AFC) is to identify past, present, and reasonably foreseeable actions in the Carrizo Energy Solar Farm (CESF or Project) project area that could affect the same resources as the CESF Project, and provide the following analysis:

- Determine if the impacts of the CESF and the other actions would overlap in time or geographic extent.
- Determine if the impacts of the CESF would interact with, or intensify, the impacts of the other actions.
- Identify any potentially significant cumulative impacts.

Where potentially significant impacts have been identified, an assessment of cumulative impacts is provided in the respective resource section(s) of this AFC.

The Project will consist of approximately one hundred and ninety-five Compact Linear Fresnel Reflector (CLFR) solar concentrating lines, and associated steam drums, steam turbine generators (STGs), air cooled condensers (ACCs), and infrastructure, producing up to a nominal 177 megawatts (MW) net. The construction laydown area will be approximately 380 acres adjacent to the Project site and will contain ancillary support facilities including restrooms, storage areas, administration buildings, a fueling station, staging area, assembly area, and parking.

5.18.1 Affected Environment

The proposed CESF, owned and operated by Ausra CA II, LLC (dba Carrizo Energy, LLC), will be located in an unincorporated area in San Luis Obispo County, California. The proposed Project is located on a 640-acre site, approximately 52 miles east of San Luis Obispo along the eastern boundary of San Luis Obispo County. Roadway access to the site will be from California State Route 58 (SR-58)/Carrisa Highway, which borders the southern edge of the Project site. According to the Countywide Rural Land Use Categorization and Combining Design Map, the site and surrounding land uses within a 5-mile radius are designated as agricultural.

Projects that will potentially contribute to cumulative impacts are those located in the same general geographic area of influence as the CESF Project. For this cumulative assessment, the area of influence is

defined as the area within a 5-mile radius of the solar power plant. Projects or proposed projects of potential regional significance are also considered in the cumulative analysis.

San Luis Obispo County provided a list of all permit applications with an application date of January 1, 2000 to current date (July 17, 2007) within five miles of the CESF site that includes the following parcels: 072-091-001, 072-091-010, 072-101-007, 072-101-008, 072-101-010, 072-101-011, and 072-101-023. Table 5.18-1 lists each permit application submitted to San Luis Obispo County and outlines specific project details including parcel number, case/permit number, site address, proposed project, acreage, and application date.

5.18.2 Environmental Consequences

Since January 2000, 41 projects with permits or permit applications have been identified within a 5-mile radius of the Project area (see Figure 5.18-1 and Table 5.18-1); however, no projects were identified within the CESF Project site or within the construction laydown area. The Project site is located on the far eastern side of San Luis Obispo County, and is predominantly surrounded by agricultural land uses. The 5-mile radius is located entirely within the County of San Luis Obispo. The nearest small-unincorporated communities to the Project are California Valley and Simmler. The list of permits indicates that no major residential or commercial projects have been constructed, or are in the process of being constructed, within a five-mile radius of the Project site.

Potential cumulative impacts were identified if the CESF 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 CESF Project will begin in the first quarter of 2009. This assessment also considers potential cumulative impacts that could occur during the operational phase of the CESF Project.

Table 5.18-1
Potential Cumulative Projects Considered

#	Parcel	Case/Permit	Site Address	Description of Proposed Development	Acreage	Application Date
1	071-161-033	PMT2003-02268	07645 Cattle Drive Shandon Rural	Single-Family Dwelling with Attached Garage and Grading	162.61	1/22/2004
2	072-061-030	PMT2005-00556	093330 Carrisa HY Carrizo Rural	Mobile Home	41.46	8/17/2005
3	072-131-001	PMT2005-02703	09685 Carrisa HY Carrizo Rural	Mobile Home Removal/Replacement	662.21	3/13/2006
4	072-141-021	PMT2003-03853	12906 Soda Lake Road California Valley	Re-Roof	3.89	6/15/2004
5	072-141-025	C8213	09765 Carrisa HY Carrizo Rural	Demo Single-family Dwelling-Mobile Home Replacement	150.04	8/22/2002

Table 5.18-1
Potential Cumulative Projects Considered
(Continued)

