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2.0 PROJECT DESCRIPTION

2.1 INTRODUCTION AND OVERVIEW

The proposed Quail Brush Generation Project (Project) will be a nominal 100-megawatt (MW) intermediate/peaking load electrical generating facility employing a set of eleven (11) natural gas-fired reciprocating engine generators that provide flexibility in meeting the generation needs of San Diego Gas and Electric (SDG&E). The Project has a long-term Power Purchase Tolling Agreement (PPA) with SDG&E as a result of a 2009 Request for Offers (RFO). The Project will support SDG&E's efforts to increase reliance on wind, solar and other renewable energy resources. It will provide peaking and load-shaping power to the grid, along with several ancillary services intended to assure system reliability within the SDG&E service area.

The Project will be located in the City of San Diego, California, west of the City of Santee, south of the Sycamore Landfill and north of State Route 52. The portion of the Project where the power plant (plant) will be constructed is approximately 11 acres and is located within a 21.6-acre privately owned parcel optioned by Development Land Holdings, LLC. The Project company Quail Brush Genco, LLC (Applicant), and Development Land Holdings are wholly owned subsidiaries of Cogentrix Energy, LLC. Additional Project components located beyond the plant site include a 230 kilovolt (kV) generation tie-line (gen tie), utility switchyard, and natural gas pipeline lateral.

The Project will provide unique flexibility to dispatch in increments of 5 to 10 percent of its total capacity, while maintaining high efficiency across the entire load range. In this respect, it compares very favorably to a similarly sized plant consisting of one or two simple-cycle combustion turbines, which would have a much lower turn-down ratio and therefore operate at reduced efficiencies as total plant output is reduced to match demand and output of variable generating resources, such as wind and solar. The high efficiency of the proposed Project across its entire load range, coupled with its fast-starting and fast-ramping design, suggest that the Project will be dispatched with increasing frequency as SDG&E moves to increase its reliance upon renewable generation sources and achieve California's ambitious Renewable Performance Standards (RPS).

In addition, the proposed Project will use very little water since the Wartsila engines use a closed loop cooling system. A demineralizing system will not be required since there is no requirement for purified water. Site water usage will be primarily for fire protection, personal consumption, sanitary purposes, landscape irrigation, and wash-down cleaning. As a result, site consumption will average approximately 1.0 gallon per minute (gpm) or 1.61 acre feet per year (afy). Section 2.3.6 includes additional details about water supply.

The major features associated with the installation of the proposed Project include the following:

- Eleven (11) nominal 9.3 MW (gross) Wartsila model 20V34SG natural gas-fired reciprocating engines;
- Eleven (11) separate state-of-the-art air pollution control systems representing Best Available Control Technology (BACT), one system for each of the 11 reciprocating engines, consisting of a selective catalytic reduction (SCR) unit for oxides of nitrogen (NO_x) control and an oxidation catalyst unit for control of carbon monoxide (CO) and precursor organic compounds (POC);

- Eleven (11) approximately 48-inch diameter x 100-foot tall stacks, each with a separate continuous emissions monitoring system (CEMS);
- Acoustically engineered building enclosing all 11 reciprocating engines;
- Closed loop cooling system consisting of multiple fan-cooled radiator assemblies outside of the engine building;
- One (1) urea storage tank, approximately 20,000 gallons, and a handling system serving the SCR units;
- One (1) 4 million British thermal units per hour (MMBtu/hr) natural gas-fired heater, used for heating of the natural gas fuel to the reciprocating engines;
- One (1) 4 MMBtu/hr natural gas-fired heater, used for heating of the engine cooling water system for 10-minute start capability;
- One (1) engine standby heater;
- One (1) new lube oil tank, approximately 10,000 gallons;
- One (1) used lube oil tank, approximately 10,000 gallons;
- One (1) maintenance service oil tank, approximately 6,000 gallons;
- Two (2) maintenance water tanks, approximately 5,000 gallons each;
- Two (2) bunkered wastewater holding tanks, approximately 3,000 gallons each;
- One (1) fire water tank, approximately 600,000 gallons, and associated fire water system,;
- One (1) diesel fueled fire pump engine, rated at approximately 144 boiler horse power unit (bhp);
- One (1) diesel storage tank, approximately 250 gallons;
- One (1) domestic water storage tank, approximately 10,000 gallons;
- Onsite septic tank and tile field;
- Plant site access road;
- Onsite 230kV facility switchyard including switchgear and the main voltage step-up transformer, switchgear, circuit breakers, and disconnects;
- Approximately 1 mile of 230kV single-circuit gen tie between the Project and the anticipated Point of Interconnection (POI) to the existing San Diego Gas & Electric (SDG&E) Miguel to Mission 230kV transmission line situated west of the plant site;
- New SDG&E 230kV utility switchyard at the POI configured as a line-break of the existing SDG&E 230kV transmission line that will include circuit breakers and disconnects, and an access road;
- Approximately 2,200 feet of 8-inch diameter natural gas pipeline lateral between the Project site and the existing SDG&E 20-inch diameter high pressure natural gas pipeline located across Mast Avenue from the landfill entrance and associated onsite metering station;
- Chain-link security fencing enclosing the facility with a secured entrance on the access road leading from Sycamore Landfill Road to the facility;
- Chain-link security fencing enclosing the utility switchyard at the POI; and

- Temporary construction laydown and parking areas that are proposed to be located on previously disturbed Sycamore Landfill property approximately one-half mile from the plant site (approximately 5 acres is required), subject to the approval of the property owner, Sycamore Landfill, Inc. A truck turnout for equipment unloading/loading will be located along Sycamore Landfill Road adjacent to the plant site. Additional construction personnel parking will be located offsite with shuttle service to the Project site.

The preliminary details for structural design are discussed in design criteria found in Appendices B2 and B7. Summary descriptions of the design criteria are included in the following appendices:

- Appendix B1 – Civil Engineering Design Criteria
- Appendix B2 – Structural Engineering Design Criteria
- Appendix B3 – Mechanical Engineering Design Criteria
- Appendix B4 – Electrical Engineering Design Criteria
- Appendix B5 – Control Engineering Design Criteria
- Appendix B6 – Chemical Engineering Design Criteria
- Appendix B7 – Geologic and Foundation Design Criteria

The proposed Project site is located in the City of San Diego, California on land immediately south and west of the Sycamore Landfill (Figure 2.1-1). The property tax assessor designation for the plant site parcel is APN 366-081-42. The parcel is located in an area currently zoned RS-1-8 (single family residential use). The Applicant is currently seeking a zoning change and community plan amendment to allow for development of the proposed facility. The City of San Diego will be processing the zoning change concurrently with the CEC siting and permitting effort. The proposed Project is located within Township 15 South, Range 1 West, Section 7, Township 15 South, Range 2 West, Section 12, and unsectioned portions of the El Cajon and Mission San Diego Land Grants, within the La Mesa, California, United States Geological Survey (USGS) 7.5-minute topographic quadrangle map. The legal description of the proposed plant site parcel is provided in Appendix A2. A list of current assessor's parcel numbers and owners' names and addresses for all parcels within 1,000 feet of the plant site parcel boundaries or within 500 feet of the Project linear facilities is provided in Appendix A1.

The proposed Project is sited to minimize engineering constraints, site geology, electric transmission constraints, waste and fuel constraints, and environmental impacts, including stabilizing construction disturbance. Figure 2.1-2 provides an aerial photograph of the proposed Project showing the locations of the proposed plant site and other components including the gen tie, utility switchyard, and natural gas pipeline lateral in relationship to the surrounding area. To the immediate south of the Project is SR 52. To the immediate north is the Sycamore Landfill. The City of Santee is located to the east of the Project.

The proposed approximately 5-acre temporary construction laydown and parking area are proposed to be located on previously disturbed Sycamore Landfill property approximately one-half mile from the plant site, subject to the approval of the property owner, Sycamore Landfill, Inc.. Additional construction personnel parking will be located offsite on Mission Gorge Road with shuttle service to construction areas.

The proposed Project will connect to the SDG&E 230kV electric transmission system via the gen tie to the utility switchyard, which is anticipated to be located approximately 1 mile northwest of the plant site. The utility switchyard and the entire run of 230kV gen tie are proposed to be located on property owned by the Sycamore Landfill subject to the approval of the property owner, Sycamore Landfill, Inc. The proposed 230kV gen tie route would run north on property owned by Sycamore Landfill, east of Sycamore Landfill Road for approximately 2,600 feet, then cross the road and run northwest for approximately 2,600 feet to the utility switchyard, subject to the approval of the property owner, Sycamore Landfill, Inc. Additional details on the transmission system are included in Section 2.5.

The proposed Project will connect to the existing 20-inch diameter SDG&E natural gas pipeline that is located 2,200 feet away from the proposed plant site at the intersection of Mast Boulevard and Sycamore Landfill Road within the City of Santee. From the tie-in point, the Project's 8-inch natural gas pipeline lateral will generally follow Sycamore Landfill Road to the proposed plant site. Section 2.3.5 includes additional details about the natural gas fuel supply.

The proposed Project occurs in an area with a mild semi-arid climate; therefore, there are no adverse meteorological or climate conditions that would require special engineering measures. Several engineering investigations and studies have been conducted to support the development of the Project design. Geology and geologic hazards have been evaluated as described in Section 4.16, Geologic Hazards and Resources. A Preliminary Geological/Geotechnical Investigation (Geotechnical Report) for the plant site performed by Petra Geotechnical Inc., is included in Appendix J. A final geotechnical report will be prepared in the first or second quarter of 2012. The resulting report will be provided to the California Energy Commission (CEC) in a future submittal.

The Geotechnical Report deems the Project site to be suitable for the proposed development. The site's existing slope is 16 percent. Approximately 150,000 cubic yards of cut and fill will be required to grade the site. Provided the site grading is performed in accordance with the recommendations of the Geotechnical Report, the use of conventional shallow foundations, rigid mat or structural slab foundations are considered feasible for support of the various structural elements of the facility. Soil conditions have been evaluated as described in Section 4.14, Soil Resources. Based on the results of these engineering investigations and studies there are no adverse site conditions that would require special engineering or pose any unmitigated hazard to the Project. In addition to these engineering investigations, a number of environmental evaluations have been conducted as described in Section 4.0, Environmental Information, and the results of these studies have been considered in the development of the conceptual Project design.

2.2 FACILITY NEED

The Project will help serve the peak demand and transmission reliability needs of SDG&E. The flexibility, efficiency and operational benefits of the Project will assist SDG&E to effectively meet its customers' needs at times of high energy demand and will support the variability of renewable energy sources, such as wind or solar.

The Applicant has entered into a long-term (20-year) Power Purchase Tolling Agreement (PPA) with SDG&E resulting from the utility's 2009 competitive solicitation for new generating resources. The Request for Offers (RFO) sought several types of energy products to support reliability within SDG&E's service territory, supply energy to bundled customers, meet Resource

Adequacy requirements and provide other portfolio needs. The requested energy products in the RFO included peaking facilities (such as the Project), demand-side management, and renewable resource generation. In particular, the RFO sought projects that would be online no later than October 1, 2014, have an annual capacity of at least 30 percent and an availability of at least 98 percent. The RFO also specified that SDG&E was seeking flexible resources that would be capable of providing regulation during the morning and evening ramps and/or units that can be started and shutdown as needed. It also emphasized the importance of quick start operations and black start capability.

The Project is designed to specifically satisfy the needs identified by SDG&E: it is expected to begin delivering electric power in mid-2014 and will provide SDG&E and the San Diego area for more peaking and load-shaping generation for both the short and long term. By necessity, peaking plants must be able to start quickly and adjust load levels easily. In particular, SDG&E needs peaking facilities to support renewable energy generation, including generation from wind, hydroelectric, and solar facilities, that have variable outputs. When the output of the renewable resources decreases, the Project can be dispatched quickly. Conversely, when the output of renewable resources increases, the Project can be ramped down quickly and still operate efficiently with the lower load. The design of the project as consisting of multiple reciprocating engines, as opposed to one or two combustion turbines, provides unique flexibility, while still achieving higher efficiencies across the entire load range. The Project can thus support further integration of renewable resources into SDG&E's generation portfolio, and assist statewide goals calling for increased reliance on renewable energy.

Additionally, the design of the Project will allow it provide several ancillary services necessary for reliability of the grid operated by the California Independent System Operator (CAISO) within SDG&E's service territory. These services include: (1) regulation service (regulation up and regulation down) to allow the CAISO balancing authority area to meet reliability standards set by the North American Electric Reliability Corporation (NERC) and the Western Electricity Coordinating Council (WECC); (2) spinning and non-spinning reserves to help maintain contingency capacity and energy on the grid; and (3) voltage support to help maintain required voltage levels and reactive margins on the grid within NERC and WECC reliability standards. Provision of such services requires the Project to be under the direct control of CAISO's Automatic Generation Control system. The ability of the Project to start quickly, operate efficiently across the entire load range, and provide such ancillary services will help improve system-wide reliability within SDG&E's service territory. These features are all key elements to the Project's overall business objectives.

The Project has a small land requirement of approximately 11 acres and has been purposefully sited near the existing Sycamore Landfill in the northeast corner of the City of San Diego to minimize potential siting impacts and to effectively enable access to existing electric and natural gas transmission systems also at this location.

The Project represents a capital investment of over $150 million and will generate significant tax revenues. Quail Brush is anticipated to provide approximately 150 construction jobs over a 12-month period.

2.3 GENERATION FACILITY DESCRIPTION

This section describes the power plant's conceptual design and proposed operation.

2.3.1 Power Plant Site Arrangement and Layout

The plant site layout including ancillary facilities is shown on Figure 2.3-1. Typical elevation views of the proposed plant are shown on Figures 2.3-2a and 2.3-2b. The General Arrangement is provided in Appendix B.8.

2.3.2 Power Plant Process Description

The power plant will consist of 11 Wartsila 20V34SG natural-gas fired reciprocating engines. Total facility generating capacity will be approximately 103 MW gross or 100 MW net. Each engine will have a gross capacity of approximately 9.3 MW based on a design temperature range of 32 degrees Fahrenheit (ºF) to 95ºF. Above 95ºF the output of the engine degrades and is expected to be approximately 9.1 MW at 100ºF. It is anticipated that the Project may be dispatched up to 3,800 hours per year excluding start-ups, equivalent to an annual capacity factor of 43.4 percent. The plant's actual operating profile will depend upon SDG&E's dispatch pattern under the terms of the Applicant's PPA. The plant heat balance (gross) is shown in Figure 2.3-3. This balance depicts performance at the expected extreme operational design ambient dry bulb temperature ranges (35ºF to 95ºF). The gross and net heat rate (higher heating value basis) of the power plant is expected to be 8,600 British thermal units per kilowatt hour (Btu/kWh) and 8,834 Btu/kWh, respectively, at steady-state, full load average summer condition of 81ºF.

In addition to the above, each engine will be equipped with standard support auxiliaries (e.g., a fuel gas system, lube oil system, charge air systems consisting of inlet air filtration, turbochargers and aftercoolers, and an engine cooling system). The charge air system provides combustion air for the engine and the turbocharger increases the density of air to the engine which increases the output. Supporting the overall plant will be a starting air system, an instrument/service air system, a main generator step-up transformer (GSUT), two 100 percent redundant auxiliary/station service transformers, clean and dirty lube oil storage tanks, maintenance water tanks, a domestic water tank, a fire water tank, two wastewater holding tanks, one urea tank, a service oil tank for temporary storage of engine oil during maintenance of engines, and associated support equipment.

All of the technologies described above are proven technologies that have been commercially demonstrated in numerous installations and are considered mature from a development standpoint. Cogentrix has owned and operated the Plains End 1 Power Generating Plant located in Arvada Colorado since 2005. In 2006, Cogentrix permitted and constructed the Plains End 2 Power Generation Plant located adjacent to Plains End 1. Both of these facilities use the same natural gas-fired reciprocating engine technology as being proposed for the Project. In early 2011, Cogentrix divested itself of these power generating plants. Use of technology that has been demonstrated in numerous commercial installations will help achieve the Project's goals, consistent with the RFO, of providing at least 98 percent availability.

2.3.3 Generating Facility Cycle

A startup air system, operating at a nominal 450 pounds per square inch gauge (psig), will provide direct injection of startup air into one main cylinder bank of each engine. Once started, combustion air for each engine will be drawn from outside the power house, flow through a combustion air filter followed by an air silencer, and then be fed to the compressor side of each engine's turbocharger (driven by exhaust flow). The pressurized air (about 50 psig) will then be supplied to the engine to mix with the natural gas fuel. Pressurized natural gas (at about 75 – 100 psig) will be fed to the engine's cylinders via header pipes that will supply the engine's main fuel regulating valve train and then the individual feed pipes to the main fuel admission valve on each cylinder head. An ignition module will be located on the top of each cylinder head, and will be connected to a spark plug for fuel/air combustion.

The hot combustion gases will exit each engine at approximately 730°F and enter the engine's dedicated air pollution control system catalyst housing for reduction of emissions. The air pollution control system will exhaust through an exhaust silencer to atmosphere via the engine's exhaust stack.

2.3.4 Reciprocating Engine Generator Components

2.3.4.1 Reciprocating Engine Generators

Electricity will be produced at the generation facility by 11 Wartsila model 20V34SG reciprocating engine generator sets, as described above. These engine generator sets will be driven by four-stroke, lean burn, pre-chamber, spark ignited, port injected, turbocharged and inter-cooled engines. This lean-burn spark ignition reciprocating engine technology has been commercially demonstrated in several hundred installations worldwide and is considered mature.

Each engine generator set will consist of two components – the engine and the generator. Thermal energy produced in the engine side through the combustion of natural gas will be converted into mechanical energy when the expanding combustion gases force a translational movement of the pistons, which in turn rotate a drive shaft. Each engine's drive shaft will be flexibly coupled to an associated electric generator to convert the rotational mechanical energy of the drive shaft into electricity.

The engines will be equipped with the following required accessories to provide safe and reliable operation:

- Auxiliary modules, including the engine pre-heating unit, a booster pump, various engine controls and indication, and piping;
- A fuel gas system;
- A charge air system, including filter, silencer, and pre-heater;
- An exhaust gas-driven turbocharger/charge air compressor and cooler;
- A lubricating oil system;
- A compressed air system;
- A cooling system;

- Fire detection and suppression; and
- An exhaust system.

2.3.4.2 Reciprocating Engine Generator Building

The 11 engine generator sets will be housed in an engine hall structure, both for their general environmental protection and for abatement of engine noise.

The engine hall will be approximately 365 feet long by 70 feet wide by 32 feet high at eave height. The building will be a pre-engineered metal building featuring a bridge crane for engine component handling. Contiguous to the engine hall will be a two-story building, approximately 92 feet long by 44 feet wide by 32 feet tall at eave height, which will house the electrical room, control, room, and administration area. Insulation will be applied to the walls of this structure as required to meet heating, ventilating, air conditioning (HVAC), and noise abatement requirements of the Project.

Initial foundation design will be based on the Geotechnical Report conducted by Petra Geotechnical, Inc. Provided site grading is performed in accordance with the recommendations of the Geotechnical Report, the use of conventional shallow foundations, rigid mat, or structural slab foundations are considered feasible for support of the various structural elements of the facility. Foundations for the engine hall will generally be constructed of reinforced concrete. Structures, equipment foundations, slabs on grade, sumps, trenches, radiators, pumps and containment areas will be constructed of reinforced concrete, and designed to meet seismic requirements for the site location. Additional details on the engineering design can be found in the design criteria in Appendices B1 through B7.

Transmission of vibration and structure borne noise will be minimized by having the engines flexibly mounted on their isolated concrete foundations and connected to piping and exhaust systems through flexible bellows. As a result, each engine will be vibrationally isolated from the building, piping, and steel structures.

2.3.4.3 Air Pollution Control System Catalyst Housing

The air pollution control system catalyst housings, one for each engine, will be equipped with SCR catalyst modules to reduce emissions of NO_x, CO and POC. The SCR emission control system will use atomized urea in the presence of a catalyst to reduce NO_x in the exhaust gases of the engines. Urea will be injected into the exhaust gas stream via a grid of nozzles located upstream of the catalyst module. The subsequent chemical reaction will reduce NO_x to nitrogen gas and water vapor, resulting in a NO_x concentration in the exhaust gas no greater than 1.317 lb/hr from each engine at 100 percent load. An excess of urea must be injected to ensure an acceptable NO_x control efficiency. Unreacted ammonia (slip) will be limited to 10 parts per million (ppm).

An oxidation catalyst will also be installed within the housing to control the concentration of CO in the exhaust gas emitted to atmosphere to no greater than 1.564 lb/hr from each engine at 100 percent load. The exhaust from each catalyst housing will be discharged through an exhaust silencer to an individual exhaust stack that is approximately 100 feet tall (top of steel) with a 48-inch outside diameter.

2.3.5 Fuel System

The reciprocating engines will be designed to burn natural gas. Natural gas requirements for a single engine at full load, over an ambient range of 32ºF to 100ºF, will be approximately 80 MMBtu/hr on a higher heating value (HHV) basis.

Natural gas will be delivered to the site at 800 psig via a new underground pipeline lateral, which will be owned by SDG&E that will connect to their existing 20-inch diameter pipeline that runs along Mast Boulevard. Additional information about natural gas supply can be found in Section 2.4, Natural Gas Pipeline Construction. Onsite, the natural gas will flow through a custody transfer flow-metering station, gas moisture scrubber/filtering equipment, a gas heater, and a gas pressure control station that will reduce the pressure to 75 to 80 psig prior to the gas being distributed to the individual engines and their gas control equipment. SDG&E's custody transfer meter station will be located onsite.

2.3.6 Water Supply and Water Quality

This subsection describes the quantity of water required, the source of the water supply, and water treatment requirements.

The estimated water usage for the generation facility operation is provided in Table 2.3-1. Figures 2.3-4a and 2.3-4b illustrate the annual and peak daily flows for the plant water distribution system. The water consumption for the proposed Project will be extremely low. Normal operations will only require water for infrequent washing of the turbocharger compressor and turbine, and for make-up water in the closed cooling system. Three design factors contribute to low water requirements for the Project:

- Use of closed-loop engine cooling;
- Use of lean-burn reciprocating engines, eliminating the need for water injection for NO_x control as typically used in conventional combustion turbine technology; and
- Use of a radiator cooling system as opposed to a cooling tower, which is the major water consumed in typical combined cycle power plants.

Table 2.3-1 Estimated Average Water Operational Usage

All Uses for Entire Facility	Expected Usage	
Average Annual Usage[a]	1.00 gpm	1.61 afy
Peak Usage (Maximum Summer Condition)	1.25 gpm	2.02 afy
Makeup Water for Engine Cooling for Entire Facility	**Expected Usage**	
Average Annual Usage[a]	0.17 gpm[b]	0.27 afy
Peak Usage (Maximum Summer Condition)	0.21 gpm	0.34 afy

Basis
[a] Usage is based on 4,000 annual operating hours, and 4,760 non-operational hours, exclusive of first fills.
[b] Average between operational and non-operational/maintenance periods.
gpm = gallons per minute; afy = acre-feet per year (1 gpm = 1.613 afy).

2.3.6.1 Water Supply

The estimated peak water usage will occur during the construction phase, and is estimated to be approximately 5,200,000 gallons during the first three months. During normal operations, the estimated peak facility water usage will be approximately 685,000 gallons per year (2 afy).

Average annual and peak use water balance diagrams are included in Figures 2.3-4a and 2.3-4b.

Construction

Construction water during the 18-month construction process will be supplied from the City of San Diego Municipal Water Department under a temporary water use permit via a nearby fire hydrant adjacent to Mission Gorge Road, south of the intersection with West Hills Parkway. Water at this location will be pumped into water trucks that will deliver the water to construction areas. If this location becomes unavailable, another suitable hydrant will be selected. Appendix I-3 provides a water chemistry profile for the Palomar water supply. Construction water use will be greatest during the first three months, when site grading is scheduled. Peak water use of 58,000 gallons per day (gpd) during construction is based on the application of 40 gallons of water per cubic yard of fill and 130,000 total cubic yards of grading over three months. For remaining construction water uses, approximately 8,000 gpd will be required to build the gas line, plant site, gen tie, and switchyard.

Operations

During plant operations, water consumption will average approximately 1,440 gpd (Table 4.13-3). Domestic water will be supplied by Palomar Mountain Premium Spring Water (Palomar). Will-serve correspondence indicating Palomar's agreement to provide water for the Project is included in Appendix I-4. The Project water use represents approximately 3 percent of Palomar's available spring sources and less than 1 percent of Palomar's overall water sources (which also includes municipal water). Appendix I-5 provides a water chemistry profile for the Palomar water supply. Water will be delivered from spring sources at Palomar (on SR 76) in two 6,500-gallon water trucks per week and kept in a storage tanks located onsite. A 10,000-gallon domestic water tank and a 600,000-gallon fire water storage tank are proposed for the plant. Domestic water will be used for all facility needs including service water, irrigation, and fire protection. No pumping of groundwater wells is anticipated. Drinking water will be served by bottle water service supplied by a local service company. Although unlikely, if back-up water supplies are required, the Project would contract with another private water supplier instead.

As described in Section 2.3.6.1, water consumption for the proposed Project will be low because the closed-loop engine cooling requires little water, the lean-burn reciprocating engines do not require water injection for NO_x control, and the system does not use a cooling tower, which is the major water consumer in typical combined-cycle gas turbine power plants.

As described in Section 2.3.7, the engine cooling water system will provide cooling water to the engine jacket, charge air, and generator set lube oil. A separate cooling water system will be provided for each of the 11 generator sets. Each system will consist of three closed-loop "fin fan" type forced draft heat exchangers (radiators), engine-driven pumps, interconnecting piping, valves, heat exchangers/coolers, and electric heaters.

Fire water will be supplied by an onsite storage tank sized in accordance with National Fire Protection Association (NFPA) guidelines. Fire water will be provided to a dedicated underground fire loop piping system, which will supply fire hydrants and fixed suppression systems. Fixed fire suppression systems will be installed at determined fire risk areas. Sprinkler systems also will be installed in the engine hall as required by NFPA and/or local code requirements.

2.3.6.2 Water Quality and Treatment

Since domestic water will be sufficient for all plant service needs, no treatment/demineralized water system will be required. If required, recirculation and aeration within the tanks will be accomplished using the fire pump or a dedicated recirculation pump. Water use will be divided into the following four areas: (1) water used for engine cooling system minor makeup and/or maintenance; (2) water for turbo-compressor cleaning; (3) general powerhouse and exterior service water; and (4) personal consumptive/sanitary water. Water balance diagrams are presented in Figures 2.3-4a and 2.3-4b. Drinking water will be served by bottle water service supplied by a local service company.

The only water treatment required onsite will be to add an anti-corrosion agent consistent with original equipment manufacturer (OEM) recommendations to the closed loop radiator system, which will result in a closed cooling loop pH in the range of 8.5 to 9.5. Anti-corrosion agent concentration will nominally be 1,500 milligrams per liter (mg/L). No additional treatment (such as glycol for anti-freeze) is anticipated.

Addition of water (make-up) and/or the anti-corrosion agent to a given engine's closed loop cooling system will only be performed during periods of engine maintenance, as required to maintain proper water levels and agent concentration. Two 5,000 gallon maintenance water tanks, one per group of engines, will be provided for this purpose. Addition of water and/or the anti-corrosion agent will be a manual activity; no automatic addition systems or equipment will be required. Water quality is described further in Section 4.13, Water Resources.

Service Water. Service water for plant functions in which operating personnel may have direct contact will be provided by the onsite storage tanks. Runoff from any service water area(s) that has the potential for contamination will be directed to the wastewater holding tank for analysis prior to removal by a licensed contractor for offsite treatment and disposal.

2.3.7 Engine Generator Set Cooling Systems

Three radiators per engine will be provided for engine cooling. As previously stated, engine cooling will be a closed loop. Engine driven pumps will provide the motive force for cooling water circulation. Two primary loops will be provided: an engine jacket water cooling loop; and an engine charge air cooling loop that will service both the engine's high and low temperature charge air cooling heat exchangers (two per engine) and the engine's lube oil cooling heat exchanger. The radiators will cool the cooling water and the heat exchangers will transfer the heat to the cooling water from the charge air, lube oil, and engine jacket. Variable frequency drives for the radiator fans will be used to minimize parasitic losses, reduce net plant heat rate, and increase net output during low load operation and/or operation on cooler days.

The cooled water discharged from the radiators will flow to either the engine's engine-driven jacket water cooling pump, or to the engine-driven charge air cooling pump. The cool water will be directed from the jacket water pump through the engine jacket and then to a three-way thermostatic valve for return either to the engine jacket and/or to the radiators.

Water from the charge air cooling pump will be directed to the low temperature charge air heat exchangers. The discharge from these heat exchangers will then be directed to the lube oil cooler, and then to the high temperature charge air heat exchangers. Water discharged from the high temperature charge air heat exchangers will then be directed back to either the radiators for cooling, and/or through a three-way thermostatic valve for return to the various engine cooling heat exchangers.

2.3.8 Waste Management

Waste management is the process whereby all wastes produced by the proposed Project are properly collected, treated if necessary, and disposed. Wastes will include potentially contaminated service and/or process wastewater, solid non-hazardous waste, and both liquid and solid hazardous waste. Waste management is discussed in more detail in Section 4.11, Waste Management.

2.3.8.1 Wastewater Collection, Treatment, and Disposal

The primary wastewater collection system will collect wastewater from all of the generation facility equipment maintenance areas where periodic maintenance/service functions can result in spillage, and from routine service water areas (including engine turbo-compressor washing). The second wastewater collection system will collect sanitary wastewater from sinks, toilets, showers, and other sanitary facilities. The two wastewater systems are described below.

Plant Equipment Maintenance Areas. In areas where periodic and/or "routine" maintenance (e.g., engine overhauls) will require water drainage, the wastewater will be collected via a floor drain or comparable system and directed to the wastewater holding tank for testing. Contents will periodically be pumped to a tanker truck for disposal by a properly-licensed contractor.

Sanitary and Consumptive System. All drains from personal uses (e.g., consumptive, showers, personal hygiene, etc.) will be directed to the onsite septic system.

The onsite wastewater treatment system will be designed with a septic tank and leach field. The sanitary system will be gravity flow and will be designed and constructed to meet applicable requirements. The San Diego Regional Water Quality Control Board (RWQCB) has jurisdiction under the California Water Code Section 13282 and transfers jurisdiction to the County of San Diego, Department of Environmental Health (DEH). The sanitary system will be designed and constructed in accordance with the requirements of, and obtain a permit from, the San Diego County DEH. Three or four percolation test borings will be drilled in the proposed leach field location to identify the average infiltration rate. A certified San Diego County sanitary sewer system consultant will be used for the design of the septic tank and leach field system.

2.3.8.2 Solid Wastes

The proposed Project will produce maintenance and plant wastes typical of natural gas-fired power generation operations. Plant wastes will include oily rags, broken and rusted metal and machine parts, defective or broken electrical materials, empty containers, and other solid wastes including the typical refuse generated by workers. Trash and other non-hazardous solid wastes will be removed by a licensed waste disposal firm and disposed of at the Sycamore Landfill.

Recyclable materials will be recycled at the Landfill's recycling facility. Waste collection and disposal will be in accordance with applicable Laws, Ordinances, Regulations, and Standards (LORS) to minimize health and safety effects. Additional details regarding waste disposal are included in Section 4.11.

2.3.8.3 Hazardous Waste Management and Disposal

Several methods will be used to properly manage and dispose of hazardous wastes generated by the proposed Project. Used lubricating oil and other materials classified as hazardous waste under Title 22 of the California Code of Regulations (CCR) will be generated by Project operations. Hazardous waste will be managed in accordance with CCR Title 22 Division 4.5 and County requirements. The plant is anticipated to be a small quantity generator for hazardous waste under 22 CCR Division 4.5, and much of the waste oil will be recycled.

Waste lubricating oil will be recovered and reclaimed by a waste oil hauler to a certified recycling facility. Spent lubrication oil filters from the reciprocating engines and other equipment will be disposed of through a local, licensed Used Oil Filter Transporter in a Class I landfill. Spent SCR and oxidation catalysts will be reclaimed by the supplier or disposed of in accordance with regulatory requirements. Workers will be trained to handle hazardous wastes generated at the plant site. Additional details on the wastes generated and their proper disposal are included in Section 4.11.

Potentially contaminated wastewater used during turbo-compressor washing and/or regular equipment maintenance, which may include high metal concentrations and/or oils, will be temporarily stored in the wastewater holding tanks. This wastewater, if verified as contaminated, will be disposed of offsite by a properly licensed contractor.

2.3.9 Management of Hazardous Materials

There will be a variety of chemicals stored and used during the construction and operation of the proposed Project. The storage, handling, and use of all chemicals will be conducted in accordance with all applicable LORS. The limited number of chemicals (e.g., cooling water corrosion-inhibitors, urea, solvents, etc.) will be stored in appropriate chemical storage tanks or cabinets. Urea will be stored in one 20,000-gallon capacity aboveground storage tank. Other chemicals will be stored in returnable delivery containers. Berm and drain piping design will allow a full-tank capacity spill, plus capacity for the rainfall from a 25-year, 24-hour storm event without overflowing the berms. For multiple tanks located within the same bermed area, the capacity of the largest single tank will determine the volume of the bermed area. Chemicals that may react with each other, if any (e.g., acid and base), will not use common containment.

For liquid materials delivered by truck, such as lubricating oil and urea, there will be truck unloading/containment area(s) to contain any potential spill that might occur during the truck unloading operation.

The urea storage area will have spill containment and ammonia vapor detection equipment inside the containment area. Urea will be transported and stored onsite as a 40 percent solution by weight.

Safety showers and eyewashes will be provided in the vicinity of all chemical storage and use areas. Hose connections will be provided near the chemical storage areas to flush spills and leaks to the plant wastewater holding tank. Approved personal protective equipment will be provided and used, as required, by plant personnel during chemical spill containment and cleanup activities. Personnel will be properly trained in the handling of these chemicals and instructed in the procedures to follow in case of a chemical spill or accidental release. Adequate supplies of absorbent material will be stored onsite for spill cleanup.

A list of the chemicals anticipated to be used at the generating facility and their locations is provided in Section 4.9, Hazardous Materials Handling. This list identifies each chemical by type, intended use, and the estimated quantity to be stored onsite.

2.3.10 Emission Control and Continuous Emissions Monitoring

Air emissions from the combustion of natural gas in the reciprocating engines will be controlled using state-of-the-art emission control systems. Emissions that will be controlled include NO_x, POC, CO, and particulates. Exhaust gases from each engine generator set will be treated by a dedicated emission control system. Each emission control system will include a SCR system and an oxidation catalyst, as described further in the following subsections.

To ensure that the emission control systems are performing correctly, CEMS will be used. Each of the 11 stacks will have a dedicated CEMS.

Section 4.7, Air Quality, includes additional information on emission control and monitoring.

2.3.10.1 NO_x Emission Control

The NO_x concentrations in the exhaust gas emitted to the atmosphere from each engine generator set will be controlled to 1.317 lb/hr per engine at full load by the SCR system. The SCR process will use urea. Ammonia slip, or the concentration of unreacted ammonia in the exiting exhaust gas, will be limited to 10 ppmvd at 15 percent oxygen. The SCR equipment will include a reactor chamber, catalyst modules, urea storage system, urea injection system, and control and monitoring equipment and sensors.

2.3.10.2 Carbon Monoxide and Precursor Organic Compounds

An oxidation catalyst will be used to reduce the CO and POC concentrations in the exhaust gas emitted to the atmosphere from the engine generators. At full load, the CO and POC emissions from each engine will be controlled to 1.564 and 1.584 lb/hr, respectively.

2.3.10.3 Particulate Emission Control

Particulate emissions will be controlled by the use of natural gas as the sole fuel for the engines, which will result in low particulate emissions. The engines will also use filters on the charge air (combustion air) supplied to the engines, also serving to minimize the introduction of particulates to the engines from the ambient air.

2.3.10.4 Continuous Emission Monitoring

The CEMs will sample, analyze, and record NO_x and CO concentrations, the percentage of O_2 and other conditions, in the exhaust gas from each engine's exhaust stack downstream of its catalyst housing and exhaust silencer, and record fuel gas flow rate as required by the San Diego Air Quality Management District. This system will generate reports of emissions data in accordance with permit requirements. The plant control system will alarm when emissions approach or exceed pre-selected limits.

2.3.11 Generation Plant Fire Protection

The plant fire protection system will be designed to protect personnel and limit property loss and plant downtime in the event of a fire. Fire water will be supplied by an approximately 600,000-gallon onsite fire water tank. The fire water tank will be sized in accordance with NFPA guidelines to provide protection from the onsite worst-case single fire.

The fire protection systems will be designed to protect personnel and limit property loss and plant downtime from fire or explosion. The Project will have the following fire protection systems:

Wet Pipe Sprinkler Fire Protection System. This system will protect the engines and their accessory equipment from fire. The system will have fire detection sensors and gas detectors. Actuation of any one local sensor will trip the associated engine, turn off ventilation and charge air to the engine, and automatically actuate the sprinkler system.

Electrical/Controls Fire Protection. For those systems where the use of fire sprinklers is not recommended, an FM-200 or comparable fire protection system will be employed. Fire detection sensors will be used; actuation of any one sensor will result in release of the active agent and, as appropriate, tripping of equipment controlled by the device(s) subject to the fire situation.

GSUT Fire Protection. The GSUT will be protected by a deluge sprinkler system which will be actuated by rate of rise temperature detectors.

Fire Hydrants/Hose Stations. This system will supplement the plant fire protection system. Water will be supplied from the plant underground fire water/domestic water system and a proposed fire water pump and associated storage tank.

Fire Extinguisher. The plant control room/maintenance area and other operational areas will be equipped with portable fire extinguishers as required by the local Fire Marshall.

Fire water will be provided to a dedicated underground fire loop piping system. Both the fire hydrants and the fixed suppression systems will be supplied from the fire water loop.

Fixed fire suppression systems will be installed at determined fire risk areas. Sprinkler systems will also be installed in the engine hall as required by NFPA and/or local code requirements. For areas such as the control room, in which water cannot be used, an FM-200 or comparable waterless system will be used. FM-200 is a colorless, liquefied compressed gas. It is stored as a liquid and dispensed into the hazard as a colorless, widely non-conductive vapor that is clear and does not obscure vision. It leaves no residue and has acceptable toxicity for use in occupied spaces at design concentration. FM-200 does not displace oxygen and therefore is safer for use in occupied spaces without fear of oxygen deprivation. Hand-held fire extinguishers of the appropriate size and rating will be located in accordance with NFPA 10 throughout the facility.

The proposed plant is located within an area San Diego County has designated as Very High Severity Hazard zone for brush fires. A brush fire burned in the vicinity of the Project 3 years ago. Section 4.6, Socioeconomics, provides information on local fire protection capability.

A comprehensive Fire Protection Plan will be prepared for the Project that will be approved by the Fire Marshal. If the Fire Protection Plan requires more stringent design requirements than described herein, then the more stringent requirements will be incorporated in the final plant design.

Section 4.9, Hazardous Materials Handling, includes additional information for fire and explosion risk.

2.3.12 Plant Electrical Systems

Plant electrical systems will be designed to provide a safe, coordinated, cost-effective, reliable, operable, and maintainable power generation and delivery system. Electrical power will be exported to the SDG&E 230 kV system by way of the Plant Switchyard, described in Section 2.5.4. A total of 11 reciprocating engine generator sets, each complete with excitation system and appurtenances, will be grouped into two clusters. Each cluster of generator sets will be provided with a 13.8 kV metal-clad switchgear lineup: one bus will collect outputs of six (6) individual generators and the second bus will collect outputs of five (5) individual generators. The summed power at each bus will be transmitted by separate 13.8 kV nonsegregated-phase bus ducts to a dedicated (low side) winding of the GSUT inside the Plant Switchyard.

A 13.8kV-480V auxiliary power transformer will be connected to each 13.8kV metal-clad switchgear bus. The auxiliary power transformers will provide power to all auxiliary loads within the plant. Plant auxiliary power distribution equipment includes station service transformers, low voltage switchgear, 480V motor control centers, 480V distribution panels, dry type transformers, lighting and receptacle power panelboards, DC station battery and battery chargers, UPS, etc. (AC and DC systems). Startup and standby power will be supplied from the grid through the GSUT, which will backfeed power into the 13.8kV switchgear and onto the auxiliary transformers. Alternately, startup and standby power might be provided by SDG&E via the existing distribution line along Sycamore Landfill Road.

The following systems will support, protect, and control the generating facility:

2.3.12.1 Lighting

The lighting system will provide personnel with illumination for operation under normal conditions and for egress under emergency conditions, and will include emergency lighting to perform manual operations during an outage of the normal power source. Light standards will be shielded and directed downward and toward the plant property per City of San Diego building requirements. In areas that do not require continuous lighting for safety reasons, lighting will be operated manually as appropriate. The system will also provide 120-volt convenience outlets for portable lamps and tools.

2.3.12.2 Grounding

The plant electrical system will be susceptible to ground faults, lightning, and switching surges that may result in high voltage that may constitute a hazard to site personnel and electrical equipment. The facility grounding system will provide an adequate electrical path to permit the safe dissipation of current created by these events. The station grounding grid will be designed for adequate capacity to dissipate heat from ground current under the most severe conditions in areas of high ground fault current concentration. The facility grounding grid will consist of buried copper electrodes, and conductors will be bonded to each metallic structure or stand-alone piece of equipment for safety and electrical continuity per the applicable standards. Equipment grounding conductors will be circuited with each power system circuit for additional safety. The grid spacing will maintain touch and step voltage potentials within acceptable limits. Bare conductors will be installed below-grade in a grid pattern. Each junction of the grid will be bonded together by an exothermic weld or compression connection.

Ground resistivity readings will be used to determine the necessary numbers of ground rods and grid spacing to ensure safe step and touch potentials under severe fault conditions. Grounding stingers will be brought from the ground grid and connected to all building steel and non-energized metallic parts of electrical equipment. Concrete foundations will have the reinforcing steel (rebar) tied to the grounding grid as well.

The facility grounding systems, including the building containing the engine generator sets and the gen tie switchyard areas, will be designed in accordance with the latest National Electric Safety Code (NESC), Institute of Electrical and Electronics Engineers (IEEE), and National Electrical Code (NEC) standards pertaining to power plant grounding systems. Plant protective relay systems will be designed to trip equipment off-line under certain ground fault conditions as required or recommended by the applicable standards.

2.3.12.3 Plant Control System

The plant control system will provide modulating control, digital control, monitoring, and indicating functions for the plant power block systems.

The following functions will be provided:

- Controlling the engines and other systems in a coordinated manner;
- Controlling the balance-of-plant systems in response to plant demands;
- Monitoring controlled plant equipment and process parameters and delivery of this information to plant operators;

- Monitoring the stack CEM units for critical alarms, and collecting data for historical logging;
- Data acquisition, annunciation, and historical storage of engine operating information;
- Providing control displays (printed logs, operator interface) for signals generated within the system or received from input/output (I/O);
- Providing consolidated plant process status information through displays presented in a timely and meaningful manner; and
- Providing alarms for out-of-limit parameters or parameter trends, displaying on operator interface units and recording on an alarm log printer.

The plant control system, provided by Wartsila NA, will provide an interface to allow remote (from site) control and dispatch capabilities on a per-engine basis, and limited data monitoring, as required by California Independent System Operator (CAISO).

The system will be designed with sufficient redundancy to preclude a single device failure from significantly affecting overall plant control and operation. This also will allow critical control and safety systems to have redundancy of controls where needed, as well as an uninterruptible power source.

2.3.12.4 Cathodic Protection

The cathodic protection system will be designed to control the electrochemical corrosion of designated metal piping (primarily natural gas lines) buried in the soil. Depending upon the corrosion potential and the site soils, either passive or impressed current cathodic protection will be provided. Isolation devices will be used between the plant systems and the underground pipeline.

2.3.12.5 Freeze Protection

A freeze protection system will not be required for this facility. A thermal warning in the control system will provide notification if circulation of the engine cooling systems is needed during unusually cold periods.

2.3.12.6 Service Air

The service air system will supply compressed air to hose connections for general plant use. Service air headers will be routed to hose connections located at various points throughout the facility.

2.3.12.7 Instrument Air

The instrument air system will provide dry, oil-free air to pneumatic operators and devices. An instrument air header will be routed to locations within the facility equipment areas.

2.3.13 Generation Plant Construction

Laydown, office trailers, and parking for plant construction will occur within the site boundaries. Portable office trailers will be provided for construction management. A temporary construction laydown area will be located on previously disturbed Sycamore Landfill property approximately

one-half mile from the site (approximately 5 acres). Temporary construction parking will be located on an existing paved parking lot at 7927 Mission Gorge Road in the City of Santee.

Onsite construction activities will include clearing of existing vegetation; grading; hauling and laydown of equipment, materials, and supplies; facility construction; and testing. The preliminary grading plan indicates that the maximum cut will be approximately 50 feet into the existing grade and the maximum fill will be approximately 80 feet above the existing grade. The total volume of soil excavation will be approximately 125,000 to 150,000 cubic yards (cy). Actual quantities will be calculated from the final grading plans and the Geotechnical Report. Final grading design will balance cut and fill volumes to the extent possible, so that there is no net import or export of common soil. Grading will be performed in accordance with the requirements of the proposed Project's geotechnical investigations. Site access and the required storm water management provisions will be constructed as part of initial grading so these facilities will be in place shortly after construction is initiated.

A Storm Water Pollution Prevention Plan (SWPPP) will be prepared in accordance with the State Water Resources control Board General Permit for Discharges of Storm Water Associated with Construction Activities prior to start of construction, and the Applicant will file a notice of intent (NOI) to comply with the General Permit. The SWPPP will identify measures to control and treat stormwater during construction and identify the appropriate Best Management Practices that will be implemented. Graded surfaces will be stabilized promptly as they are completed to control erosion and runoff when precipitation events occur during the construction period. Engineered erosion control measures will be maintained until the surface is stabilized. The Landscaping Plan will include planting of native grasses and wildflower seed mix and visual screening vegetation in the construction laydown area as soon as practical once construction activities in the area are complete.

The engine generator sets and most ancillary equipment will be supplied as prefabricated modules to the greatest practical extent, which will facilitate construction of the plant. Once rough grading is completed and underground systems are installed, foundations and footings will be poured and finished, building erection will commence, gen-sets will be mounted, and auxiliary systems will be constructed or installed. The engine hall, administration area, control room, electrical room, and maintenance area will be housed in a prefabricated metal building erected onsite.

Construction of the plant, from mobilization, through site preparation and grading, to commercial operation, is expected to take place from March 2013 until June 2014. Major construction milestones are listed in Table 2.3-2. The Project schedule is discussed in Section 2.3.13.2.

Table 2.3-2 Project Schedule Milestones

Mobilization	March 2013
Start-up and Testing	March 2014
Commercial Operation	June 2014

2.3.13.1 Generation Plant Construction Workforce

There will be an expected average and peak workforce of approximately 120 and 268, respectively, of construction craft people, supervisory, support, and construction management personnel onsite during construction (Table 2.3-3).

Table 2.3-3 Construction Workforce

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Total
Carpenter	0	0	8	8	15	15	22	22	18	18	8	8	0	0	0	0	0	0	142
Cement Mason	0	6	12	20	20	24	26	26	26	12	12	12	6	6	2	0	0	0	210
Electricians	0	0	0	0	0	0	0	0	16	42	58	56	42	40	12	3	2	2	273
Iron Worker	0	0	0	8	14	20	22	14	14	14	14	12	12	8	2	0	0	0	154
Labor	9	15	10	24	46	56	50	44	44	34	46	46	36	18	9	0	0	0	487
Millwright	0	0	0	0	0	6	16	32	36	36	36	36	26	4	4	2	2	2	238
Operator	18	20	15	15	15	15	15	15	6	6	12	12	12	6	2	2	0	0	186
Pipe Fitter	0	0	0	0	0	6	6	12	38	42	52	52	38	8	6	2	2	2	266
Teamster	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	0	0	0	30
Insulation Worker	0	0	0	0	0	0	0	0	6	6	12	12	12	12	8	2	0	0	70
Painter	0	0	0	0	0	0	0	0	0	0	0	6	6	8	8	2	2	2	34
Sheet Metal	0	0	0	0	0	0	0	0	6	10	16	10	10	0	0	2	0	0	54
Total Craft	**29**	**43**	**47**	**77**	**112**	**144**	**159**	**167**	**212**	**222**	**268**	**264**	**202**	**112**	**55**	**15**	**8**	**8**	**2144**

Notes: Table based on the construction of Plains End Facility with adjustments for Quail Brush site specifics:

2.3.13.2 Generation Plant Construction Schedule

An estimate of project construction activities by phase is shown in Table 2.3-4. Construction activities will be scheduled to occur between 7 a.m. and 7 p.m., Monday through Friday. Occasionally, additional hours may be necessary to make up schedule deficiencies or to complete critical construction activities. During some construction periods and during the startup phase of the Project, some activities will continue 24 hours per day, 7 days per week. The peak construction site workforce is expected to occur in months 11 and 12 of the construction period; however, peak heavy truck traffic, related to excavation efforts, will occur during months 1 and 2.