#	Parcel	Case/Permit	Site Address	Description of Proposed Development	Acreage	Application Date
6	072-201-016	PMT2007-00200	13642 Branch Mountain Road California Valley	Mobile Home as Secondary Primary Dwelling/Patio	29.64	7/26/2007
7	072-301-003	PMT2002-11973	8730 Carissa HY Shandon Rural	Mobile Home	111.29	10/9/2001
8	072-301-004	PMT2002-11973	8730 Carissa HY Shandon Rural	Mobile Home	129.28	10/9/2001
9	072-301-005	PMT2003-00524	08990 Carrisa HY Shandon Rural	Expired – Mobile Home	136.47	8/13/2003
10	072-301-007	PMT2002-27779	08360 Carrisa HY Shandon Rural	Mobile Home – Second Primary As Built	40.86	3/7/2000
11	072-301-010	PMT2003-00361	08550 Carrisa HY Shandon Rural	Manufacture Home	46.33	8/5/2003
12	072-301-012	PMT2003-03667	08770 Carissa HY Shandon Rural	Replacement Single-Family Dwelling for Mobile Home	42.42	5/27/2004
13	072-301-014	C2549	08920 Carrisa HY Shandon Rural	Mobile Home	40.32	1/12/2001
14	072-311-004	PMT2005-02263	11051 Bitterwater Road Shandon Rural	Mobile Home	46.03	1/30/2006
15	072-311-005	PMT2003-02851	11111 Bitterwater Road Shandon Rural	Mobile Home	42.1	3/16/2004
16	072-311-008	PMT2002-10942	07575 Carrisa HY Carrizo Rural	Single-Family Dwelling	108.14	4/27/2001
17	072-311-010	C5624	07755 Carrisa HY Carrizo Rural	Single-Family Dwelling	56.01	10/16/2001
18	072-311-015	C3329	08155 Carrisa HY Shandon Rural	Single Wide Mobile Home with Foundation	40.57	12/28/2000
19	072-311-017	C6663	07575 Carrisa HY Carrizo Rural	Single-Family Dwelling	0.28	4/27/2001
20	082-061-007	PMT2002-13061	11440 Cloverdalr TR California Valley	Mobile Home	3.04	7/12/2002
21	082-061-028	C7898	12625 Deep Springs Road California Valley	Demos As Built Carport and Barn	2.53	9/19/2002
22	082-071-030	PMT2006-00653	11090 Deleker TL California Valley	Install New Manufactured Home/Used Mobile Home	2.52	9/12/2006
23	082-081-032	PMT2005-00289	13250 Delevan TR California Valley	Mobile Home	2.54	7/31/2006
24	082-111-025	PMT2005-01821	13470 Desabla California Valley	Mobile Home	2.4	12/12/2005
25	082-131-004	PMT2004-00246	11110 Belmont TL California Valley	Mobile Home	2.68	7/20/2004

#	Parcel	Case/Permit	Site Address	Description of Proposed Development	Acreage	Application Date
26	082-211-034	PMT2005-02273	13690 Grant Road California Valley	Mobile Home	2.67	1/31/2006
27	082-211-057	PMT2004-00987	13790 Glassrock Road California Valley	Mobile Home Pre 1976	2.62	9/24/2004
28	082-211-060	PMT2004-01952	13785 Grassland Road California Valley	Mobile Home Pre 1976	2.54	1/6/2005
29	082-221-008	C5931	10760 Greybrair TR California Valley	Mobile Home	2.59	1/17/2002
30	082-221-054	PMT2002-15477	10675 Granite TL California Valley	Mobile Home	2.48	4/28/2003
31	082-221-054	PMT200229472	11445 del Loma TR California Valley	Mobile Home	4.89	6/23/2003
32	082-222-009	C4066	10815 Glade Road California Valley	Patio Cover	2.47	8/7/2001
33	082-271-012	PMT2002-13876	13555 Branch Mountain Road California Valley	Mobile Home	2.38	12/9/2002
34	082-271-015	PMT2003-03747	13595 Gem Road California Valley	Mobile Home	2.46	6/4/2004
35	082-271-026	PMT2005-03716	13631 Branch Mountain Road California Valley	Mobile Home	2.67	6/22/2006
36	082-281-018	PMT2003-02874	13855 Garnet Road California Valley	Manufactured Home	2.46	3/18/2004
37	082-281-021	PMT2003-03368	13820 Georgia Road California Valley	Mobile Home	2.45	4/30/2004
38	082-281-052	PMT2005-00774	13915 Gleason Road California Valley	Mobile Home	2.45	9/6/2005
39	082-291-008	PMT2004-02203	10280 Belmont California Valley	Mobile Home	2.63	2/2/2005
40	082-291-079	PMT2006-02902	10075 Greybriar TL California Valley	Single-Family Dwelling with Attached Garage and Temporary Trailer/Mobile Home	2.62	5/14/2007
41	083-341-019	PMT2003-00493	12595 Compton Road California Valley	Expired – Manufactured Home	2.51	8/12/2003

5.18.3 Cumulative Impacts

The CESF and other projects listed in Table 5.18-1 are not expected to result in significant cumulative impacts to environmental resource areas, including, but not limited to, air quality, land use, cultural resources, water resources, or traffic during the construction or operation phases. As shown in Figure 5.18-1, all existing and proposed projects can be characterized primarily as residential development (i.e., new single-family dwellings and mobile homes). Of the 41 projects with permit applications submitted since January 2000, only 6 projects proposed new residential construction (i.e., single-family dwellings).