Table 2.3-4 Construction Schedule

Project Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Mobilize	■																	
Site Boundary Works	■																	
Demolition	■	■																
Civil Rough Grade Works	■	■																
Civil Foundation/Concrete Works		■	■	■	■													
Steel Works			■	■	■	■	■											
Gas Line Installation			■	■	■	■	■											
Building Erection				■	■	■	■	■	■									
Genset Delivery							■	■	■	■	■							
BoP Deliver							■	■	■	■	■	■						
Mechanical Installation				■	■	■	■	■	■	■	■	■	■					
Electrical Installation				■	■	■	■	■	■	■	■	■	■	■	■			
Interior Finishing and Landscaping						■	■	■	■	■	■	■	■					■
HV Interconnection Works					■	■	■	■	■	■	■	■	■					
Pre-Commissioning											■	■	■	■	■			
Training On-Site and O&M Team														■	■	■	■	■

Project Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1st Start and Commissioning																		
Performance Testing																		
Commercial Operation																		
Final Grading																		
Demobilization																		

2.3.13.3 Construction Facilities

Water supply during construction will be the responsibility of the contractor. The primary construction water use will include dust control, soil moisture conditioning for compaction, and hydraulic testing of fire and other water systems. The contractor will truck water to the site from a permitted fire hydrant located nearby within the City of San Diego.

Sanitary facilities will be provided for the construction workforce using self-contained portable facilities. Bottled water will be provided for drinking.

2.3.13.4 Construction Deliveries

Construction materials and supplies such as equipment modules, concrete, structural steel, pipe, wire, cable, fuel, lubricant, paint, adhesives, tools, water, and consumables will be delivered by truck. Deliveries will arrive via SR 52. A truck turnout will be provided along Sycamore Landfill Road on the northwest edge of the site to allow construction equipment that cannot be driven on the paved landfill road to be delivered and picked up.

An average of approximately 15 and a peak of approximately 30 deliveries will occur each weekday during the construction period to bring equipment, materials, and supplies to the site, including about four deliveries per day to gas pipeline staging areas. These deliveries will be distributed throughout the work day.

The site will be fenced during construction and 24-hour security will be provided.

Table 2.3-5 provides an estimate of the average and peak round trip construction traffic during the appropriate 18-month construction and startup period. Additional discussion on traffic volumes is presented in Section 4.4, Traffic and Transportation.

Table 2.3-5 Average and Peak Construction Traffic

Vehicle Type	Average Daily Trips	Peak Daily Trips (Occurs in Month 11)
Construction Workers	120	268
Delivery	15	30
Heavy Trucks	5	10
Total	140	308

Construction laydown and parking areas will either be within the proposed Project site and/or a previously disturbed portion of Sycamore Landfill property. Construction worker parking will be located at 7927 Mission Gorge Road in the City of Santee. This location is an existing paved parking lot that Quail Brush will enter into an agreement with the property owner for its use for

this purpose. Construction workers will be bused to construction areas from this location. Construction access will be from Sycamore Landfill Road, as shown on Figure 2.1-2. Materials and equipment will be delivered by truck via Sycamore Landfill Road.

Construction of the utility switchyard will be managed and controlled by SDG&E in a manner that will be supportive of the construction and initial operation schedule for the proposed Project.

2.3.13.5 Generation Plant Construction Disturbance

Construction of the generation plant will result in disturbance to 11 acres of the 21.6-acre plant site parcel.

2.3.14 Generation Plant Operation

The Project will be designed as an intermediate/peaking and load-shaping facility to serve SDG&E load during periods of high demand, which generally occur during daytime hours, and more frequently during the summer than other periods. Because the high efficiency of the 20V34SG engines, the plant's flat, high efficiency profile across its load range, and because of the support this plant will provide both to SDG&E's local 230kV transmission systems, it is anticipated that the Project may be dispatched up to 3,800 hours/year excluding start-ups.

The Applicant retained an independent power market analysis to predict expected hours of operation over the 30-year design life of the facility. The analysis predicts the actual annual average operations of the plant will be 1,739 hours/year. Actual operation will, of course, depend upon actual SDG&E system demand and CAISO dispatch requirements. The plant work force requirements are provided in Table 2.3-6.

Table 2.3-6 Typical Plant Operation Workforce

Department	Personnel	Shift	Workdays
Operations & Maintenance	1 Plant Manager		5 days a week
	10 Plant Technicians	5 Rotating 12-hour shifts with 2 Plant Technicians per shift	7 days a week

All of the plant's capacity will be sold to SDG&E under the terms of the PPA between the Applicant and SDG&E. The exact operational profile of the plant will be dependent on SDG&E's needs and requirements.

While the capacity will be sold under the PPA and it is anticipated that the Project will be dispatched as a peaking, load-following facility for up to 3,800 hours per year, the exact mode of operation cannot be described. It is conceivable, however, that the facility could be operated in one or all of the modes described below.

2.3.14.1 Peak Operations

SDG&E will dispatch the facility, up to maximum continuous output, more often in the summer than during other seasons. Because the facility will be designed to be an intermediate/peaking plant, it is likely that the plant will primarily operate only during high ambient temperature (e.g., high load) periods. It is also quite possible that the plant will operate more in the summer to help support the local 230 kV system.

2.3.14.2 Load Following

The facility will be operated to meet PPA requirements up to the maximum available output at high load times of the day. The output of the plant will therefore be adjusted periodically either to meet SDG&E's load or, if under direct control of the CAISO by Distribution Dispatch Center (DDC) operation, to meet the CAISO's real time market needs.

2.3.14.3 Partial and Stand-by Operation

This mode of operation can be expected to occur during late evening and early morning hours and on weekends when SDG&E only requires a portion of the plant's maximum output; on those occasions only a few of the engines may be in operation. If the engines not in operation are not undergoing maintenance, they will in most cases be available to SDG&E for non-spinning (capacity) reserve.

2.3.14.4 Non-operational Periods

This mode will occur if forced by equipment malfunction, fuel supply interruption, transmission line disconnect, or scheduled maintenance. Because the Project will be an intermediate load/peaking unit, full shutdown would be expected for a majority of the off-peak hours of the year and in the winter, although non-spinning reserve capability would still be available for engines that are off-line, but not in maintenance.

2.3.14.5 Long-Term Closure

In the unlikely event of a situation that causes a long-term cessation of operations, security of the facility will be maintained on a 24-hour basis, and the CEC will be notified. Depending on the length of shutdown, a contingency plan for the temporary cessation of operations may be implemented. Such a contingency plan will be in conformance with all applicable LORS and protection of public health, safety, and the environment. The plan, depending on the expected duration of the shutdown, could include the draining of all chemicals from storage tanks and other equipment and the safe shutdown of all equipment. All wastes from equipment shutdown will be disposed of according to applicable LORS. If the cessation of operations becomes permanent, the plant will be decommissioned. Section 2.8, Facility Closure, includes more information on facility closure.

2.4 NATURAL GAS PIPELINE LATERAL CONSTRUCTION

The Project will connect to the existing 20-inch diameter SDG&E natural gas pipeline that is located 2,200 feet away from the proposed Project site at the intersection of Mast Boulevard and Sycamore Landfill Road. From the tie-in point, the Project's 8-inch natural gas pipeline lateral will generally follow along the north side of Sycamore Landfill Road to the proposed Project site.

Gas pipeline construction will be scheduled so that it is finished and operational when the plant is ready for testing near the end of the construction period. The tap to the existing SDG&E gas main will be constructed by SDG&E. The gas line between the tap point and the onsite metering station, including the metering station itself, will be constructed by SDG&E, who will own and operate this portion of the gas line. From the metering station to each of the engines, the gas piping will be constructed, owned, and operated by the Applicant. Construction of the gas

pipeline will occur over an approximately 6-month long period. The gas pipeline will be designed and constructed in accordance with California Department of Transportation (Caltrans), San Diego County, Department of Transportation (DOT), and SDG&E specifications.

The gas pipeline will be installed underground using open trenching and backfill construction methods, except for the Mast Boulevard crossing. The trenching and backfill construction method will include: hauling and stringing of pipe along the pipeline route in advance of the moving area of installation; trenching for pipe installation; welding; radiographic inspection and coating of pipe welds; lowering the pipe into the trench; pressure testing; and backfilling of the trench. At the Mast Boulevard crossing, the pipeline will be installed beneath the road using either the horizontal-directional-drilling or jack-or-bore construction method. The crossing will be completed from a bore pit to a bore receiving pit located outside of Mast Boulevard. The bore pit excavation will be approximately 10 feet wide and 30 feet long, and the receiving pit will be approximately 10 feet wide and 10 feet long. The boring will be cased with a steel encasement within the right-of-way (ROW), the gas pipeline will be installed within the casing with spacers to center the pipeline, and the void between the pipeline and the casing will be pressure grouted.

Traffic control for pipeline construction will be in accordance with Caltrans and the California Manual on Uniform Traffic Control Devices (MUTCD).

The trenching and crossing excavations for gas pipeline construction will total approximately 1,500 cy of cut soil, most of which will be required for backfill. The trenching and crossing work will generate an estimated 200 cy of remaining soil in excess of the backfill requirement. Remaining material will be delivered to the Sycamore Landfill.

The majority of the pipeline route occurs along the north side of Sycamore Landfill Road. The road surface will be stabilized by engineering measures including compacting and crowning the backfilled trench and constructing water bars on the road surface to prevent concentrated runoff. Off of the road surface, disturbances from pipeline construction will be stabilized by planting of native grasses and wildflower seed mix and coastal sage scrub species. The pipeline route will be monitored following the completion of construction, and engineering erosion control measures will be maintained in disturbed areas until the surface is stabilized.

2.5 TRANSMISSION LINE DESCRIPTION, DESIGN, AND OPERATION

2.5.1 Introduction

Section 2.5 discusses the transmission interconnection between the proposed Project and the existing SDG&E electrical grid, and the potential impacts that the operation of the proposed Project will have on the flow of electrical power in the local and regional transmission systems. To better understand the potential impacts of the proposed Project on the regional transmission system and power flows, the analysis presented will focus on (a) the existing electrical transmission system in the immediate area of the proposed Project, (b) the proposed 230kV gen tie between the Project and the electrical grid, and (c) the proposed gen tie route. The anticipated system impacts of the proposed interconnection to the SDG&E transmission system are also discussed. The Project Cluster 2 – Phase II Interconnection Study is being conducted by CAISO/SDG&E and the study results will be available in late August 2011. The Phase II Study report will be provided as supplemental transmission interconnection information upon its

receipt. Hence, where appropriate the information described herein will be updated as required after the receipt of the Phase II Study Report.

Additional detail provided below is focused on potential nuisances (e.g., electrical, magnetic, audible noise, and corona effects), and safety issues associated with the proposed 230kV gen tie. A description of applicable laws, ordinances, regulations and standards (LORS) is also provided in Section 2.9.

The site for the proposed Project was selected, in part, for its proximity to the existing transmission and natural gas lines. SDG&E has several transmission lines near the proposed power plant. SDG&E owns and maintains two separate parallel Mission to Miguel 230kV transmission lines, which pass approximately 4,800 feet west of the plant site in a north south direction. SD&E also owns and maintains the two parallel Sycamore to Miguel 230kV transmission lines located approximately 1.5 miles north of the proposed power plant site. Figure 2.1-2 shows the proposed Project in relation to the relevant transmission resources in the immediate vicinity.

The proposed 230kV gen tie will be connected directly to a new utility switchyard, which will be designed, built, and owned by SDG&E. The new SGD&E switchyard will be constructed at a site northwest of the plant site in the vicinity of the existing Mission to Miguel 230kV transmission lines. The new utility switchyard will be selected from three possible sites described herein along the existing or realigned Mission to Miguel transmission corridor. The exact routing of the Project gen tie from the plant site to the new SDG&E utility switchyard location will be determined during route survey and detailed design.

The initial examination of the local transmission system concentrated on anticipated Project power flows, the capacity and location of existing transmission lines, and the physical distances involved with the proposed gen tie. Primary consideration in the analysis was given to the ability of the existing transmission lines to carry the anticipated Project output. Additional aspects considered included environmental effects of building and maintaining the new interconnecting gen tie, right-of-way (ROW) modification(s) and acquisition, engineering requirements, and costs. Alternative interconnection options were identified after analyses of these data and review of the SDG&E system maps and one-line diagrams for their respective service areas. From these alternatives, the proposed transmission line alignment, interconnection configuration, and construction techniques were selected.

Conceptual engineering of the proposed 230kV gen tie will be performed by the Applicant based on the results of the Phase II Study being performed by CAISO/SDG&E and technical engineering support provided by SDG&E.

2.5.2 Existing Transmission Facilities

The proposed power plant site is located west of the City of Santee, south of the Sycamore Canyon Landfill, and north of Hwy 52 in the City of San Diego, California. The two nearest transmission lines are the Mission to Miguel 230kV transmission lines (23022 and 23023) located approximately 4,800 feet west of the plant site and the Sycamore to Miguel (23021) and Sycamore to Miguel Tap (23041) 230kV transmission lines, which run approximately 1.5 miles north of the proposed plant site. Based on preliminary information addressing the capability to accept the added generation capacity represented by the proposed Project, the Mission to

Miguel (23023) 230kV transmission line was selected based on proximity of the line to the Project and the feasibility of interconnection.

2.5.3 System Interconnection Studies

The Phase II Study for the San Diego Area Cluster 2, of which the Project is included, is being performed jointly by CAISO/SDG&E. The study is examining the local and regional loads, rating of the existing 230kV transmission system and the ability of the existing transmission grid to safely and reliably transmit the Project nominal capacity (100 MW net), along with the anticipated increases in capacity from other projects in the San Diego Area Cluster 2. It is anticipated that the results of the system impact studies, coupled with the physical location of the transmission resources relative to the proposed Project, will aid in the selection of the proposed interconnecting transmission line route and design of interconnection facilities.

2.5.4 Proposed Generation Tie-Line

The proposed 230kV gen tie will start at the dead-end structure inside the plant switchyard on the north side of the plant. The gen tie route will then proceed north along the west side of Sycamore Landfill Road for approximately 2,600 feet, then travel northwest for approximately 2,600 feet to the proposed preferred location of the new SDG&E switchyard. The final location of the utility switchyard and its interconnection to the existing or realigned Mission to Miguel transmission line is subject to SDG&E approval. The Applicant intends to commence interconnection facilities review with SDG&E transmission department personnel pursuant to a an engineering support agreement entered into with SDG&E.

The total length of this segment of the 230kV gen tie between the plant site and the proposed location for the new SDG&E switchyard will depend on the final site selected for the new switchyard. The 230kV gen tie will be installed on steel poles (Figure 2.5-1) and will have a ruling span of about 350 to 400 feet. The location and width of the gen tie corridor ROW will consider, as required, 230kV line clearances and address operational and maintenance criteria required by California Public Utilities Commission (CPUC) General Order (GO)-95 In addition, the new gen tie will conform to the recent Electromagnetic Field (EMF) Guidelines for Electrical Facilities prepared in response to the CPUC Decision 06-01-042.

The proposed route of the gen tie requires a line crossing with the existing 230kV Mission to Miguel 230kV line. The Applicant has identified two possible options for this crossing:

- A direct buried 230kV cable: In this option, the overhead line would terminate before the existing line and transition to an underground cable. Once under the existing line the option exists to either transition back up to an overhead line, which will then lead directly to the proposed new switchyard or to continue the underground cable from the crossing into the proposed switchyard.
- Raised overhead transmission line: In this option, the gen tie line would “go over” the SDG&E T-lines by raising. In this scenario, the gen tie towers on either side of the SDG&E transmission lines are raised to ensure that the gen tie line height provides the proper clearance. However, due to concerns about potential interruption caused by an upper line falling on a lower line and the resulting unexpected outage and mechanical damage, typically require that the existing T-lines remain high in these types of line crossings. This option would necessitate the developer to pay for raising the towers on

the utility lines. In this crossing that would mean four large multi-bundled towers would need to be raised and the cost would be high and the responsibility of the developer. This option is therefore impractical.

In light of these options, the Applicant proposes to underground the gen tie line prior to the crossing and, depending on the final location of the switchyard, to continue running the underground cable directly into the switchyard.

The Applicant proposes to direct bury the 230kV cable ensuring proper protection of the cable and attention to thermal management as well as the associated electric and magnetic field management. The greatest benefit of this option is the reduced impact on the existing line – mainly in terms of live-line maintenance. As the proposed route of the cable is relatively short, no manholes or joints are anticipated. 230kV cable technology is considered routine and there are many competitors providing very reliable products. Likewise, the bushings to be used at the connection between the overhead line conductors and the cable as well as between the cable and the switchyard equipment are considered well established, with many products available.

2.5.5 Generation Plant Switchyard

The proposed Project 230kV switchyard consists of a single three-winding generation station unit transformer (GSUT) and associated 230kV gas-insulated (SF_6) circuit breaker, disconnect switches, and interconnecting bus structures. The plant switchyard general arrangement layout is shown on Figure 2.3-1. An electrical single-line diagram of the proposed Project substation is shown on Figure 2.5-2.

The 230kV plant switchyard and all associated equipment will be designed for 1,200 amperes (A) continuous current and a 40 kiloampere interrupting capacity (kAIC). As shown on Figure 2.4-2, each cluster of generator sets would be provided with an independent tie to a dedicated low side winding of the GSUT inside the plant switchyard via 15kV nonsegregated-phase bus duct. The high-side bus, consisting of rigid aluminum bus structures, or strain bus, will be connected to the new 230kV transmission line through 60-foot dead-end structures on the southeast end of the switchyard.

One 13.8kV-480 volt auxiliary power transformer will be connected to each 15kV metal-clad switchgear. This switchgear would collect power from a cluster of five to six generator sets and distribute it to the respective GSUT winding. The auxiliary power transformers would provide power to all auxiliary loads within the plant. Startup and standby power would be supplied from the grid through the GSUT, which will backfeed 13.8kV power into the power plant 15kV switchgear and to the respective auxiliary transformers. Alternately, startup and standby power might be provided by separate 480 volt services from the local distribution system, if available.

Auxiliary controls and protective relay systems for the 230kV plant switchyard would be installed in a controlled enclosure on the west side of the plant switchyard.

2.5.6 Overhead Generation Tie-Line Characteristics

The proposed gen tie will be designed to carry the full output of the facility at 230kV. The gen tie would be arrayed in a single-circuit configuration, supported by steel structures placed at appropriate intervals. The overhead line conductor type (Table 2.5-1) to be considered will have

a range of 859 thousand circular mil (kcmil) Aluminum Conductor Steel Reinforced (ACSR), Expanded, 954 kcmil ACSR (Rail) to 1113 kcmil ASCR/SDC (or higher) to curtail corona effect.

Table 2.5-1 Comparisons of Conductor Sags and Tensions

Span Length in Feet	Conditions	Type 1113 kcmil ACSR SDC	Type 954 kcmil Alloy Expanded	Type 859 kcmil ACSR Expanded
400 ft span **				
MTHL	I	14506	8500	8950
0° bare	F	9881	5060	5060
120° bare	F	3874 (06.20')	2282 (10.54')	3270 (07.35')
212° bare	F	2664 (09.02')	1694 (14.21')	2662 (09.03')
600 ft span				
MTHL	I	14743	9109	9437
1 inch ice	I		10710	11133
21 psf wind	I		7328	7723
0° bare	F	9488	5060	5060
120° bare	F	4487 (12.08')	2702 (14.80')	3097 (15.25')
212° bare	F	3279 (16.57')	2099 (19.12')	2514 (18.84')
800 ft span				
MTHL	I	15403	9998	9861
1 inch ice	I		12243	12472
21 psf wind	I		8395	8166
0° bare	F	9095	5060	5060
120° bare	F	5197 (18.56')	3200 (22.24')	3587 (23.45')
212° bare	F	4035 (23.97')	2600 (27.49')	3021 (27.92')
1,000 ft span				
MTHL	I	16039	10679	10416
1 inch ice	I		13483	13520
21 psf wind	I		9218	8860
0° bare	F	8914	5060	5060
120° bare	F	5778 (26.12')	3578 (31.14')	3934 (33.49')
212° bare	F	4682 (32.32')	3011 (37.15')	3429 (38.53')

Notes:
** tension data extrapolated
Acronyms and Abbreviations:
ACSR – Aluminum Conductor Steel Reinforced Cable
F – Final
ft - feet
I – Initial
kcmil – thousand circular mil
MTHL – Maximum Tension Heavy Loading
psf – pound per square foot
SDC - Self Damping Conductor

Selection of the appropriate conductor depends upon the peak power to be transmitted through the gen tie line. The Project is capable of generating 100 MW. Assuming power factor equal to 0.95, nominal current of single circuit 230 kV line will be 264 (A).

Below are the current ratings for the three conductors suggested above:

Conductor type	Current Rating (A)*
859 kcmil ACSR	>918
954 kcmil ACSR (Rail)	993
1113 kcmil ASCR/SD	1092

* Ratings are from Vendor's catalogue

Current ratings for all conductors are greater than 3 times as many amps as required to accommodate the proposed gen tie line current. Considering all ampacity de-rating factors; solar heat absorption and conductor heat due to current and all site condition factors (such as maximum ambient temperature, azimuths of sun and line), all conductors are more than sufficient with regards to ampacity. The only concern in conductor selection is corona. By experience, use of conductors larger than 900 kcmil in size guarantees limitation of corona in acceptable range. As a result, the Applicant proposes to use 954 kcmil Rail ASCR conductor for this line.

The selection of the steel pole designs for the 230kV gen tie will be determined by the exact route and to accommodate changes of direction in the transmission line route. The dead-end poles, heavy-angle poles, and tangent type poles would be used as needed.

The structure of gen tie line will be of single circuit steel mono-pole design with 230kV circuit. Tangent pole outline and geometry will be as shown in Figure 2.5-1 and Table 2.5-2.

Table 2.5-2 Steel Pole Structure Dimensions

Minimum Dimensions (ft)		
Voltage	230kV	
Number of Insulators	12	13
Dimension A	10.0	10.5
Dimension B	11.0	11.5
Dimension C	13.0	14.
Dimension D	10.0	11.0

Reference: RUS BULETTIN 1724E-204, Transmission Line Structures, Guide for Steel Pole Structure Dimensions (115kV-230kV)

Referring to Table 2.5-1, the maximum sag for 954 kcmil ACSR (Rail) conductor in 600-foot span and 212° F is 19.12 feet. Therefore, tangent pole height will reach (assuming 13 insulators per string):

D + 2*C + insulator string length + sag + clearance above ground =
11 + 2* 14 + 6.78 + 19.12 + 20.9 = 85.8 (feet)

The proposed 230kV gen tie will exit the plant switchyard in a slack span configuration from the dead-end structures (approximately 60 feet tall) on the north side of the plant site (Figure 2.3-1). From that structure, the 230kV gen tie will travel north then northwest with an average span of 400 to 600 feet. Depending on the final routing of the gen tie, heavy-angle structures will be placed as required along the approximate one mile long ROW of the 230kV gen tie to

accommodate changes in direction of the line. The remaining new pole structures will be tangent-type design and will be spaced based on engineering criteria. The new pole structures will be approximately 70 to 90 feet tall. Figure 2.5-1 shows a typical mono steel pole with vertical arrangement of three phases at one side of conductor, which has been chosen for the gen tie. Reference is made to RUS Bulletin 1724E-204, Transmission Line Structures, Guide for Steel Pole Structure Dimensions (115kV-230kV) in Table 2.5-2. A 954 kcmil ACSR Rail conductor has been chosen to avoid Corona. This conductor has sufficient capacity to carry required current.

2.5.7 Transmission Interconnection System Impact Studies (SIS)

The proposed Project will be operated as a peaking station and will enhance the reliability and availability of the 230kV network in the area by supporting intermittent solar and wind generation. The Phase II SIS is being performed by CAISO/SDG&E for the proposed Project. From the SIS report, the impact of the proposed Project's generation capacity on the grid will be determined. The transmission system's transient performance, relative to CAISO reliability guidelines, will also be analyzed. A copy of the Phase II SIS report will be provided when the final version is available. A copy of the Large Generator Interconnection Study Process Agreement is provided as Appendix B.9.

2.5.8 Transmission Interconnection Safety and Nuisances

This section discusses safety and nuisance issues associated with the proposed electrical interconnection of the proposed Project to the SDG&E electrical grid. Construction and operation of the proposed overhead gen tie will be undertaken in a manner that ensures the safety of the public, as well as maintenance and ROW crews, while supplying power with minimal electrical interference.

2.5.8.1 Electrical Clearances

Typical high-voltage overhead transmission lines are composed of bare conductors connected to supporting structures by means of porcelain, glass, or polymer 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 safe operation of the line.

The proposed 230kV gen tie will be installed overhead and will be approximately one mile in length, and will be constructed with bare overhead conductors connected to supporting structures by means of porcelain, glass, or polymer insulators. The overhead gen tie will be built by the Applicant and owned and operated by SDG&E. The safety clearance required around the conductors is determined by normal operating voltages, conductor temperatures, short-term abnormal voltages, windblown swinging conductors, contamination of the insulators, clearances for workers, and clearances for public safety. Minimum clearances are specified in GO-95 and the National Electrical Safety Code (NESC). Electric utilities, state regulators, and local ordinances may specify additional (more restrictive) clearances.

Gen tie line clearances above ground and ROW width for the 230 kV gen tie are provided in Tables 2.5-3 and 2.5-4 below.

Table 2.5-3 Ground Clearance (Reference: RUS BULLETIN 1724E-200)

Clearance description	Clearance above ground for 230kV line (Nominal Voltage, Phase to Phase (kV_{LL})) in (ft)
Spaces and ways accessible to pedestrians only Note: Areas accessible to pedestrians only are areas where riders on horses or other large animals, vehicles or other mobile units exceeding 8 feet in height are prohibited by regulation or permanent terrain configurations or are not normally encountered nor reasonably anticipated. Land subject to highway right-of-way maintenance equipment is not to be considered as being accessible to pedestrians only	20.9

Table 2.5-4 ROW Width (Reference: RUS BULLETIN 1724E-200)

Clearance description	Typical ROW width for 230kV line (Nominal Voltage, Phase to Phase (kVLL)) in (ft)
ROW width	125-200

Other typical clearances will be specified for the following, as part of the final design:

- Distance between the energized conductors themselves (same line)
- Distance between the energized conductors and the supporting structure (taking into account the length of insulators used and the swing and vibration movement of the conductors)
- Distance between the 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
- Distance from the energized conductors to the ground and features, such as roadways, railroads, driveways, parking lots, navigable waterways, and airports
- Distance from the energized conductors to buildings and signs
- Distance from the energized conductors to other power lines (examples include other parallel lines and line being crossed over)

The proposed Project gen tie will be designed to meet all national, state, and local code clearance requirements. These standards are summarized in the LORS table in Section 2.9 and described in more detail in Appendix B Engineering Design Criteria.

2.5.8.2 Electrical Effects

The electrical effects of high-voltage transmission lines fall into two broad categories—corona effects and field effects. Because these effects have the potential to cause a deviation from the normal they are often termed Electromagnetic Interference (EMI):

- Corona is the ionization of the air that occurs at the surface of the energized conductor and suspension hardware due to very high (i.e., when it is above a critical level) electric

field strength at points between the high voltage side of the line and ground. The location and extend of corona varies and is dependent on the design, construction techniques and the environment. Besides the power loss associated with corona, corona could result in radio and television reception interference (RI and TVI), audible noise (AN), light, and production of ozone. The key technical parameters affecting corona include: line voltage, line phase configuration, insulating distances, insulating hardware, conductors and configuration of conductor bundles, environmental parameters, and attention to detail during construction.

- Field effects are a direct result of the voltage and current associated with the line. Electric field effects are a direct result of the 60 hertz (Hz) line voltage and the 60Hz magnetic field effects and are a consequence of the load current. These fields are of interest because they couple into nearby objects. Consequently, levels need to be managed such that the coupling does not produce unintended consequences.

Operating power lines, like the energized components of electrical motors, home wiring, lighting, and all other electrical appliances, produce electric and magnetic fields commonly referred to as the electromagnetic field (EMF). The dominant EMF produced by the alternating current electrical power system in the United States has a frequency of 60 Hz, meaning that the intensity and orientation of the field changes 60 times per second. Consequently, it is essential to ensure electromagnetic compatibility (EMC) with the operating environment.

The 60 Hz power line fields are considered to be extremely low frequency. To place this in context, other common frequencies include: AM radio, which operates up to 1,600,000 Hz (1,600 kilohertz [kHz]); television, 890,000,000 Hz (890 megahertz [MHz]); cellular telephones, 900,000,000 Hz (900 MHz); microwave ovens, 2,450,000,000 Hz (2.4 gigahertz [GHz]); and X-rays, about 1 billion Hz. Higher frequency fields have shorter wavelengths and greater energy in the field. Microwave wavelengths are a few inches long and have enough energy to cause heating in conducting objects. High frequencies, such as x-rays, have enough energy to cause ionization (breaking of atomic or molecular bonds). At the 60 Hz frequency associated with electric power transmission, the electric and magnetic fields have a wavelength of 3,100 miles and have very low energy that does not cause heating or ionization. The 60 Hz fields do not radiate, unlike radio frequency fields.

2.5.8.3 Electric Fields

Electric fields around transmission lines are produced by potential difference (voltage) between an energized conductor and surrounding objects. Electric field strength is directly proportional to the line's voltage; that is, increased voltage produces a stronger electric field. The electric field is inversely proportional to the distance from the conductors, so that the electric field strength declines as the distance from the conductor increases. As the electric field is relative to line voltage which can be considered a "constant", electric field around a transmission line remains practically steady and is not affected by the common daily and seasonal fluctuations in use of electricity by customers. The electric field pattern is however affected by both permanent and temporary objects within the electric field.

The basic unit of measurement for an electric field is V/m – volts per meter. In the case of transmission lines the usual unit of measure is kV/m – thousands of volts per meter. Table 2.5-5 provides a preliminary calculation of the electric field strength for the Project's 230kV gen tie line.

Table 2.5-5 Calculation of Electric Field at Ground

Reference: EPRI's Red Book, section 8.5, Nomogram to calculate Emax.

Introducing involved parameters:

- H: Distance between conductor to measuring point at ground,
- D: Diameter of conductor: 1.165 (in) or 0.097 (ft) taken from vendor's catalogue,
- S: Phase spacing: 14 (ft),
- E: Electrical field,
- V: nominal line-line voltage: 230 kV,
- HE/V: To be taken from reference graph,
- H/D: To be calculated.

Distance from ROW Centerline (ft)	H (ft)	H (m)	H/D	S/H	HE/V	E (kV/m)
-50	43.81	13.35	451.62	0.32	0.0685	1.1799
-45	39.48	12.04	407.06	0.35	0.071	1.3569
-40	35.34	10.77	364.35	0.40	0.083	1.7721
-35	31.45	9.59	324.22	0.45	0.087	2.0875
-30	27.91	8.51	287.75	0.50	0.095	2.5683
-25	24.88	7.58	256.50	0.56	0.097	2.9418
-20	22.56	6.88	232.60	0.62	0.108	3.6120
-15	21.19	6.46	218.46	0.66	0.112	3.9882
-10	20.95	6.39	216.02	0.67	0.1125	4.0514
-5	21.89	6.67	225.64	0.64	0.1085	3.7406
0	23.85	7.27	245.93	0.59	0.1055	3.3372
5	26.63	8.12	274.52	0.53	0.0965	2.7346
10	29.98	9.14	309.12	0.47	0.092	2.3153
15	33.75	10.29	347.94	0.41	0.0845	1.8893
20	37.80	11.52	389.72	0.37	0.079	1.5769
25	42.06	12.82	433.61	0.33	0.069	1.2379
30	46.47	14.16	479.03	0.30	0.0675	1.0962
35	50.98	15.54	525.58	0.27	0.0645	0.9547
40	55.58	16.94	572.98	0.25	0.063	0.8553
45	60.24	18.36	621.05	0.23	0.0615	0.7704
50	64.95	19.80	669.63	0.22	0.06	0.6970

Anticipated electric field "E" levels are well within acceptable margin of 230kV lines.

The highest electric field on ground (directly below the conductor) is approximately 4.05 kV/m. The electric field at 40 feet from that point is approximately 0.7 kV/m. Since the ROW width of this line is 125 feet, the electric field at the edge of ROW should be well below the acceptable maximum value (utilized formulas and graphs are taken from EPRI's red book, ROW from RUS Bulletin 1724E-200).

Once the gen tie route is finalized, a final calculation will be performed to determine the actual strength of the electric field along the proposed route.

2.5.8.4 Magnetic Fields

Magnetic fields or EMF around transmission lines are produced by the current flow, measured in terms of amperes, through the conductors. The magnetic field strength is directly proportional to the magnitude of current flow; that is, increased amperes produce a stronger magnetic field, or increased magnetic flux density. The magnetic field is inversely proportional to the distance from the conductors. Thus, like the electric field, the magnetic field strength declines as the distance from the conductor increases. The international unit of measure for magnetic flux density is Tesla (T). In the United States, the more common measure is Gauss (G). For transmission lines, typical magnetic fields are expressed in units of milligauss (mG). The amperes and, therefore, the magnetic field around a transmission line, fluctuate daily and seasonally as the use of electricity varies.

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

EMF field strengths were calculated using the Transmission Line Parameters and Transmission Line Calculator program developed by the Safe Engineering Services & Technologies, LTD (SESTLC). SESTLC calculates the electric fields (EF) expressed as kV/m and the EMF expressed in mG (Table 2.5-6).

The various inputs for the calculations include voltage, current load, current angle, conductor type and spacing, number of subconductors, subconductor bundle symmetry, spatial coordinates of the conductors and shield wire, various labeling parameters, and other specifics. The field level is calculated perpendicular to the line and at mid-span where the overhead line sags closest to the ground (calculation point). The midspan location, therefore, provides the maximum value for the field. The EF and EMF values should be calculated at a level of 3 feet (or 1 meter) above flat terrain.

Table 2.5-6 Calculation of Magnetic Field at 1 Meter above Ground

1- Calculation of magnetic field at 1 meter above ground:

Reference: EPRI's Red Book, section 8.6.

Introducing involved parameters:

- B: Magnetic field (in mG),
- R: Distance between center of set of conductors (phases) to measuring point at 1 meter above ground (in m),
- P: Spacing between conductors: 14 (ft) or 4.27 (m)
- I: Current: 264 (A).

Distance from ROW Centerline (ft)	R(m)	B (mG)
-50	39.94	2.45
-45	35.15	3.16
-40	30.42	4.22
-35	25.80	5.87
-30	21.34	8.57
-25	17.19	13.22
-20	13.62	21.06
-15	11.20	31.13
-10	10.75	33.82
-5	12.47	25.12
0	15.67	15.91
5	19.63	10.13
10	23.99	6.79
15	28.56	4.79
20	33.25	3.53
25	38.02	2.70
30	42.84	2.13
35	47.70	1.72
40	52.59	1.41
45	57.49	1.18
50	62.41	1.00

While the State of California does not set a statutory limit for electric and magnetic field levels, the CPUC, which regulates electric transmission lines, mandates EMF reduction as a practicable design criterion for new and upgraded electrical facilities. As a result of this mandate, the regulated electric utilities have developed their own design guidelines to reduce EMF at each new facility. In the spring of 2006, a utility workshop culminated in the development of standardized design guidelines. The CEC, which regulates transmission lines to the first POI, requires independent power producers (IPP) to follow the existing guidelines used by local electric utilities or transmission system owners.

In keeping with the goal of EMF reduction, the interconnection of the proposed Project will be designed and constructed using the principles outlined in the SDG&E publication, *EMF Design Guidelines for Electrical Facilities*. These guidelines explicitly incorporate the directives of the CPUC by developing design procedures compliant with Decision 93-11-013 and General Orders 95, 128, and 131-D. When the gen tie structures, conductors, and ROW are designed according to the SDG&E guidelines, the gen tie will be consistent with the CPUC mandate.

From page 37 of the SDG&E guidelines, the following are the primary techniques for reducing EMF along the line:

1. Increase the pole height for overhead design.
2. Use compact pole-head configuration.
3. Minimize the current on the line.
4. Optimize the configuration of the phases (A, B, C).

The anticipated EMF levels have been calculated for the proposed Project gen tie as preliminarily designed. The CEC requires actual measurements of pre-interconnection background EMF to compare with measurements of post-interconnection EMF levels. If required, the pre- and post-interconnection verification measurements will be made consistent with IEEE guidelines and will provide sample readings of EMF at the edge of the ROW. Additional measurements will be made by request for locations of particular concern.

The highest magnetic field at 1 meter above ground (directly below the conductor) is 34 mG. The magnetic field at 40 feet from that point is 1 mG. Since the ROW width of this gen tie is 125 feet, the magnetic field at the edge of the ROW is well below the acceptable maximum value (utilized formulas are taken from EPRI's red book).

2.5.8.5 Audible Noise

Corona is a function of the voltage of the line, the diameter of the conductor, and the condition of the conductor and suspension hardware and the environment. The electric field gradient is the rate at which the electric field changes and is directly related to the line voltage. The electric field gradient is greatest at the surface of the conductor. Large-diameter conductors and bundles of conductors (a bundle of conductors is equivalent to a conductor of the same diameter as the outer diameter of the bundle) have lower electric field gradients at the conductor surface and, hence, lower corona than smaller conductors, everything else being equal. Irregularities, such as knicks and scrapes on the conductor surface, or sharp edges on suspension hardware, concentrate the electric field at these locations and increase corona at these spots. Similarly, contamination on the conductor surface, such as dust or insects, can cause irregularities that are a source for corona. Raindrops, snow, fog, and condensation are also sources of irregularities. Corona typically becomes a design concern for transmission lines having voltages of 345kV and above.

It is important that any discussion of EMF and audible noise include the assumptions used to calculate these values and remembering that EMF and audible noise near the power lines vary with regard to line design, line loading, distance from the line, and other factors. Both the electric field and audible noise depend on line voltage, which remains nearly constant for a transmission line during normal operation. A worst-case voltage of 242kV (230 kV +5 percent) will be used in the calculations for the proposed 230kV gen tie.

Once the transmission line route is finalized a calculation will be performed to determine the magnitude of audible noise from the 230kV gen tie along the proposed route. The following assumptions commonly used by utility companies will be adopted for this study:

- The line will be considered loaded at 75 percent of forecasted load.
- Magnetic field strength will be calculated at 3 feet above ground.
- Resultant magnetic fields are to be utilized.
- All line loadings are assumed balanced.
- Dominant power flow directions will be used.

Currently, the region immediately surrounding the power plant site is undeveloped land and the majority of noise sensitive areas are located to the east in the City of Santee. There is

significant terrain shielding that will help block sound propagating to the residential areas. Given the extended separation distances and terrain shielding, operation of the electrical transmission line and switchyard are not expected to result in an adverse noise impact. Transmission line and switchyard audible noise are further discussed in AFC Section 4.3.4.3.

2.5.8.6 Induced Current and Voltages

A conducting object, such as a vehicle or person located within an electric field, will have induced voltages and currents. The strength of the induced current will depend on the electric field strength, the location, size and shape of the conducting object, and the object-to-ground resistance. Examples of measured induced currents in a 1 kV/m electric field are about 0.016 milliamps (mA) for a person, about 0.41 mA for a large school bus, and about 0.63 mA for a large trailer truck.

When a conducting object is isolated from the ground (e.g. the rubber tires of a vehicle) and a grounded person touches the object, a perceptible current or shock could occur as the current flows to ground. In the case of a person the common terms for this are called: step-and-touch potential. Shocks are classified as below perception, above perception, secondary, and primary. The mean perception level is 1.0 mA for a 180-pound man and 0.7 mA for a 120-pound woman. Secondary shocks cause no direct physiological harm, but could annoy a person and cause involuntary muscle contraction. The lower average secondary shock level for an average sized man is about 2 mA. Primary shocks can be harmful. Their lower level is described as the current at which 99.5 percent of subjects can still voluntarily “let go” of the shocking electrode. For a 180-pound man this is 9 mA, for a120-pound woman, 6 mA, and for children, 5 mA. The NESC specifies 5 mA as the maximum allowable short-circuit current-to-ground from vehicles, trucks, and equipment near transmission lines.

The mitigation for hazardous and nuisance shocks is to ensure that metallic objects on or near the ROW are grounded, and that sufficient clearances are provided at roadways and parking lots to keep electric fields at these locations sufficiently low to prevent vehicle short circuit currents from exceeding 5 mA.

Magnetic fields can also induce voltages and currents in conducting objects. Typically, this requires a long metallic object, such as a wire fence or aboveground pipeline that is grounded at only one location. A person who closes an electrical loop by grounding the object at a different location will experience a shock similar to that previously described for an ungrounded object. Mitigation for this problem is to ensure multiple grounds on fences or pipelines, especially those that are oriented parallel to the transmission line.

The proposed 230kV gen tie will be constructed in conformance with CPUC GO-95 and Title 8 CCR 2700 requirements. Therefore, hazardous shocks are unlikely to occur as a result of Project construction, operation, or maintenance.

2.5.8.7 Communications (Radio or Television) Interference

The communication interference (radio or television) for the proposed Project 230kV gen tie has been calculated for two different environmental conditions applied to the new gen tie—the heavy rain condition and the fair weather condition.

The North American Regional Broadcasting Agreement recognizes a 54 decibel (dB) signal level as the outer boundary of an AM radio station's primary service territory. The amount of AM radio interference caused by the gen tie depends on the relative signal strength of the radio signal and other sources of ambient radio noise. The Federal Communications Commission (FCC) recommends the following minimum signals as necessary to reliably serve a primary service area:

- Business City Area: 80 to 94 dB
- Residential City Area: 66 to 80 dB
- Rural Area: 40 to 54 dB

The requirements for higher signal strengths in city areas takes into consideration the higher level of ambient noise levels typically found in the city as compared with a rural location.

Good radio reception is typically based on a signal strength 26 dB greater than ambient noise. This 26 dB signal-to-noise ratio is applied to the fair weather ambient noise level. A commonly accepted level of transmission radio noise is 40 to 45 dB at the edge of ROW for fair weather conditions. A 40 dB noise level and 26 dB signal-to-noise ratio would imply a signal strength of 66 dB, which agrees with recommended signal strength as listed above for a residential city area.

Digital communication (digital radio and TV) and FM radio is immune to corona type radio noise and, therefore, is not considered in evaluation of transmission radio interference. Television audio is also an FM signal that is not affected by transmission line radio noise. In the past and in some areas, Television video is an AM signal that is subject to interference from transmission lines. As analog TV is phased out in favor of digital TV, TVI will not be an issue. However, the frequency spectrum for fair weather corona noise follows an inverse law. The transmission noise attenuates at a rate of 20 dB per frequency decade. In addition to attenuation for frequency, an adjustment is made for the different bandwidth of the television signal versus AM radio. When the frequency and bandwidth adjustments are made, the net correction is 10 dB. The expected noise at television frequencies is 10 dB less than for AM radio.

The following is a calculation of potential radio and TV interference levels:

Reference: EPRI's Red Book, sections 5.3 and 5.4.

Introducing involved parameters:

- RI: Radio interference,
- TVI: Television interference,
- h: Height of closest phase to ground (in m),
- R: Lateral distance from antenna to nearest phase

Assumptions:

- Ground resistivity is taken equal to 100 ohms (Ω).
- Prediction of RI & TVI is made for an antenna located at 100 m from the line.

- Frequency of interest for RI and TVI prediction is assumed to be 83.25 MHz (carrier frequency of TV channel 6 with a grade B signal of 47dB above 1 μV/m).
- RI and TVI have been calculated for heavy rain condition as the worst case.
- RI level of 362 kV line has been considered as the base case and correction factors and dB adders have been extrapolated. This assumption will result in conservative values as 230 kV line has smaller corona than a 362 kV line. Base case parameters are:
  - Line voltage: 362 kV,
  - Phase arrangement and spacing: Vertical and 7.5 m,
  - Lowest phase to ground clearance: 12.5 m

Calculations:

- RI level in heavy rain from base case graph (introduced reference): 73.2 dB,
- Adjustment due to voltage level from corresponding graph: -18.5 dB,
- Adjustment due to phase spacing: +2.2 dB from corresponding graph,
- Adjustment due to average height above ground from corresponding graph: +0.5 dB,
- 3.2 = Constant
- Tie-Line project's RI = 73.2 - 18.5 +2.2 + 0.5 = 57.4 dB above 1 μV/m,
- TVI = RI – 20 $Log_{10}(f((1 + (R/h)^2)/(1 + (15/h)^2))^{0.5})$ +3.2 = 57.4 - 54.18 +3.2 = 6.42 dB above 1 μV/m,
- SNR (Signal to Noise ratio) = 47 - 6.42 = 40.58 dB.

Referring to SNR rating scale (graph 5.3.5 of introduced reference), TVI of the project is less than scale 3 and is within the acceptable range. SNR in other conditions such as wet conductor or dry weather condition is much smaller and is actually negligible.

2.5.8.8 Aviation Safety

Federal Aviation Administration (FAA) Regulations, Title 14 of the Code of Federal Regulations (CFR), Part 77, establishes standards for determining obstructions in navigable airspace in the vicinity of airports that are available for public use and are listed in the airport directory of the current airman's information manual. These regulations set forth requirements for notification of proposed obstructions that extend above the earth's surface. FAA notification is required for any potential obstruction structure erected over 200 feet in height above ground level. Notification is required if the obstruction is greater than specified heights and falls within any restricted airspace in the approach to airports. For airports with runways longer than 3,200 feet, the restricted space extends 20,000 feet (3.3 nautical miles) from the runway with no obstruction greater than a 100:1 ratio of the distance from the runway. For airports with runways measuring 3,200 feet or less, the restricted space extends 10,000 feet (1.7 nautical miles) with a 50:1 ratio of the distance from the runway. For heliports, the restricted space extends 5,000 feet (0.8 nautical miles) with a 25:1 ratio.

The Marine Corps Air Station (MCAS) Miramar boundary is to the north of the Project approximately 1.55 miles, and the main runway complex at MCAS Miramar is 6 miles to the northwest. Gillespie Field (airport) lies approximately 3 miles to the southeast, and Montgomery

Field (airport) lies 6.4 miles to the southwest. While the gen tie will be below the thresholds associated with FAA regulations and impacts would be less than significant, the Applicant will file a Notice of Proposed Construction or Alteration (Form 7460-1) with the FAA. The Project would also comply with the San Diego County Regional Airport Land Use Commission (ALUC) – Miramar Airport Land Use Compatibility Plan.

2.5.8.9 Vegetation Management and Associated Fire Hazards

The proposed 230kV gen tie will be designed, constructed, and maintained in accordance with GO-95, which establishes clearances from other constructed and natural structures and tree-trimming requirements to mitigate fire hazards. In the event that trees are encountered along the proposed gen tie corridor, those trees will be trimmed or removed to ensure mitigation of these hazards. However, it is unlikely that any vegetation management will be required because the entire proposed route is over scrubland. SDG&E will maintain the gen tie ROW and immediate area in accordance with accepted industry practices that will include identification and abatement of any fire hazards to ensure safe operation of the gen tie.

2.5.9 Generation Tie-Line Interconnection Construction

The proposed 230kV gen tie will start at the dead-end structure inside the plant switchyard on the north side of the power plant. The gen tie will then proceed north along property owned by Sycamore Landfill for approximately 2,600 feet then run north-west for approximately 2,600 feet to the POI, the new SDG&E switchyard. The location of the utility switchyard needs to be finalized by SDG&E. The total length of this segment of the 230kV gen tie between the Project site and the proposed location for the new SDG&E switchyard is approximately 5,280 feet. The 230kV gen tie will be installed on steel poles and will have a ruling span of about 350 to 400 feet. The gen tie corridor ROW is estimated to be approximately 125 to 200 feet wide and will consider, as required, 230kV gen tie clearances and address operational and maintenance criteria required by the CPUC GO-95. In addition, the new gen tie will conform to the recent EMF Guidelines for Electrical Facilities prepared in response to CPUC Decision 06-01-042. The gen tie will be serviced by an unpaved, approximately 16-foot wide access road that will parallel the gen tie route.