The remaining 35 projects include minor construction projects such as manufactured and mobile home permits, mobile home foundations, carport additions, roof replacements, deck additions, and residential renovations. Further, some of the listed projects have permits that have expired since their issuance and thus, can be dismissed from this cumulative impact analysis.

The closest permitted project is located approximately 0.5-mile to the west of the CESF site and includes the addition of a mobile home. In addition, all permitted projects within 2.0-miles of the CESF site include manufactured and mobile home permits and/or mobile home foundations. All other proposed projects are located over 2.0-miles from the Project site. Thus, as mentioned above, no significant cumulative impacts have been identified as a result of the construction, operation, maintenance, or long-term presence of the CESF and other projects in the area.

5.18.4 Mitigation Measures

No mitigation measures are proposed.

5.18.5 LORS Compliance

In accordance with the siting regulations §1748(c) provided in Public Resources Code §25525, Appendix B, Section (h), proposed projects being evaluated to determine impacts and mitigations also require compliance with a list of standards known as laws, ordinances, regulations and standards (LORS).

As shown in Table 5.18-2, no LORS apply to the issue area of cumulative impacts.

Table 5.18-2
Summary of LORS

Jurisdiction	LORS	Requirements	Conformance Section	Administering Agency	Agency Contact
Federal	No Federal LORS apply	N/A	N/A	N/A	N/A
State	No State LORS apply	N/A	N/A	N/A	N/A
Local	No Local LORS apply	N/A	N/A	N/A	N/A

5.18.5.1 Agencies and Agency Contacts

Agency contacts are provided in Table 5.18-3.

Table 5.18-3
Agency Contact List

	Agency	Contact	Address	Telephone
1	San Luis Obispo County	Steven Griffith	Department of Planning and Building 976 Osos Street, Room 300 San Luis Obispo, CA 93408	(805) 788-2777

5.18.5.2 Agencies and Agency Contacts

As shown in Table 5.18-4, no permits are required.

Table 5.18-4
Applicable Permits

Responsible Agency	Permit/Approval	Schedule
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A

5.18.6 References

No other references were used other than those listed in Table 5.18-3 as agency contacts. Personal communication with San Luis Obispo County occurred between July 3 and August 1, 2007.

SECTION 6 FINANCIAL INFORMATION

Ausra CA II, LLC (dba Carrizo Energy, LLC), a Delaware limited liability company, is a private enterprise whose sole purpose is to develop, construct, own, and operate the solar thermal power generation project and supply the electrical output to a major California utility under a 20-year power purchase agreement. Aside from this agreement and other supporting project agreements (e.g., interconnection, security deposits, etc.), the utility and Carrizo Energy, LLC have no financial relationship, asset ownership, or otherwise. All financial risks associated with the construction and operation of the Carrizo Energy Solar Farm (CESF or Project) will rest on Carrizo Energy, LLC and its engineering, procurement, and construction (EPC) contractor. The total capital cost of the CESF is estimated to be $500 million.

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SECTION 7 LIST OF PREPARERS

This Application for Certification (AFC) to the California Energy Commission (CEC) for the Carrizo Energy Solar Farm (CESF or Project) was prepared by numerous contributors including the following key contributors shown on Table 7-1.

Table 7-1
Consultant Participant Contacts

Responsibility	Name	Company/Affiliation
Chief Development Officer	Robert Morgan	Ausra, Inc.
Vice President, Projects	Perry Fontana	Ausra, Inc.
Development Manager	Sohier Dane	Ausra, Inc.
Development Manager	Sarah Temple	Ausra, Inc.
Counsel	Jane Luckhardt	Downey Brand
Project Engineer	Joe Patch	Patch Services, LLC
AFC Project Manager	Angela Leiba	URS Corporation
Assistant AFC Project Manager	Kristen Walker	URS Corporation
Air Quality	Anne Runnalls	URS Corporation
Biological Resources	Theresa Miller	URS Corporation
Cumulative Impacts	Elizabeth Nedeff	URS Corporation
Cultural Resources	Reid Farmer	URS Corporation
Geologic Hazards and Resources	Kelly Giesing	URS Corporation
Hazardous Materials Handling	Tricia Winterbauer	URS Corporation
Land Use	Seth Hopkins	URS Corporation
Noise	Mark Storm	URS Corporation
Public Health and Safety	Anne Runnalls	URS Corporation
Socioeconomics	Seth Hopkins	URS Corporation
Soils	Mike Hatch	URS Corporation
Traffic and Transportation	Noel Casil	URS Corporation
Visual Resources	Amy Gramlich	URS Corporation
Waste Management	Tricia Winterbauer	URS Corporation
Water Resources	Matt Moore	URS Corporation
Worker Safety	Tricia Winterbauer	URS Corporation
Paleontological Resources	Lanny Fisk	PaleoResource Consultants

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