Construction of the gen tie to the proposed SDG&E switchyard will occur within the limits of Sycamore Landfill-owned property.

The proposed 230kV gen tie will be connected directly to a new SDG&E switchyard, which will be designed, built, and operated by SDG&E. The new SGD&E switchyard is anticipated to be located approximately 1 mile northwest of the plant site, along the existing 230kV transmission lines. The Applicant has requested SDG&E assistance in selection of the site for the new switchyard from possible sites along the existing transmission corridor. The exact routing of this gen tie will be determined during the route survey and detailed design.

Transmission system upgrades may be required beyond the immediate SDG&E point of interconnection.

2.6 FACILITY CLOSURE

2.6.1 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. Causes for temporary closure include a disruption in the supply of natural gas 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 due to plant age, damage to the plant beyond repair, economic conditions, or other reasons. Section 2.6.2 discusses temporary facility closure; Section 2.6.3 discusses permanent facility closure.

2.6.2 Temporary Closure

For a temporary facility closure where no release of hazardous materials occurs, security of the plant will be maintained on a 24-hour basis and the CEC and other responsible agencies will be notified. Depending on the length of shutdown necessary, a contingency plan for the temporary shutdown of operations will be implemented. The contingency plan will be conducted to ensure conformance with all 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 all chemicals from storage tanks and other equipment and the safe shutdown of all equipment. All wastes will be disposed of according to applicable LORS, as discussed in Section 2.9.

If 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 Risk Management Plan (RMP) to be developed. 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.

2.6.3 Permanent Closure

The planned life of the proposed Project is 30 years. However, if the plant is still economically viable, it could be operated longer. It is also possible that the plant could become economically noncompetitive earlier than 30 years, forcing early decommissioning. When the plant is permanently closed, the closure procedure will follow a plan that will be developed as described below.

The removal of the plant from service or decommissioning may range from “mothballing” to the removal of all 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 the City of San Diego when more information is available and the timing for decommissioning is more imminent.

To ensure that public health and 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 all appurtenant facilities constructed as part of the facility
- Conformance of the proposed decommissioning activities to all applicable LORS and local/regional plans
- Activities necessary to restore the site if the plan requires removal of all 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 all facility components. The Applicant will attempt to sell unused chemicals back to the suppliers or other purchasers or users. All equipment containing chemicals will be drained and shut down to ensure public health and safety and to protect the environment. All nonhazardous wastes will be collected and disposed of in appropriate landfills or waste collection facilities. All hazardous wastes will be disposed of according to all applicable LORS. The site will be secured 24 hours per day during the decommissioning activities.

2.7 SAFETY, AVAILABILITY, AND RELIABILITY

2.7.1 Natural Hazards

The principal natural hazard associated with the proposed Project is the potential for earthquakes and brush fires.

2.7.1.1 Seismic Hazards

The Project lies outside of designated Fault Hazard Zones. The site is located in Seismic Risk Zone 4. Structures will be designed to meet the seismic requirements of the latest edition of the CBC. Section 4.16, Geologic Hazards and Resources, includes additional information on natural hazards.

2.7.1.2 Flooding Hazards

Flooding is not a hazard of concern. According to the Federal Emergency Management Agency (FEMA), the site is not within either the 100- or 500-year flood plain. Section 4.13, Water Resources, includes additional information on the potential for flooding.

2.7.1.3 Fire Hazards

The proposed Project will be designed, constructed, and maintained in accordance with LORS to mitigate fire hazards.

The plant site and associated linear facilities are located in a Very High Fire Hazard Severity Zone (VHFHSZ) based on the City of San Diego Fire-Rescue Department Official Very High Fire Hazard Severity Zone Map (Grids 29 and 30). The Project design will include considerations for building standards as identified in Chapter 7A of the California Building Code (CBC), as adopted and amended by the City of San Diego, and the additional building standards identified in Chapter 14 Article 5 Division 38 of the San Diego Municipal Code.

The proposed 230kV gen tie will be designed, constructed, and maintained in accordance with GO-95, which establishes clearances from other constructed and natural structures and tree-trimming requirements to mitigate fire hazards. In the event that trees are encountered along the gen tie corridor, those trees will be trimmed or removed to ensure mitigation of these hazards before or during construction of the gen tie. However, it is unlikely that any vegetation management will be required because the entire proposed route is over scrubland. Following construction, SDG&E will maintain the gen tie corridor and immediate area in accordance with accepted industry practices that will include identification and abatement of any fire hazards to ensure safe operation of the line.

2.7.2 Emergency Systems and Safety Precautions

This subsection discusses the fire protection systems, emergency medical services, and safety precautions to be used by project personnel. Section 4.6, Socioeconomics, includes additional information on area medical services, and Section 4.10, Worker Health and Safety, includes additional information on safety for workers. Appendices B1 through B7 contain the design practices and codes applicable to safety design for the Project. Compliance with these requirements will minimize project effects on public and employee safety.

2.7.2.1 Fire Protection Systems

The Project will rely on both onsite fire protection systems (as described in Section 2.3.11) and local fire protection services. The proposed Project is located within an area that San Diego County has designated as Very High Severity Hazard zone for brush fires. A brush fire burned in the vicinity of the Project in 2008. Section 4.6, Socioeconomics, provides information on local fire protection capability.

A comprehensive Fire Protection Plan will be prepared for the Project that will be approved by the Fire Marshal. If the Fire Protection Plan requires more stringent design requirements than described herein, then the more stringent requirements will be incorporated in the final plant design.

The vegetation within the overall Project site will be maintained in a manner to reduce the risk of a brush fire reaching the facilities.

Local Fire Protection Services. In the event of a major fire, the plant personnel will be able to call upon the local Fire Department for assistance. The Hazardous Materials Risk Management Plan M for the plant will include all information necessary to permit all firefighting and other emergency response agencies to plan and implement safe responses to fires, spills, and other emergencies. Section 4.9, Hazardous Materials Handling, includes more information on the Hazardous Materials Risk Management Plan and Section 4.6 Socioeconomics describes local fire services including response times.

Personnel Safety Program. The Project will develop an Injury and Illness Prevention Program (IIPP) in compliance with Title 8 CCR Section 3203. The plant will operate in compliance with federal and state occupational safety and health program requirements. Compliance with these programs will minimize project effects on employee safety. These programs are described in Section 4.10, Worker Health and Safety.

2.7.3 Project Quality Control

The Quality Control Program for the Project is summarized in this subsection. The objective of the Quality Control Program is to ensure that all systems and components have the appropriate quality measures applied, whether it is during design, procurement, fabrication, construction, or plant operations. The goal of the Quality Control Program is to achieve the desired levels of safety, reliability, availability, operability, constructability, and maintainability for the generation of electricity. The required quality assurance for a system will be obtained by applying controls to various activities, according to the activity being performed. For example, the appropriate controls for design work will be checking and review, and the appropriate controls for manufacturing and construction will be inspection and testing. Appropriate controls will be applied to each of the various activities for the Project.

2.7.3.1 Project Stages

For quality assurance planning purposes, the Project activities will be divided into the following 10 stages that apply to specific periods of time during the Project:

Conceptual Design Criteria. Design criteria will include such activities as definition of requirements, applicable codes and standards, and engineering analyses.

Preliminary Design. Preliminary design arrangements and calculations will be prepared, consistent with the conceptual design criteria.

Detailed Design. Activities such as refining detailed calculations, preparing detailed drawings and lists that are needed to describe, illustrate, or define systems, structures, or components will be included. This phase will incorporate the dimensioned equipment drawings provided for major equipment and expected details for long lead time items. Cut sheet data and final vendor drawings from the procurement phase will be incorporated into the final and as-built drawings for the plant.

Procurement. Activities necessary to compile and document the contractual, technical, and quality provisions for procurement specifications for plant systems, components, or services will be conducted. This also will include actual procurement and the provision of final dimensioned equipment drawings required to complete detailed design. Appendices B1-B7 include more information on design requirements.

Manufacturer's Control and Surveillance. Activities necessary to ensure that the manufacturers conform to the provisions of the procurement specifications will be conducted.

Manufacturer Data Review. Activities required include reviewing 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, review, and storage of products at the time of delivery to the construction site will be conducted.

Construction/Installation. Inspection and review of storage, installation, cleaning, and initial testing of systems or components at the facility will be conducted.

System/Component Testing. Actual operation of generating facility components in a system will be conducted in a controlled manner to ensure that the performance of systems and components conform to specified requirements.

Plant Operation. As the Project progresses, the design, procurement, fabrication, erection, and checkout of each generating facility system will progress through the nine stages defined above, culminating in plant commercial operation.

2.7.3.2 Quality Control Records

The following quality control records will be maintained for review and reference:

- Project instruction manuals;
- Design calculations;
- Project design criteria, drawings, and calculations;
- Quality assurance audit reports;
- Conformance to construction record drawings;
- Procurement specifications (contract issue and change orders); and
- Purchase orders and change orders.

A list of qualified suppliers and subcontractors will be developed for equipment purchase orders. Before contracts are awarded, the subcontractors' capabilities will be evaluated by the entity making the purchase. Construction activities will encompass the last four stages of the Project: receipt inspection, construction/installation, system/component testing, and plant operations. The construction contractor will be contractually obligated to perform the work in accordance with the quality requirements specified in its contract with the Project.

The contractor's subcontractors' quality compliance will be surveyed, as appropriate, through inspections, audits, and/or administration of independent testing contracts.

A plant operation and maintenance (O&M) program, typical of a project this size, will be implemented by the Applicant and/or its plant O&M contractor to assure that proper O&M procedures and methods are employed. A specific program for this project will be defined and implemented prior to and/or during initial plant startup.

2.7.4 Reliability

The proposed Project will have the capability to operate 7 days per week, 24 hours per day. Special features are included in the Project design to ensure the power plant's reliability, including redundancy of critical components. The power plant uses 11 separate, parallel trains of generators, each with an independent engine and set of auxiliary components. This operation in parallel provides a capacity to address maintenance or repairs on individual components without interrupting the operation of the other trains.

The planned operational life of the Project is 30 years. In order for this life to be realized, and in order for the plant to operate reliably for this duration, a preventive maintenance program will be implemented. This program will begin during the engineering and procurement phase of the

Project, where the designs and specifications will be reviewed for reliability and maintainability of the plant systems and equipment. Once the plant goes into the operational phase of the Project, the preventive maintenance program will include monitoring, record keeping, and maintenance work to detect and rectify deterioration in systems and equipment before such deterioration results in a forced outage or prolonged maintenance outage. It is expected that the preventive maintenance program will result in high plant availability.

2.7.4.1 Fuel Availability

Natural gas will be provided by SDG&E and delivered to the proposed Project by pipeline. SDG&E is the major transporter of natural gas in southern California. An approximately 2,200-foot-long pipeline will extend from the interconnection point on SDG&E Line 2010 at the corner of Mast Boulevard and Sycamore Landfill Road. The new gas pipeline lateral will be routed along the north side of Sycamore Landfill Road toward the plant site. At the plant site, the natural gas will flow through gas scrubber/filtering equipment, a metering/pressure reducing/regulating station, and a fuel gas heater prior to the gas entering each reciprocating engine. The SDG&E gas delivery system is considered to be extremely reliable and, due to the availability of natural gas, the Project will have no backup supply of natural gas or other fuel.

2.7.4.2 Plant Availability

The proposed Project will operate under the terms of a PPA between SDG&E and the Applicant as an integral part of the overall generation and transmission system, and will be dispatched by SDG&E and/or the CAISO depending on system demand, generating cost, availability of other generating units, contractual agreements, and other factors. Due to the relatively high efficiency of the Project, it is anticipated that for normal operations the facility will operate as an intermediate load/peaking unit. The Project will be designed to operate between approximately 5 and 100 percent of base load to support dispatch service. While the term of the PPA is 20 years, the proposed Project will be designed for an operating life of 30 years; hence its reliability and availability projections are based on this operating life. Operation and maintenance procedures will be consistent with industry standard practices to maintain the useful life status of plant components.

The Project is projected to operate up to 3,800 hours per year (or approximately 43 percent of the time) during each of the 30 years. The projected EAF for the Project, based on the SDG&E PPA, is estimated to exceed 98 percent in the summer months (June-September), and exceed 94 percent in the non-summer months. The equivalent availability factor (EAF) considers the projected percentage of energy production capacity achievable. EAF for a given month is defined as the ratio (expressed as a percentage) of the total energy that was actually available for dispatch that month, taking into account downtime for forced outages, divided by the total energy that could have been produced during the month absent forced outages. The EAF is also weighted for the ability of the Facility to achieve 10 minute start-ups for qualification of the Facility to achieve CAISO certification for Non-Spinning Reserve. EAF differs from the “availability of a unit,” which is the percentage of time that a unit is available for operation, whether at full load, partial load, or standby.

2.7.4.3 Water Availability

The Project will use on average 1 gallon per minute (1.61 acre-feet per year) of water provided by onsite storage tanks, fed by truck delivery, primarily for domestic purposes. This is an extremely small water demand that can be easily met by the trucking in the water supply.

2.8 EFFICIENCY

2.8.1 Power Plant Efficiency

The thermal efficiency expected from a natural-gas-fired reciprocating engine-based plant using the proposed Wartsila engines is approximately 39 percent on a HHV basis. This level of efficiency is estimated based on the facility operating at base-load. A key benefit provided by the Project will be its ability to largely maintain this relatively high efficiency across nearly the entire output range of the plant. This is achievable by operating individual engines at maximum capacity as they are dispatched to meet increasing demand. As a consequence, use of the eleven individual engines will allow the Project's power output to be increased or decreased in increments of roughly 5 to 10 percent of total capacity (based on either partial or full operation of each of the 11 engines), reflecting a very flexible turndown. In contrast, a comparably sized simple-cycle gas turbine plant (100 MW) would consist of substantially fewer units (such as one LMS100 or two LM6000s) and the operational turndown available from each turbine and from the overall plant would be much more limited. Thus, a plant using simple-cycle combustion turbines would be expected to operate at lower efficiencies as total plant output is reduced to match demand and output of variable generating resources, e.g., solar and wind.

The basis of the Project operations will be system dispatch within SDG&E's power generation and transmission system. The Project will provide several ancillary services necessary for reliability of the grid operated by the CAISO, which will require it to be under the direct control of CAISO's Automatic Generation Control system. Although it is expected that the Project will be primarily operated as an intermediate load/peaking facility during summer months, for the balance of the year the Project will be available for load-following or cycling service for up to 3,800 hours per year. The number of startup and shutdown cycles is expected to range between 0 and 400 per year per engine generator set.

Plant fuel consumption will depend on the operating profile of the power plant. It is estimated that the range of fuel consumed by the power plant will be from a minimum of approximately 40 MMBtu/hr at minimum plant load, to a maximum of approximately 1,009 MMBtu/hr (HHV basis) at base load. There will be minimal fuel gas consumption when the facility is shut down as there is a small, <4 MMBtu/hr consumption, when the units are off-line but in warm standby.

The net annual electrical production of the Project cannot be accurately forecasted at the present time due to uncertainties in the system load dispatching model and the associated policies, e.g., uncertainty about how evolving regulation, such as the CARB's Cap-and-Trade Regulation, will affect variable costs and consequently dispatch of existing and proposed generating units. However, due to the relatively high efficiency of the plant, its ability to maintain this efficiency across the entire load range and its flexibility to provide load-shaping power to match changing demand from variable renewable resources, it is expected that the proposed Project will be dispatched with increasing frequency as SDG&E moves to increase its reliance upon renewable resources and achieve California's ambitious RPS. The maximum annual

generation possible from the facility is estimated to be approximately 379 gigawatt hours (GWh) per year.

While the plant maximum output is not expected to degrade over time, efficiency will be impacted by total run time. Degradation of the Project's efficiency over time is expected to average approximately 1.25 percent between major engine overhauls, which are recommended to occur every 16,000 operating hours. Cleaning, maintenance, or overhaul will recapture most of the efficiency loss. When the OEM recommended overhaul practices are followed over the expected 30-year life of the facility, the estimated total, non-recovered loss in efficiency is expected to be less than 3 percent.

2.9 LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

This section provides a list of LORS that apply to the engineering, design, installation, and operation of the proposed 230kV gen tie and associated interconnection facilities. Additional details regarding the design of the Project are found in Appendix B, Engineering Design Criteria. The following compilation of LORS is provided in accordance with the CEC's Rules of Practice and Procedure & Power Plant Site Certification Regulations.

2.9.1 General LORS

The following LORS are generally applicable to the Project:

Table 2.9-1 General LORS

Agency	Area	Reference in AFC
Federal Jurisdiction		
Environmental Protection Agency	40 CFR 50 (Ambient Air Quality Standards) 40 CFR 60 (Performance Standards for New Stationary Sources) 40 CFR 75 (Continuous Monitoring) 40 CFR 112 (Oil Spills) 40 CFR 122 (NPDES Permits) 40 CFR 260 (Hazardous Waste Management) 40 CFR 300 (National Oil and Hazardous Substances Pollution Contingency Plan) 40 CFR 401 (Effluent Standards and Pretreatment Standards)	4.7
Occupational Safety and Health Act	29 CFR 1910 29 CFR 1926	4.10
Federal Aviation Administration	14 CFR 77 (Objects Affecting Navigable Airspace)	4.4
California Jurisdiction		
California Occupational Safety and Health Administration (Cal-OSHA)	Title 8 CCR Division 1 Chapter 4: Subchapter 1 (Unfired Pressure Vessel Safety Orders) Subchapter 4 (Construction Safety Orders) Subchapter 7 (General Industry Safety Orders)	4.10
Department of Toxic Substances Control	Title 22 Division 4.5 (Management of Hazardous Waste)	4.8
Regional Water Quality Control Board (San Diego)	Title 23, Division 4, Chapter 1, Article 9 (San Diego Region)	4.13
California Department of Transportation (Caltrans)	Standard Specifications	4.4

Agency	Area	Reference in AFC
State Water Resources Control Board	23 CCR § 2205 (Waste Discharge Requirements)	4.13
California Energy Code	Title 24 part 6 (2008)	2.0
State Fire Marshal	Title 19 Division 1	2.0
Department of Consumer Affairs	Title 16 Division 5 and 29 (Professional Registration of Engineers and Geologists)	2.0
Department of Motor Vehicles, and California Highway Patrol	Title 13 Motor Vehicles	4.4
Local Jurisdiction		
County of San Diego		4.2
City of San Diego	Regulations and Ordinances including California Building Code – 2010 (California Title 24, includes Building, Electrical, Mechanical, Plumbing, Energy, Fire and Green Building Standards Codes)	4.2
San Diego Air Pollution Control District	Rules and Regulations	4.7

2.9.2 Local LORS

The plant site zoning is consistent with the development of a generating facility (see Section 4.2, Land Use).

The Quail Brush site is located within the city limits of the City of San Diego in an area which will require a zoning change for industrial use, and will therefore be subject to applicable regulations of the City of San Diego as discussed in detail in Section 4.2 Land Use.

2.9.3 Design and Construction

Table 2.9-4 lists the applicable LORS for the design and construction of the proposed transmission line and substations.

Table 2.9-4 Design and Construction LORS

LORS	Applicability	AFC Reference
GO-95, CPUC, "Rules for Overhead Electric Line Construction"	CPUC rule covers required clearances, grounding techniques, maintenance, and inspection requirements.	2.5.7.1
Title 8 CCR, Section 2700 et seq. "High Voltage Electrical Safety Orders"	Establishes essential requirements and minimum standards for installation, operation, and maintenance of electrical installation, and equipment to provide practical safety and freedom from danger.	2.5.7.1, 2.5.7.6
GO-128, CPUC, "Rules for Construction of Underground Electric Supply and Communications Systems"	Establishes requirements and minimum standards to be used for the station AC power and communications circuits.	2.5.7.1
GO-52, CPUC, "Construction and Operation of Power and Communication Lines"	Applies to the design of facilities to provide or mitigate inductive interference.	2.5.7.1
ANSI/IEEE 693 "IEEE Recommended Practices for Seismic Design of Substations"	Provides recommended design and construction practices.	2.5.7.1, 2.5.4

LORS	Applicability	AFC Reference
IEEE 1119 "IEEE Guide for Fence Safety Clearances in Electric-Supply Stations"	Provides recommended clearance practices to protect persons outside the facility from electric shock.	2.5.7.1, 2.5.4
IEEE 998 "Direct Lightning Stroke Shielding of Substations"	Provides recommendations to protect electrical system from direct lightning strokes.	2.5.7.1, 2.5.4
IEEE 980 "Containment of Oil Spills for Substations"	Provides recommendations to prevent release of fluids into the environment.	2.5.7.1, 2.5.4
Suggestive Practices for Raptor Protection on Power lines, April 1996	Provides guidelines to avoid or reduce raptor collision and electrocution.	2.5.7.1

2.9.4 Electric and Magnetic Fields

The applicable LORS pertaining to EMF interference are shown in Table 2.9-5.

Table 2.9-5 Electric and Magnetic Field LORS

LORS	Applicability	AFC Reference
Decision 93-11-013 of the CPUC	CPUC position on EMF reduction.	2.5.7.4
GO-131, CPUC, Rules for Planning and Construction of Electric Generation, Line, and Substation Facilities in California	CPUC construction-application requirements, including requirements related to EMF reduction.	2.5.7.4
EMF Design Guidelines for Electrical Facilities, Southern California Edison Company, EMF Research and Education, 6090 Irwindale Avenue, Irwindale, California 91702, 626-812-7545, September 2004	Large local electric utility's guidelines for EMF reduction through structure design, conductor configuration, circuit-phasing, and load balancing (in keeping with CPUC D.93-11-013 and GO-131).	2.5.7.4
EMF Design Guidelines for Electrical Facilities, Pacific Gas and Electric Company	EMF Design Guidelines adopted in conformance with CPUC Decision 06-01-042 specifying design measures to be considered for reducing EMF	2.5.7.4
ANSI/IEEE 644-1994 "Standard Procedures for Measurement of Power Frequency Electric and Magnetic Fields from AC Power Lines"	Standard procedure for measuring EMF from an electric line that is in service.	2.5.7.4

2.9.5 Hazardous Shock

Table 2.9-6 lists the LORS regarding hazardous shock protection for the Project.

Table 2.9-6 Hazardous Shock LORS

LORS	Applicability	AFC Reference
Title 8 CCR Section 2700 et seq. "High Voltage Electrical Safety Orders"	Establishes essential requirements and minimum standards for installation, operation, and maintenance of electrical equipment to provide practical safety and freedom from danger.	2.5.7.6
ANSI/IEEE 80 "IEEE Guide for Safety in AC Substation Grounding"	Presents guidelines for assuring safety through proper grounding of AC outdoor substations.	2.5.4
NESC, ANSI C2, Section 9, Article 92, Paragraph E; Article 93, Paragraph C.	Covers grounding methods for electrical supply and Communications facilities.	2.5.7.6

2.9.6 Communication Interference

The applicable LORS pertaining to communication interference are shown in Table 2.9-7.

Table 2.9-7 Communications Interference LORS

LORS	Applicability	AFC Reference
Title 8 CCR Section 2700 et seq. "High Voltage Electrical Safety Orders" Title 47 CFR Section 15.25, "Operating Requirements, Incidental Radiation"	Prohibits operations of any device emitting incidental radiation that causes interference to communications. The regulation also requires mitigation for any device that causes interference.	2.5.7.7
GO-52, CPUC	Covers all aspects of the construction, operation, and maintenance of power and communication lines and specifically applies to the prevention or mitigation of inductive interference.	2.5.7.7
CEC staff, Radio Interference and Television Interference (RI-TVI) Criteria (Kern River Cogeneration) Project 82-AFC-2, Final Decision, Compliance Plan 13-7	Prescribes the CEC's RI-TVI mitigation requirements, developed and adopted by the CEC in past siting cases.	2.5.7.7

2.9.7 Aviation Safety

Table 2.9-8 lists the aviation safety LORS that may apply to the proposed construction and operation of the Project.

Table 2.9-8 Aviation Safety LORS

LORS	Applicability	AFC Reference
Title 14 CFR Part 77 "Objects Affecting Navigable Airspace"	Describes the criteria used to determine whether a "Notice of Proposed Construction or Alteration" (NPCA, FAA Form 7460-1) is required for potential obstruction hazards.	2.5.7.8
FAA Advisory Circular No. 70/7460-1G, "Obstruction Marking and Lighting"	Describes the FAA standards for marking and lighting of obstructions as identified by FAA Part 77.	2.5.7.8
PUC, Sections 21656-21660	Discusses the permit requirements for construction of possible obstructions near aircraft landing areas, in navigable airspace, and near airport boundaries.	2.5.7.8

2.9.8 Fire Hazard

Table 2.9-9 lists the LORS governing fire hazard protection for the Project.

Table 2.9-9 Fire Hazard LORS

LORS	Applicability	AFC Reference
Title 14 CCR Sections 1250-1258, "Fire Prevention Standards for Electric Utilities"	Provides specific exemptions from electric pole and tower firebreak and electric conductor clearance standards, and specifies when and where standards apply.	2.5.7.9, 2.7.1, 2.7.2.1
ANSI/IEEE 80 "IEEE Guide for Safety in AC Substation Grounding"	Presents guidelines for assuring safety through proper grounding of AC outdoor substations.	2.5.7.9, 2.5.7.9, 2.7.1, 2.7.2.1
GO-95, CPUC, "Rules for Overhead Electric Line Construction" Section 35	CPUC rule covers all aspects of design, construction, operation, and maintenance of electrical transmission line and fire safety (hazards).	2.5.7.1, 2.5.7.9

2.9.9 Agency Jurisdiction

Table 2.9-10 identifies national, state, and local agencies with jurisdiction to issue permits or approvals, conduct inspections, and enforce the previously referenced LORS. Table 2.9-10 also identifies the associated responsibilities of these agencies as they relate to the construction and operation of Quail Brush.

Table 2.9-10 Jurisdiction

Agency or Jurisdiction	Responsibility
Federal	
FAA	Establishes regulations for notifications of construction and of new structures that may obstruct or interfere with air traffic, (14CFR77.9) marking and lighting of obstructions in navigable airspace. (AC No. 70/7460-1G).
OSHA	Establishes regulations for the protection of workers during construction and operations.
USEPA	Implements Prevention of Significant Deterioration (PSD) review/permitting program for sources locating in areas designated attainment/unclassifiable for criteria pollutants
State	
CEC	Jurisdiction over new transmission lines associated with thermal power plants that are 50 MW or more (PRC 25500). Jurisdiction of lines out of a thermal power plant to the interconnection point to the utility grid (PRC 25107). Jurisdiction over modifications of existing facilities that increase peak operating voltage or peak kilowatt capacity 25 percent (PRC 25123).
CPUC	Regulates construction and operation of overhead transmission lines (GO No. 95 and 131-D) (those not regulated by the CEC). Regulates construction and operation of power and communications lines for the prevention of inductive interference (GO No. 52).
State WRCB	Responsible for implementing 23 CCR § 2205 (Waste Discharge Requirements)
CAISO	Provides final interconnection approval.
Local	
City of San Diego	Establishes and enforces zoning regulations for specific land uses; issues variances in accordance with zoning ordinances. City-specific requirements under the California Building Code, Electrical Code and Fire Code. Jurisdiction over safety inspection of electrical installations that connect to the supply of electricity (NFPA 70).
SDAPCD	Regulates air quality emissions for construction and operations.

2.9.10 Local Agencies and Agency Contacts

Table 2.9-2 lists local agency contacts.

Table 2.9-2 Local Agencies and Agency Contacts

Agency	Contact	Title	Telephone	Email	Mailing Address
City of San Diego Fire Services	Javier Mainar	Fire Chief	619-533-4300	sdfd@sandiego.gov	1010 2nd Avenue, Suite 400 San Diego, CA 92101
City of San Diego Engineering	Afsaneh Ahmadi	Deputy Director Building Construction and Safety Department	619-446-5406	aahmadi@sandiego.gov	1222 First Avenue, MS 301 San Diego, CA 92101-4154
City of San Diego Community and Economic Development	Morris Dye	Project Manager	619-446-5201	mdye@sandiego.gov	1222 First Avenue, MS 301 San Diego, CA 92101-4154

Local Permits Required and Permit Schedule

After receipt of the approval of project design, several permits will be required. These include a Building Permit, a Grading Permit, and a Certificate of Occupancy. These permits are summarized in Table 2.9-3.

Table 2.9-3 Required Permits and Agency Contacts

Permit or Approval	Schedule	Agency Contact	Applicability
Approval of Grading Plan; issuance of construction, grading, and building permits	Minimum of 30 days prior to construction	City of San Diego	Site grading and excavation at site or along linear project features within public rights-of-way
Certificate of Occupancy	Completion of construction	City of San Diego	Occupancy of facilities once construction is completed

2.10 GUIDANCE AND REGULATORY DOCUMENTS

California Public Service Commission, General Order 52: Construction and Operation of Power and Communication Lines.

_____. General Order 95: Rules for Overhead Electric Line Construction.

_____. General Order 128: Rules for Construction of Underground Electric Supply and Communications Systems.

_____. General Order 131D: Rules for Planning and Construction of Electric Generation, Line, and Substation Facilities.

_____. Decision 93-11-013: Corona and Field Effects of AC Overhead Transmission Lines, Information for Decision Makers, IEEE Power Engineering Society, July 1985.

Electrical and Biological Effects of Transmission Lines, A Review, U.S. Department of Energy, Bonneville Power Administration, Portland, Oregon, June 1989.

EMF Design Guidelines for New Electrical Facilities: Transmission, Substation, and Distribution, SDG&E.

National Electrical Safety Code, ANSI C2.

Overhead Conductor Manual by Southwire.

SDG&E Interconnection Handbook.

Power flow cases used for the Feasibility Study as supplied by SDG&E.

Power flow cases used for the LGIP “System Impact Study” provided by SDG&E.

Power Flow Cases obtained from WECC.

SDG&E and Federal Energy Regulatory Commission (FERC) Form 715.

Transmission Line Reference Book, 230-138-kV Compact Line Design, Electric Power Research Institute, Palo Alto, California, 1978.

Transmission Line Reference Book, 345-kV and Above, Electric Power Research Institute, Palo Alto, California, 1975.

United States of America. 47CFR15.25—Operating Requirements, Incidental Radiation.

_____. 15CFR77—Objects Affecting Navigable Airspace.

_____. 14CFR1250—1258-Fire Prevention Standards for Electric Utilities.

FIGURES

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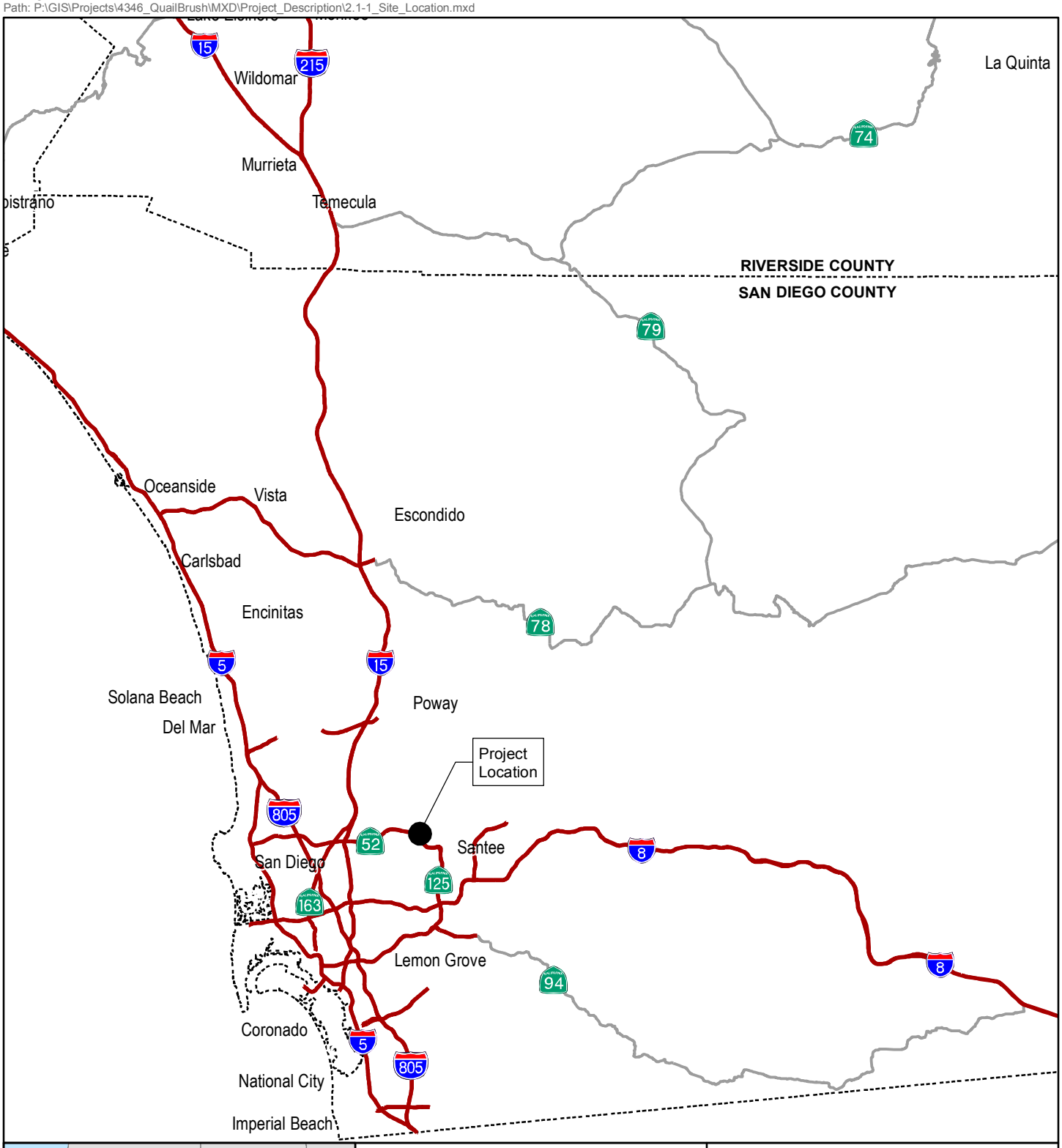

Cogentrix

QUAIL BRUSH GENERATION PROJECT

FIGURE 2.1-1
SITE LOCATION MAP

0 5 10 20
Miles

TETRA TECH EC, INC.

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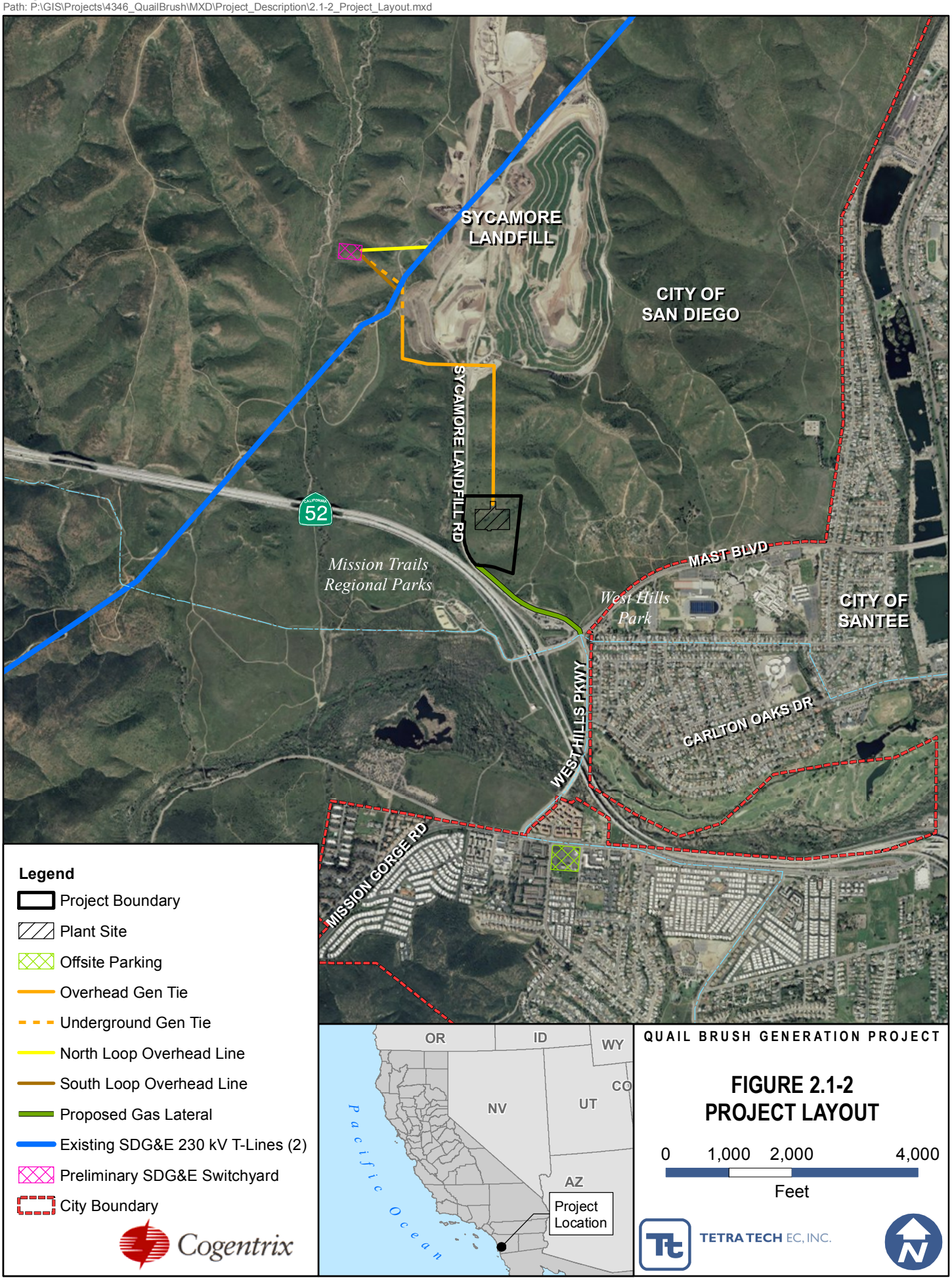

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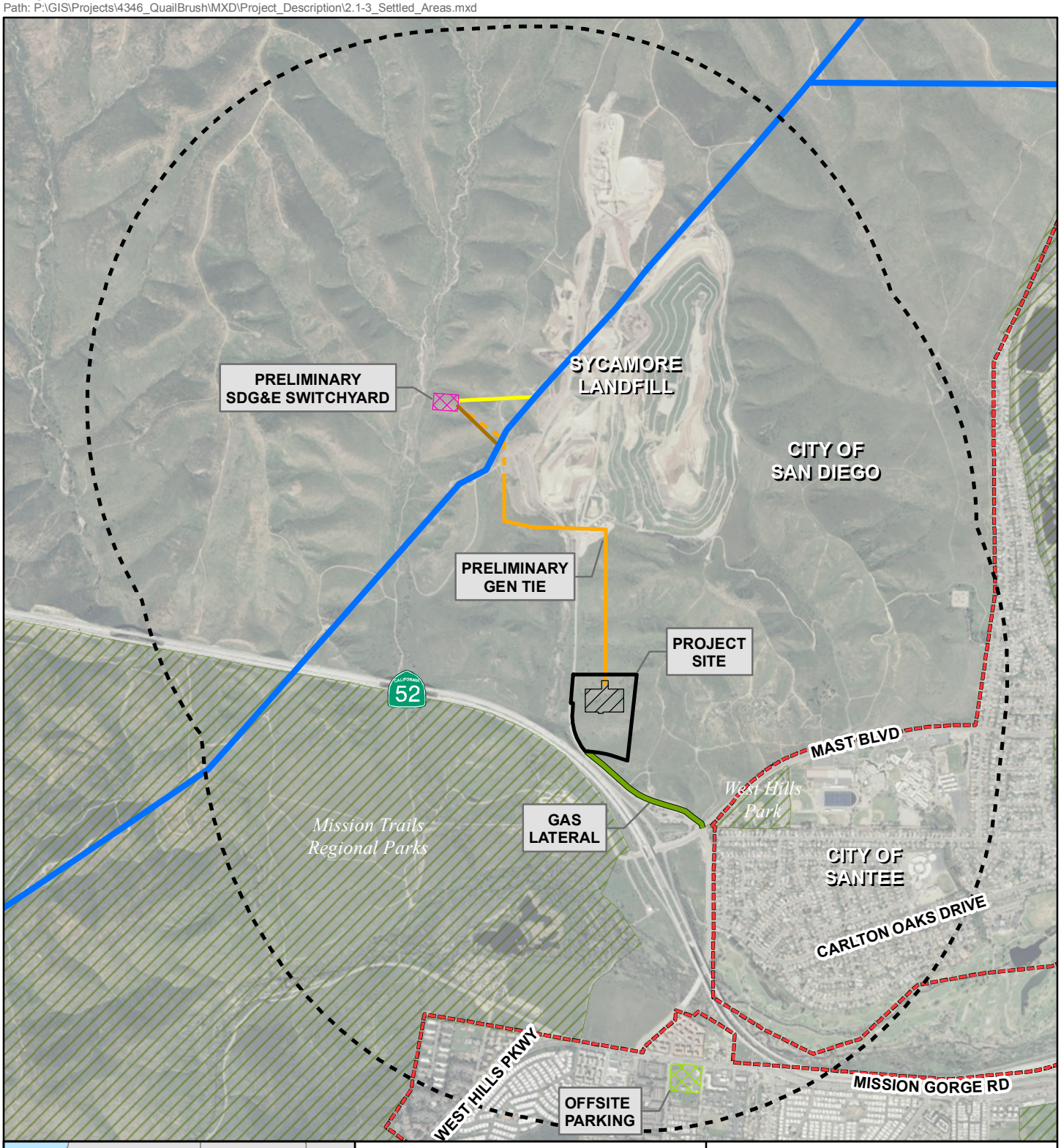


Legend

- Overhead Gen Tie
- Underground Gen Tie
- North Loop Overhead Line
- South Loop Overhead Line
- Existing SDG&E 230 kV T-Lines (2)
- Preliminary SDG&E Switchyard

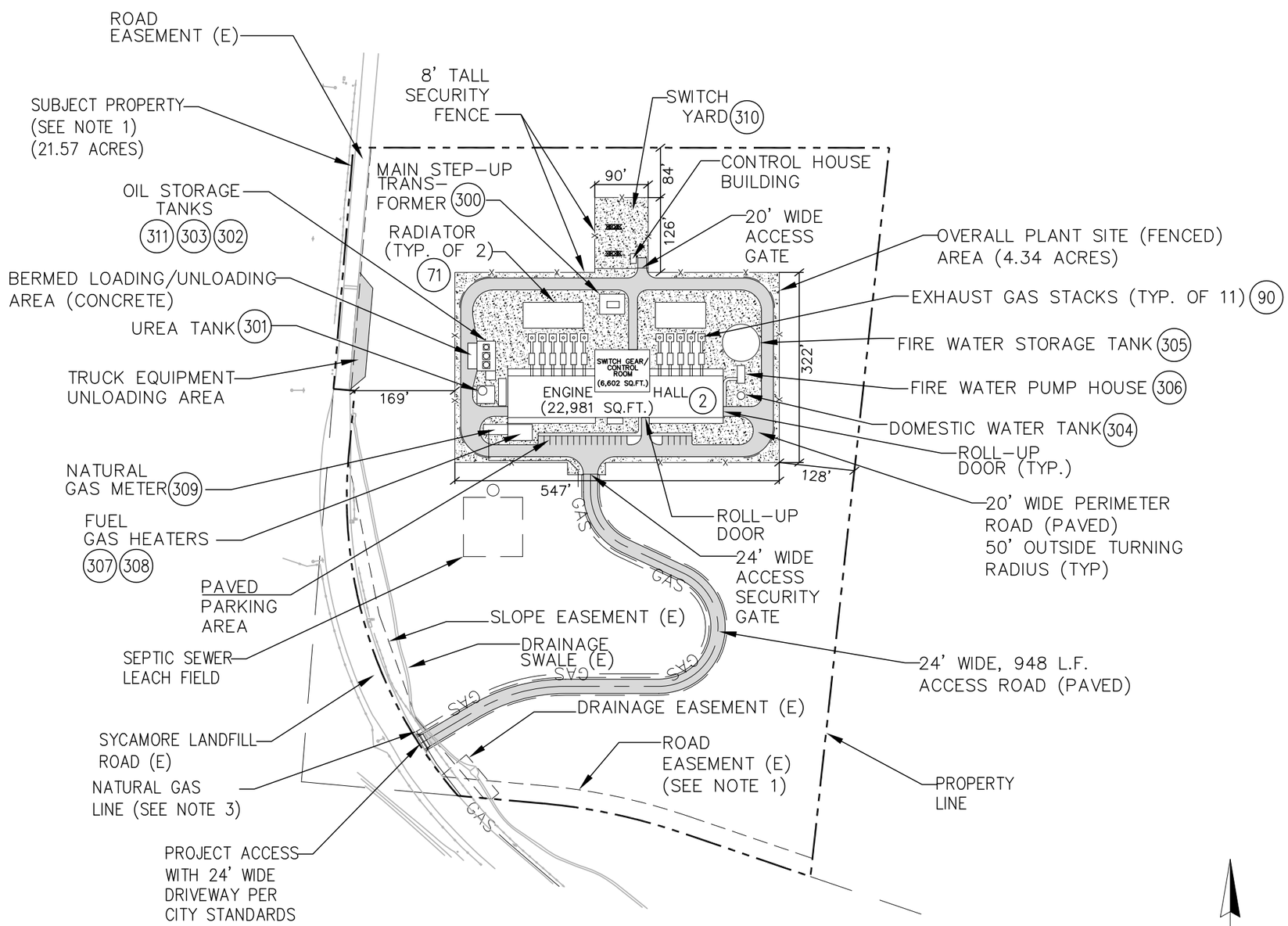
Cogentrix

QUAIL BRUSH GENERATION PROJECT

FIGURE 2.1-3
SETTLED AREAS

0 1,000 2,000 4,000
Feet

TETRA TECH EC, INC.



LEGEND:

GAL.	GALLON
L.F.	LINEAR FEET
SQ.FT.	SQUARE FEET
TYP.	TYPICAL
(E)	EXISTING
310	ITEM NO.
	ASPHALT PAVEMENT
	GRAVEL
—x—	CHAINLINK FENCE
— - —	PARCEL BOUNDARY
— GAS —	NEW NATURAL GAS LINE

POWER PLANT EQUIPMENT (SEE NOTE 2)

Item No	Pcs.	DESCRIPTION	DESCRIPTION Dia.	Ht.	Cap.(G)
2	1	Engine Hall	–	24'	
71	2	Radiator Sets		18' H	
90	11	Exhaust gas Stack	4' ø	100' H	
300	1	Main Step-Up Transformer		30' H	
301	1	UreaTank	13' ø	22' H	20,000
302	1	Used Oil Tank	10' ø	20' H	10,000
303	1	New Oil Tank	10' ø	20' H	10,000
304	1	Domestic Water Tank	10' ø	20' H	10,000
305	1	Fire Water Tank	60' ø	30' H	600,000
306	1	Fire Water Pumphouse		STACK=30'H	
307	1	Warm Start Gas Heater		STACK=30'H	
308	1	Fuel Gas Heater		STACK=30'H	
309	1	Natural Gas Metering Station		6' H	
310	1	Facility 230kV Switchyard		52' H Mast	
311	1	Maintenance Oil Tank	8' ø	16' H	6,000

NOTES:

1. PROPERTY AND EASEMENT INFORMATION FROM ALTA/ACSM LAND TITLE SURVEY PREPARED BY RBF CONSULTING APRIL 25, 2011.
2. PLANT SITE ITEMS FROM QUAIL BRUSH MASTER LAYOUT PLAN QB-SP-2 REVISION B DATED 3/9/11. (SEE APPENDIX B2 FOR ADDITIONAL DETAILS ON THE POWER PLANT LAYOUT.)
3. ALIGNMENT OF NATURAL GAS LINE WILL BE ESTABLISHED BY SAN DIEGO GAS & ELECTRIC.

QUAIL BRUSH GENERATION PROJECT

FIGURE 2.3-1
SITE PLAN

TETRA TECH EC, INC. Cogentrix

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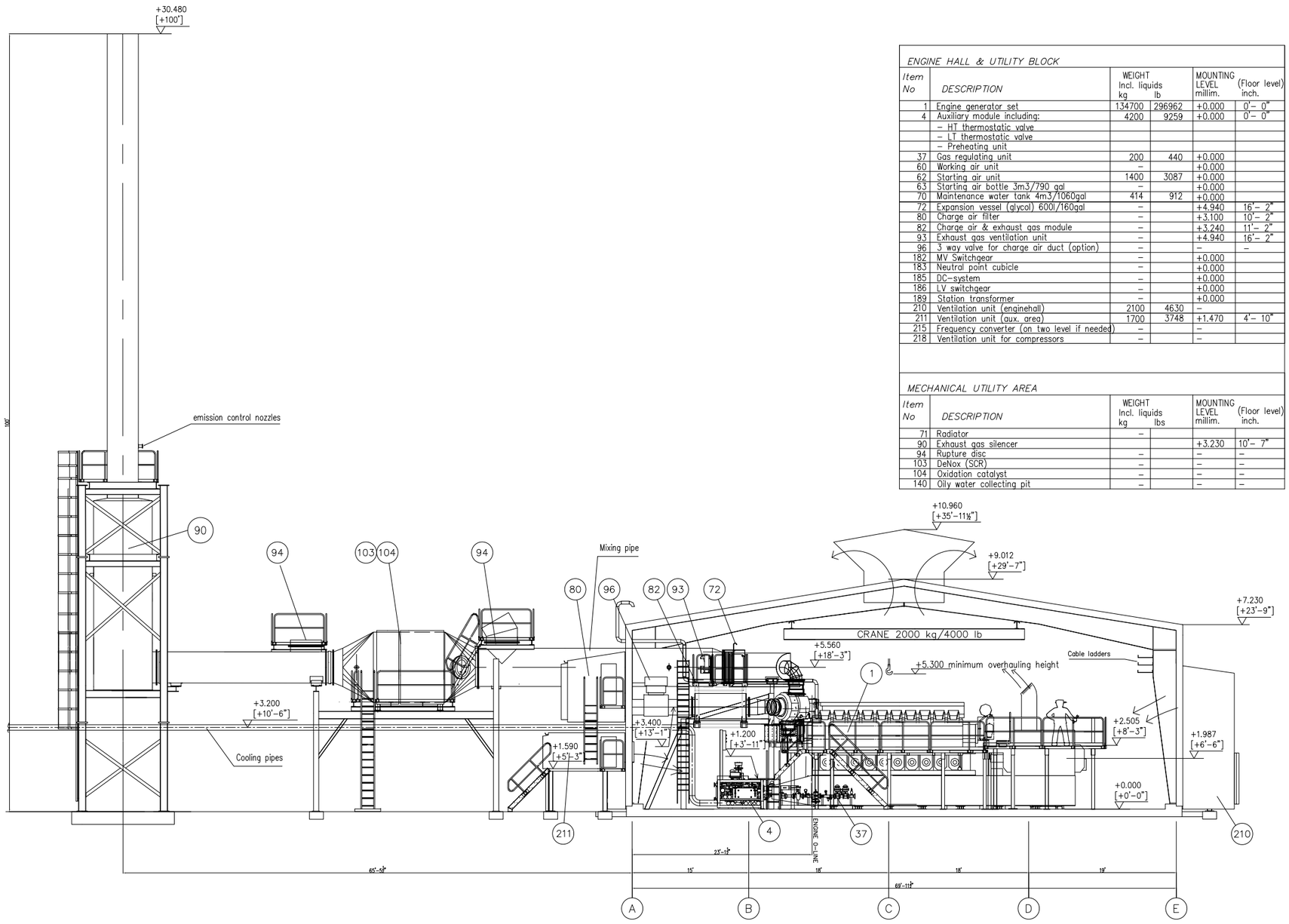


ENGINE HALL & UTILITY BLOCK

Item No	DESCRIPTION	WEIGHT Incl. liquids kg	lb	MOUNTING LEVEL millim.	(Floor level) inch.
1	Engine generator set	134700	296962	+0.000	0'– 0"
4	Auxiliary module including:	4200	9259	+0.000	0'– 0"
	– HT thermostatic valve				
	– LT thermostatic valve				
	– Preheating unit				
37	Gas regulating unit	200	440	+0.000	
60	Working air unit	–		+0.000	
62	Starting air unit	1400	3087	+0.000	
63	Starting air bottle 3m3/790 gal	–		+0.000	
70	Maintenance water tank 4m3/1060gal	414	912	+0.000	
72	Expansion vessel (glycol) 600l/160gal	–		+4.940	16'– 2"
80	Charge air filter	–		+3.100	10'– 2"
82	Charge air & exhaust gas module	–		+3.240	11'– 2"
93	Exhaust gas ventilation unit	–		+4.940	16'– 2"
96	3 way valve for charge air duct (option)	–		–	–
182	MV Switchgear	–		+0.000	
183	Neutral point cubicle	–		+0.000	
185	DC–system	–		+0.000	
186	LV switchgear	–		+0.000	
189	Station transformer	–		+0.000	
210	Ventilation unit (enginehall)	2100	4630	–	
211	Ventilation unit (aux. area)	1700	3748	+1.470	4'– 10"
215	Frequency converter (on two level if needed)	–		–	
218	Ventilation unit for compressors	–		–	

MECHANICAL UTILITY AREA

Item No	DESCRIPTION	WEIGHT Incl. liquids kg	lbs	MOUNTING LEVEL millim.	(Floor level) inch.
71	Radiator	–			
90	Exhaust gas silencer			+3.230	10'– 7"
94	Rupture disc	–		–	–
103	DeNox (SCR)	–		–	–
104	Oxidation catalyst	–		–	–
140	Oily water collecting pit	–		–	–

LEGEND:

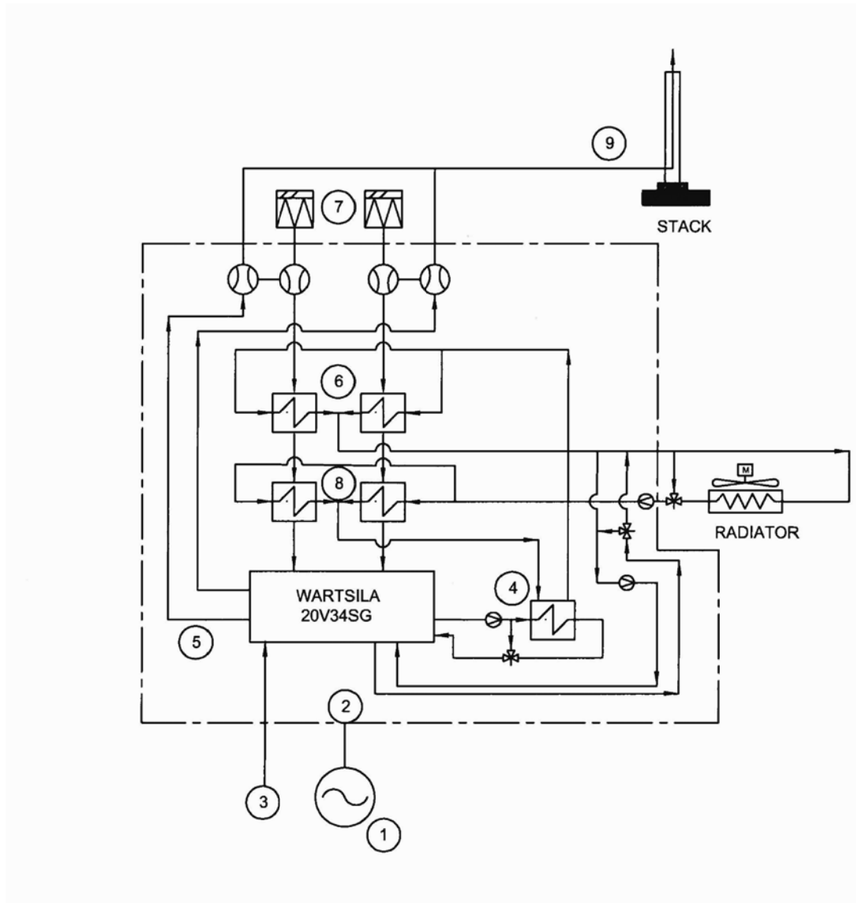
gal	GALLON
kg	KILOGRAM
lb	POUND
millim	MILLIMETERS
m^3	CUBIC METERS
(1)	ITEM NO.

QUAIL BRUSH GENERATION PROJECT

FIGURE 2.3-2
TYPICAL ELEVATION VIEW

TETRA TECH EC, INC.

Cogentrix



			35F / 68% RH			64F / 60% RH			81F / 48% RH			95F / 24% RH		
Stream	Load	Units	50%	75%	100%	50%	75%	100%	50%	75%	100%	50%	75%	100%
1	Generator Output	KW	4,646	6,998	9,341	4,646	6,998	9,341	4,646	6,998	9,341	4,646	6,998	9,341
2	Engine Output	KW	4,802	7,203	9,604	4,802	7,203	9,604	4,802	7,203	9,604	4,802	7,203	9,604
3	Fuel Flow (LHV)	MMBTU/Hr	39.56	55.96	72.31	39.56	55.96	72.31	39.56	55.96	72.31	39.56	55.96	72.31
		lb/hr	1,860	2,660	3,400	1,915	2,709	3,501	1,915	2,709	3,501	1,800	2,600	3,500
4	Lube Oil	MMBTU/Hr	2.62	3.39	3.86	2.62	3.39	3.86	2.62	3.39	3.88	2.64	3.43	3.92
5	Jacket Cooler	MMBTU/Hr	3.42	4.42	5.04	3.42	4.43	5.05	3.42	4.43	5.07	3.45	4.49	5.14
6	HT Charge Air Cooler	MMBTU/Hr	1.32	3.01	5.15	1.87	3.81	6.25	2.19	4.28	6.86	2.40	4.54	7.41
7	Inlet Air	lb/hr	62,940	84,940	114,300	62,949	84,981	114,428	62,950	85,000	114,800	63,300	85,800	115,800
8	LT Charge Air Cooler	MMBTU/Hr	0.28	0.69	1.46	0.33	0.80	1.69	0.36	0.87	1.83	0.38	0.91	1.77
	Miscellaneous Heat Losses	MMBTU/Hr	0.88	0.92	0.98	0.88	0.92	0.98	0.88	0.92	0.98	0.88	0.92	0.98
9	Exhaust	MMBTU/Hr	14.67	18.98	23.09	14.07	18.07	21.75	13.72	17.53	20.96	13.45	17.13	20.35
		lb/hr	64,800	87,600	117,700	64,802	87,603	117,815	64,800	87,600	118,207	65,100	88,400	119,300
10	Generator Losses	MMBTU/Hr	0.53	0.70	0.90	0.53	0.70	0.90	0.53	0.70	0.90	0.53	0.70	0.90
	Plant Gross (Note 1)	KW	51,106	76,978	12,751	51,106	76,978	102,751	51,106	76,978	12,751	51,106	76,978	102,751
	Plant Auxiliaries	KW	1,593	2,142	2,746	1,628	2,181	2,760	1,664	1,664	2,774	1,664	2,219	2,774
	Plant Net (Note 1)	KW	49,513	74,836	100,005	49,478	74,797	99,991	49,442	75,314	99,977	49,442	74,759	99,977
	Heat Rate (HHV)	BTU/KWH	9,755	9,130	8,828	9,762	9,134	8,830	9,769	9,072	8,831	9,769	9,139	8,831

NOTES:

1. TOTAL FOR ELEVEN (11) ENGINES IN SERVICE.

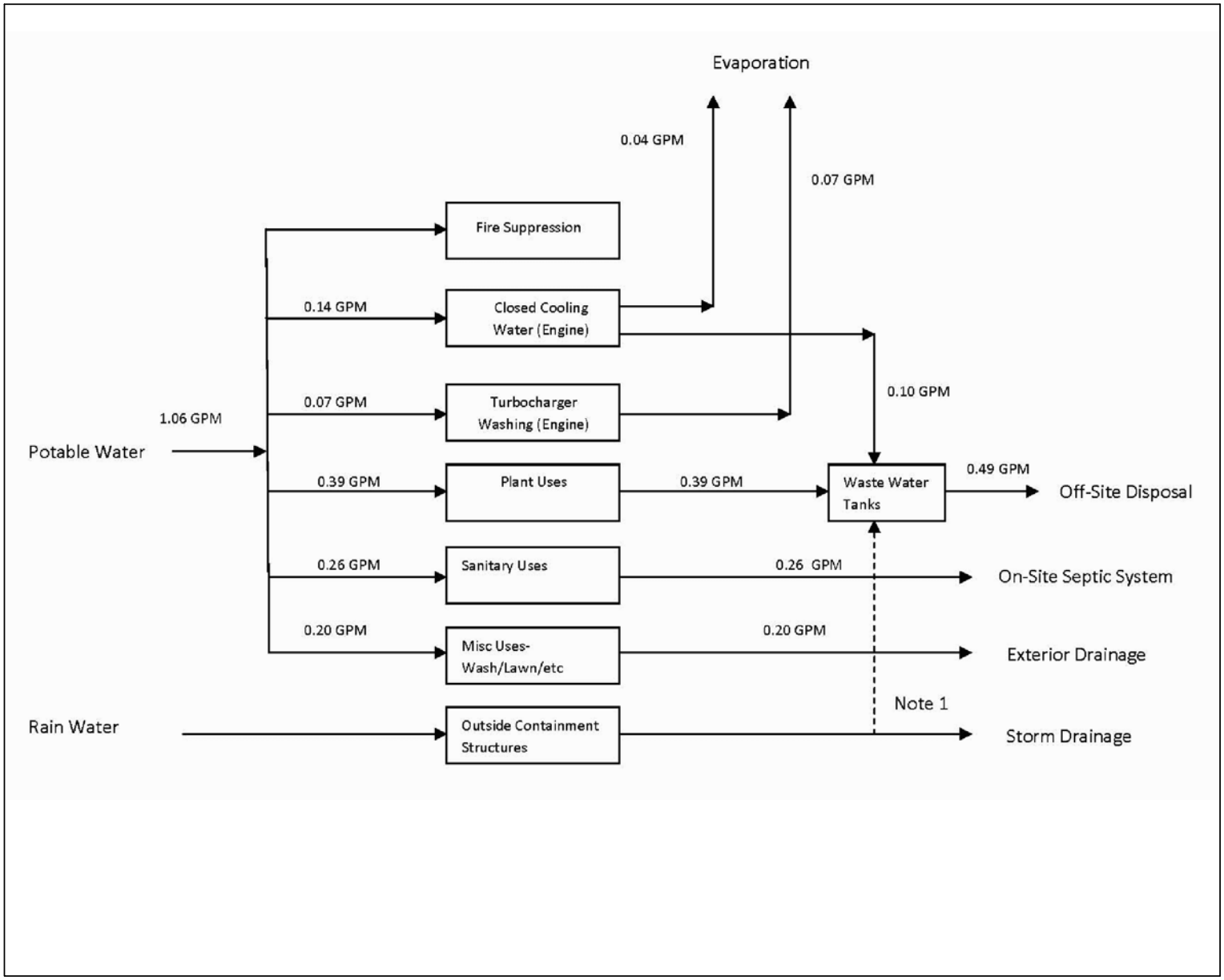
LEGEND:

BTU	BRITISH THERMAL UNITS
F	FAHRENHEIT
HHV	HIGH HEATING VALUE
HT	HIGH TEMPERATURE
KW	KILOWATTS
KWH	KILOWATT–HOUR
lb	POUND
LHV	LOW HEATING VALUE
LT	LOW TEMPERATURE
MMBTU/Hr	MILLION BTU PER HOUR
RH	RELATIVE HUMIDITY

QUAIL BRUSH GENERATION PROJECT

FIGURE 2.3-3
HEAT AND MASS BALANCE DIAGRAM

TETRA TECH EC, INC.
Cogentrix



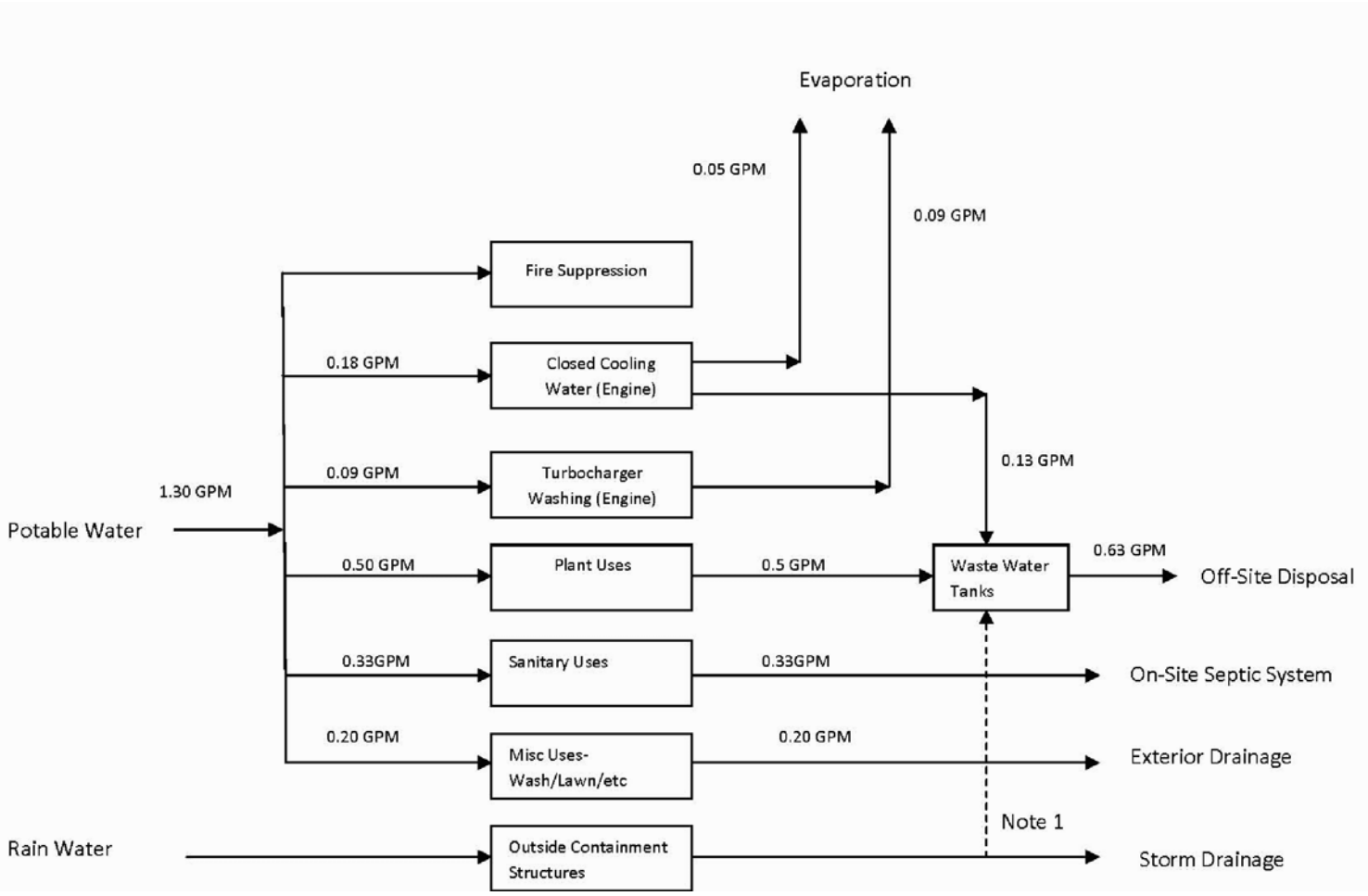
NOTES:

1. CONTAMINATED WATER WILL BE DIVERTED TO WASTE WATER.

QUAIL BRUSH GENERATION PROJECT

FIGURE 2.3-4A
AVERAGE ANNUAL WATER BALANCE

TETRA TECH EC, INC.
Cogentrix



NOTES:

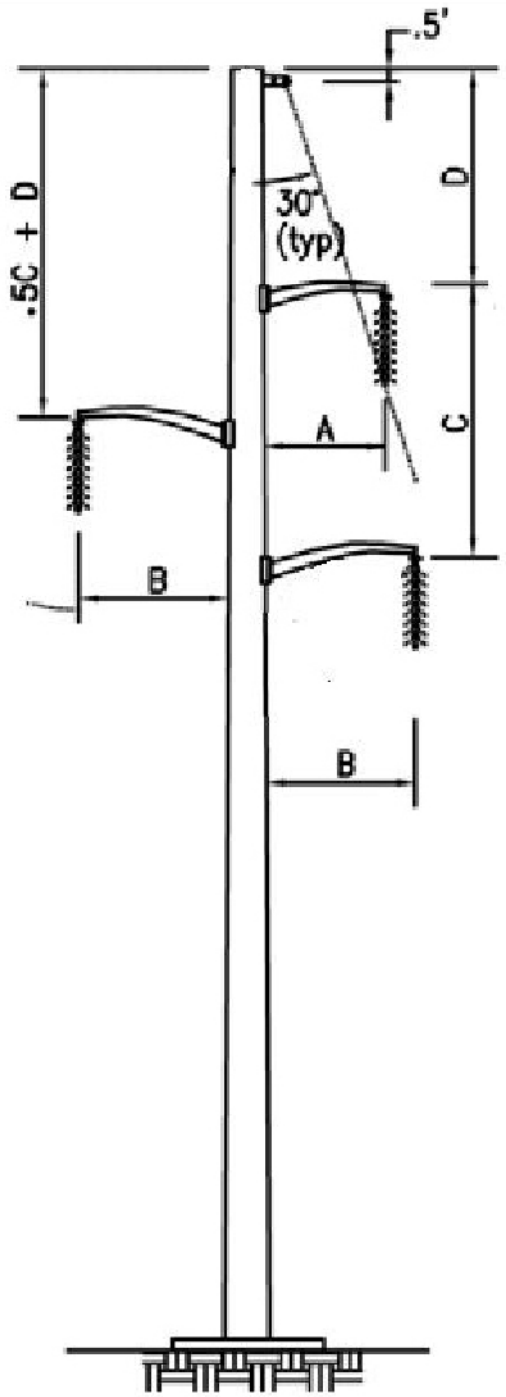
1. CONTAMINATED WATER WILL BE DIVERTED TO WASTE WATER.

QUAIL BRUSH GENERATION PROJECT

FIGURE 2.3-4B
PEAK DEMAND WATER BALANCE

TETRA TECH EC, INC.

Cogentrix



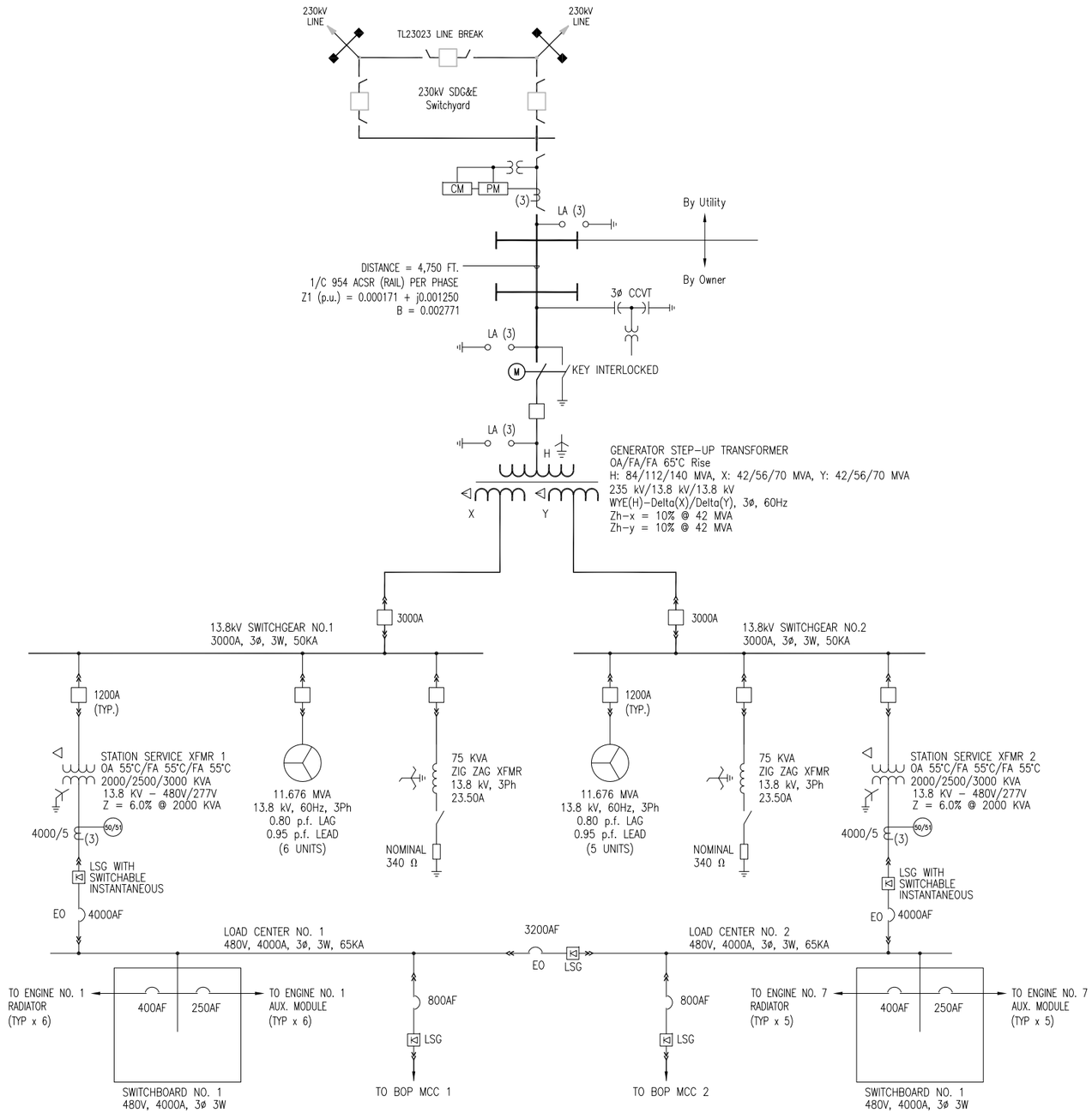
Minimum Dimensions (f)		
Voltage	230kV	
Number of Insulators	12	13
Dimension A	10.0	10.5
Dimension B	11.0	11.5
Dimension C	13.0	14.0
Dimension D	10.0	11.0

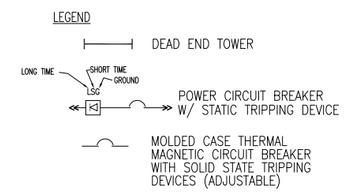
Cogentrix

TETRA TECH EC, INC.

QUAIL BRUSH GENERATION PROJECT

FIGURE 2.5-1
230 kV TANGENT POLE GEOMETRY





QUAIL BRUSH GENERATION PROJECT

FIGURE 2.5-2
ELECTRICAL ONE-LINE DIAGRAM

TETRA TECH EC, INC.

Cogentrix

P:\4346-COGENTRIX QUAIL BRUSH\CAD-ENGINEERING\FINAL\FIGURES\CAD-FILES\FIGURE 2.5-2.DWG
PLOT/UPDATE: Aug 10, 2011 12:45:01 AM

DATA ADEQUACY WORKSHEETS

Adequacy Issue: Adequate ____ Inadequate ____

DATA ADEQUACY WORKSHEET

Revision No. 0 Date ____

Technical Area: **Project Overview**

Project: Quail Brush Generation Project

Technical Staff: ____

Docket: ____

Technical Senior: ____

SITING REGULATIONS	INFORMATION	AFC PAGE NUMBER AND SECTION NUMBER	ADEQUATE YES OR NO	INFORMATION REQUIRED TO MAKE AFC CONFORM WITH REGULATIONS
Cal. Code Regs., tit. 20, § 1704, (a) (3) (A)	Descriptions of all significant assumptions, methodologies, and computational methods used in arriving at conclusions in the document.	Sections 2.0. 3.0, 4.1 through 4.16		
Cal. Code Regs., tit. 20, § 1704, (a) (3) (B)	Descriptions, including methodologies and findings, of all major studies or research efforts undertaken and relied upon to provide information for the document; and a description of ongoing research of significance to the project (including expected completion dates; and	Sections 2.0, 3.0, 4.1 through 4.16		
Cal. Code Regs., tit. 20, § 1704, (a) (3) (C)	A list of all literature relied upon or referenced in the documents, along with brief discussions of the relevance of each such reference	References cited in Sections 2.0. 3.0, 4.1 through 4.16		
Cal. Code Regs., tit. 20, § 1704, (a) (4)	Each principal subject area covered in a notice or application shall be set forth in a separate chapter or section, each of which shall identify the person or persons responsible for its preparation.	Section 5.0		
Appendix B (a) (1) (A)	A general description of the proposed site and related facilities, including the location of the site or transmission routes, the type, size and capacity of the generating or transmission facilities, fuel characteristics, fuel supply routes and facilities, water supply routes and facilities, pollution control systems, and other general characteristics.	Section 2.1		
Appendix B (a) (1) (B)	Identification of the location of the proposed site and related facilities by section, township, range, county and assessor's parcel numbers.	Section 2.1		
Appendix B (a) (1) (C)	A description of and maps depicting the region, the vicinity, and the site and its immediate surroundings.	Section 2.1, Figure 2.1-1, Figure 2.1-2, Figure 2.1-3		

SITING REGULATIONS	INFORMATION	AFC PAGE NUMBER AND SECTION NUMBER	ADEQUATE YES OR NO	INFORMATION REQUIRED TO MAKE AFC CONFORM WITH REGULATIONS
Appendix B (a) (1) (D)	A full-page color photographic reproduction depicting the visual appearance of the site prior to construction, and a full-page color simulation or artist's rendering of the site and all project components at the site, after construction.	Figure 4.5-10		
Appendix B (a) (1) (E)	In an appendix to the application, a list of current assessor's parcel numbers and owners' names and addresses for all parcels within 500 feet of the proposed transmission line and other linear facilities, and within 1000 feet of the proposed powerplant and related facilities.	Appendix A.1		
Appendix B (a) (2)	Project Schedule: Proposed dates of initiation and completion of construction, initial start-up, and full-scale operation of the proposed facilities.	Section 2.3.1.3		
Appendix B (a) (3) (A)	A list of all owners and operators of the site(s), the power plant facilities, and, if applicable, thermal host, the geothermal leasehold, the geothermal resource conveyance lines, and the geothermal re-injection system, and a description of their legal interest in these facilities.	Section 2.1		
Appendix B (a) (3) (B)	A list of all owners and operators of the proposed electric transmission facilities.	Section 2.1		
Appendix B (a) (3) (C)	A description of the legal relationship between the applicant and each of the persons or entities specified in subsections (a)(3)(A) and (B).	Section 2.1		
Appendix B (b) (1)	In a section entitled, "Generation Facility Description, Design, and Operation" provide the following information:			

SITING REGULATIONS	INFORMATION	AFC PAGE NUMBER AND SECTION NUMBER	ADEQUATE YES OR NO	INFORMATION REQUIRED TO MAKE AFC CONFORM WITH REGULATIONS
Appendix B (b) (1) (A)	Maps at a scale of 1:24,000 (1" = 2000'), (or appropriate map scale agreed to by staff) along with an identification of the dedicated leaseholds by section, township, range, county, and county assessor's parcel number, showing the proposed final locations and layout of the power plant and all related facilities;	Figure 2.1-2		
Appendix B (b) (1) (B)	Scale plan and elevation drawings depicting the relative size and location of the power plant and all related facilities to establish the accuracy of the photo simulations required in Sections (a)(1)(D) and (g)(6)(F);	Figures 2.3-1 and 2.3-2		
Appendix B (b) (1) (C)	A detailed description of the design, construction and operation of the facilities, specifically including the power generation, cooling, water supply and treatment, waste handling and control, pollution control, fuel handling, and safety, emergency and auxiliary systems, and fuel types and fuel use scenarios; and	Section 2.3		
Appendix B (b) (1) (D)	A description of how the site and related facilities were selected and the consideration given to engineering constraints, site geology, environmental impacts, water, waste and fuel constraints, electric transmission constraints, and any other factors considered by the applicant.	Section 2.1		
Appendix B (b) (2)	In a section entitled, "Transmission Lines Description, Design, and Operation" provide the following information:	Section 2.5		

SITING REGULATIONS	INFORMATION	AFC PAGE NUMBER AND SECTION NUMBER	ADEQUATE YES OR NO	INFORMATION REQUIRED TO MAKE AFC CONFORM WITH REGULATIONS
Appendix B (b) (2) (A)	Maps at a scale of 1:24,000 (or appropriate map scale agreed to by staff) of each proposed transmission line route, showing the settled areas, parks, recreational areas, scenic areas, and existing transmission lines within one mile of the proposed route(s);	Figure 2.1-3		
Appendix B (b) (2) (B)	A full-page color photographic reproduction depicting a representative above ground section of the transmission line route prior to construction and a full-page color photographic simulation of that section of the transmission line route after construction.	Figure 4.5-10		
Appendix B (b) (2) (C)	A detailed description of the design, construction, and operation of any electric transmission facilities, such as power lines, substations, switchyards, or other transmission equipment, which will be constructed or modified to transmit electrical power from the proposed power plant to the load centers to be served by the facility. Such description shall include the width of rights-of-way and the physical and electrical characteristics of electrical transmission facilities such as towers, conductors, and insulators.	Section 2.5		
Appendix B (b) (2) (D)	A description of how the route and additional transmission facilities were selected, and the consideration given to engineering constraints, environmental impacts, resource conveyance constraints, and electric transmission constraints; and	Section 2.5.1		
Appendix B (e) (1)	A discussion of how facility closure will be accomplished in the event of premature or unexpected cessation of operations.	Section 2.6		

Adequacy Issue: Adequate ____ Inadequate ____

DATA ADEQUACY WORKSHEET

Revision No. 0 Date _____

Technical Area: **Facility Design**

Project: _____

Technical Staff: _____

Project Manager: _____

Docket: _____

Technical Senior: _____

SITING REGULATIONS	INFORMATION	AFC PAGE NUMBER AND SECTION NUMBER	ADEQUATE YES OR NO	INFORMATION REQUIRED TO MAKE AFC CONFORM WITH REGULATIONS
Appendix B (h) (1) (A)	A description of the site conditions and investigations or studies conducted to determine the site conditions used as the basis for developing design criteria. The descriptions shall include, but not be limited to, seismic and other geologic hazards, adverse conditions that could affect the project's foundation, adverse meteorological and climatic conditions, and flooding hazards, if applicable.			
Appendix B (h) (1) (B)	A discussion of any measures proposed to improve adverse site conditions.			
Appendix B (h) (1) (C)	A description of the proposed foundation types, design criteria (including derivation), analytical techniques, assumptions, loading conditions, and loading combinations to be used in the design of facility structures and major mechanical and electrical equipment			
Appendix B (h) (1) (D)	For each of the following facilities and/or systems, provide a description including drawings, dimensions, surface-area requirements, typical operating data, and performance and design criteria for protection from impacts due to adverse site conditions:			
Appendix B (h) (1) (D) (i)	The power generation system;			
Appendix B (h) (1) (D) (ii)	The heat dissipation system;	Appendices B.1, B.2, B.3, B.4, B.5, B.6, B.7, B.8, B.9		
Appendix B (h) (1) (D) (iii)	The cooling water supply system, and, where applicable, pre-plant treatment procedures;	Appendices B.1, B.2, B.3, B.4, B.5, B.6, B.7, B.8, B.9		
Appendix B (h) (1) (D) (iv)	The atmospheric emission control system;	Appendices B.1, B.2, B.3, B.4, B.5, B.6, B.7, B.8, B.9		

Adequacy Issue: Adequate ____ Inadequate ____

DATA ADEQUACY WORKSHEET

Revision No. 0 Date _____

Technical Area: **Facility Design**

Project: _____

Technical Staff: _____

Project Manager: _____

Docket: _____

Technical Senior: _____

SITING REGULATIONS	INFORMATION	AFC PAGE NUMBER AND SECTION NUMBER	ADEQUATE YES OR NO	INFORMATION REQUIRED TO MAKE AFC CONFORM WITH REGULATIONS
Appendix B (h) (1) (D) (v)	The waste disposal system and on-site disposal sites;	Appendices B.1, B.2, B.3, B.4, B.5, B.6, B.7, B.8, B.9		
Appendix B (h) (1) (D) (vi)	The noise emission abatement system;	Appendices B.1, B.2, B.3, B.4, B.5, B.6, B.7, B.8, B.9		
Appendix B (h) (1) (D) (vii)	The geothermal resource conveyance and re-injection lines (if applicable);	n/a		
Appendix B (h) (1) (D) (viii)	Switchyards/transformer systems; and	Appendices B.1, B.2, B.3, B.4, B.5, B.6, B.7, B.8, B.9		
Appendix B (h) (1) (D) (ix)	Other significant facilities, structures, or system components proposed by the applicant.	Appendices B.1, B.2, B.3, B.4, B.5, B.6, B.7, B.8, B.9		

Adequacy Issue: Adequate ____ Inadequate ____

DATA ADEQUACY WORKSHEET

Revision No. 0 Date _____

Technical Area: **Transmission System Design** Project: Quail Brush Generation Project Technical Staff: _____

Project Manager: _____ Docket: _____ Technical Senior: _____

SITING REGULATIONS	INFORMATION	AFC PAGE NUMBER AND SECTION NUMBER	ADEQUATE YES OR NO	INFORMATION REQUIRED TO MAKE AFC CONFORM WITH REGULATIONS
Appendix B (h) (2) (A)	A discussion of the need for the additional electric transmission lines, substations, or other equipment, the basis for selecting principal points of junction with the existing electric transmission system, and the capacity and voltage levels of the proposed lines, along with the basis for selection of the capacity and voltage levels.	2.5.3		
Appendix B (h) (2) (B)	A discussion of the extent to which the proposed electric transmission facilities have been designed, planned, and routed to meet the transmission requirements created by additional generating facilities planned by the applicant or any other entity.	2.5.4		
Appendix B (b) (2) (C)	A detailed description of the design, construction, and operation of any electric transmission facilities, such as power lines, substations, switchyards, or other transmission equipment, which will be constructed or modified to transmit electrical power from the proposed power plant to the load centers to be served by the facility. Such description shall include the width of rights of way and the physical and electrical characteristics of electrical transmission facilities such as towers, conductors, and insulators. This description shall include power load flow diagrams which demonstrate conformance or nonconformance with utility reliability and planning criteria at the time the facility is expected to be placed in operation and five years thereafter; and	2.5, Figure 2.5-1, Figure 2.5-2		
Appendix B (b) (2) (D)	A description of how the route and additional transmission facilities were selected, and the consideration given to engineering constraints, environmental impacts, resource conveyance constraints, and electric transmission constraints.	2.5.1		

SITING REGULATIONS	INFORMATION	AFC PAGE NUMBER AND SECTION NUMBER	ADEQUATE YES OR NO	INFORMATION REQUIRED TO MAKE AFC CONFORM WITH REGULATIONS
Appendix B (b) (2) (E)	A completed System Impact Study or signed System Impact Study Agreement with the California Independent System Operator and proof of payment. When not connecting to the California Independent System Operator controlled grid, provide the executed System Impact Study agreement and proof of payment to the interconnecting utility. If the interconnection and operation of the proposed project will likely impact an transmission system that is not controlled by the interconnecting utility (or California Independent System Operator), provide evidence of a System Impact Study or agreement and proof of payment (when applicable) with/to the impacted transmission owner or provide evidence that there are no system impacts requiring mitigation.	2.5.3		
Appendix B (i) (1) (A)	Tables which identify laws, regulations, ordinances, standards, adopted local, regional, state, and federal land use plans, leases, and permits applicable to the proposed project, and a discussion of the applicability of, and conformance with each. The table or matrix shall explicitly reference pages in the application wherein conformance, with each law or standard during both construction and operation of the facility is discussed; and	2.9		
Appendix B (i) (1) (B)	Tables which identify each agency with jurisdiction to issue applicable permits, leases, and approvals or to enforce identified laws, regulations, standards, and adopted local, regional, state and federal land use plans, and agencies which would have permit approval or enforcement authority, but for the exclusive authority of the commission to certify sites and related facilities.	2.9		

Adequacy Issue: Adequate ____ Inadequate ____

DATA ADEQUACY WORKSHEET

Revision No. 0 Date _____

Technical Area: **Transmission System Design** Project: Quail Brush Generation Project Technical Staff: _____

Project Manager: _____ Docket: _____ Technical Senior: _____

SITING REGULATIONS	INFORMATION	AFC PAGE NUMBER AND SECTION NUMBER	ADEQUATE YES OR NO	INFORMATION REQUIRED TO MAKE AFC CONFORM WITH REGULATIONS
Appendix B (i) (2)	The name, title, phone number, address (required), and email address (if known), of an official who was contacted within each agency, and also provide the name of the official who will serve as a contact person for Commission staff.	2.9		
Appendix B (i) (3)	A schedule indicating when permits outside the authority of the commission will be obtained and the steps the applicant has taken or plans to take to obtain such permits.	2.9		

Adequacy Issue: Adequate ____ Inadequate ____

DATA ADEQUACY WORKSHEET

Revision No. 0 Date _____

Technical Area: **Trans Line Safety & Nuisance** Project: _____ Technical Staff: _____

Project Manager: _____ Docket: _____ Technical Senior: _____

SITING REGULATIONS	INFORMATION	AFC PAGE NUMBER AND SECTION NUMBER	ADEQUATE YES OR NO	INFORMATION REQUIRED TO MAKE AFC CONFORM WITH REGULATIONS
Appendix B (g) (1)	...provide a discussion of the existing site conditions, the expected direct, indirect and cumulative impacts due to the construction, operation and maintenance of the project, the measures proposed to mitigate adverse environmental impacts of the project, the effectiveness of the proposed measures, and any monitoring plans proposed to verify the effectiveness of the mitigation.	2.1, 4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 4.7, 4.8, 4.9, 4.10, 4.11, 4.12, 4.13, 4.14, 4.15, 4.16, 4.17		
Appendix B (g) (18) (A)	The locations and a description of the existing switchyards and overhead and underground transmission lines that would be affected by the proposed project.	2.5.2		
Appendix B (g) (18) (B)	An estimate of the existing electric and magnetic fields from the facilities listed in (A) above and the future electric and magnetic fields that would be created by the proposed project, calculated at the property boundary of the site and at the edge of the rights of way for any transmission line. Also provide an estimate of the radio and television interference that could result from the project.	2.5.8.2, 2.5.8.3, 2.5.8.4		
Appendix B (g) (18) (C)	Specific measures proposed to mitigate identified impacts, including a description of measures proposed to eliminate or reduce radio and television interference, and all measures taken to reduce electric and magnetic field levels.	2.5.8.2, 2.5.8.3, 2.5.8.4		

Adequacy Issue: Adequate ____ Inadequate ____

DATA ADEQUACY WORKSHEET

Revision No. 0 Date _____

Technical Area: **Trans Line Safety & Nuisance** Project: _____ Technical Staff: _____

Project Manager: _____ Docket: _____ Technical Senior: _____

SITING REGULATIONS	INFORMATION	AFC PAGE NUMBER AND SECTION NUMBER	ADEQUATE YES OR NO	INFORMATION REQUIRED TO MAKE AFC CONFORM WITH REGULATIONS
Appendix B (i) (1) (A)	Tables which identify laws, regulations, ordinances, standards, adopted local, regional, state, and federal land use plans, leases, and permits applicable to the proposed project, and a discussion of the applicability of, and conformance with each. The table or matrix shall explicitly reference pages in the application wherein conformance, with each law or standard during both construction and operation of the facility is discussed; and	2.9		
Appendix B (i) (1) (B)	Tables which identify each agency with jurisdiction to issue applicable permits, leases, and approvals or to enforce identified laws, regulations, standards, and adopted local, regional, state and federal land use plans, and agencies which would have permit approval or enforcement authority, but for the exclusive authority of the commission to certify sites and related facilities.	2.9		
Appendix B (i) (2)	The name, title, phone number, address (required), and email address (if known), of an official who was contacted within each agency, and also provide the name of the official who will serve as a contact person for Commission staff.	2.9		
Appendix B (i) (3)	A schedule indicating when permits outside the authority of the commission will be obtained and the steps the applicant has taken or plans to take to obtain such permits.	2.9		

Adequacy Issue: Adequate ____ Inadequate ____

DATA ADEQUACY WORKSHEET

Revision No. 0 Date _____

Technical Area: **Reliability** Project: _____ Technical Staff: _____

Project Manager: _____ Docket: _____ Technical Senior: _____

SITING REGULATIONS	INFORMATION	AFC PAGE NUMBER AND SECTION NUMBER	ADEQUATE YES OR NO	INFORMATION REQUIRED TO MAKE AFC CONFORM WITH REGULATIONS
Appendix B (g) (1)	...provide a discussion of the existing site conditions, the expected direct, indirect and cumulative impacts due to the construction, operation and maintenance of the project, the measures proposed to mitigate adverse environmental impacts of the project, the effectiveness of the proposed measures, and any monitoring plans proposed to verify the effectiveness of the mitigation.	2.1, 4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 4.7, 4.8, 4.9, 4.10, 4.11, 4.12, 4.13, 4.14, 4.15, 4.16, 4.17		
Appendix B (h) (3) (A)	A discussion of the sources and availability of the fuel or fuels to be used over the estimated service life of the facilities.	2.7.4.1		
Appendix B (h) (3) (B)	A discussion of the anticipated service life and degree of reliability expected to be achieved by the proposed facilities based on a consideration of:			
Appendix B (h) (3) (B) (i)	Expected overall availability factor, and annual and lifetime capacity factors;	2.7.4.2		
Appendix B (h) (3) (B) (ii)	The demonstrated or anticipated feasibility of the technologies, systems, components, and measures proposed to be employed in the facilities, including the power generation system, the heat dissipation system, the water supply system, the reinjection system, the atmospheric emission control system, resource conveyance lines, and the waste disposal system;	2.7.4.2		
Appendix B (h) (3) (B) (iii)	Geologic and flood hazards, meteorologic conditions and climatic extremes, and cooling water availability;	4.16.2.1 4.7.2.3, 2.7.4.3		
Appendix B (h) (3) (B) (iv)	Special design features adopted by the applicant or resource supplier to ensure power plant reliability including equipment redundancy; and	2.7.4		
Appendix B (h) (3) (B) (v)	For technologies not previously installed and operated in California, the expected power plant maturation period.	n/a		

SITING REGULATIONS	INFORMATION	AFC PAGE NUMBER AND SECTION NUMBER	ADEQUATE YES OR NO	INFORMATION REQUIRED TO MAKE AFC CONFORM WITH REGULATIONS
Appendix B (i) (1) (A)	Tables which identify laws, regulations, ordinances, standards, adopted local, regional, state, and federal land use plans, leases, and permits applicable to the proposed project, and a discussion of the applicability of, and conformance with each. The table or matrix shall explicitly reference pages in the application wherein conformance, with each law or standard during both construction and operation of the facility is discussed; and	2.9		
Appendix B (i) (1) (B)	Tables which identify each agency with jurisdiction to issue applicable permits, leases, and approvals or to enforce identified laws, regulations, standards, and adopted local, regional, state and federal land use plans, and agencies which would have permit approval or enforcement authority, but for the exclusive authority of the commission to certify sites and related facilities.	2.9		
Appendix B (i) (2)	The name, title, phone number, address (required), and email address (if known), of an official who was contacted within each agency, and also provide the name of the official who will serve as a contact person for Commission staff.	2.9		
Appendix B (i) (3)	A schedule indicating when permits outside the authority of the commission will be obtained and the steps the applicant has taken or plans to take to obtain such permits.	2.9		

Adequacy Issue: Adequate ____ Inadequate ____

DATA ADEQUACY WORKSHEET

Revision No. 0 Date ____

Technical Area: **Efficiency** Project: ____ Technical Staff: ____

Project Manager: ____ Docket: ____ Technical Senior: ____

SITING REGULATIONS	INFORMATION	AFC PAGE NUMBER AND SECTION NUMBER	ADEQUATE YES OR NO	INFORMATION REQUIRED TO MAKE AFC CONFORM WITH REGULATIONS
Appendix B (g) (1)	...provide a discussion of the existing site conditions, the expected direct, indirect and cumulative impacts due to the construction, operation and maintenance of the project, the measures proposed to mitigate adverse environmental impacts of the project, the effectiveness of the proposed measures, and any monitoring plans proposed to verify the effectiveness of the mitigation.	2.1, 4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 4.7, 4.8, 4.9, 4.10, 4.11, 4.12, 4.13, 4.14, 4.15, 4.16, 4.17		
Appendix B (h) (4) (A)	Heat and mass balance diagrams for design conditions for each mode of operation.	Figure 2.3-3		
Appendix B (h) (4) (B)	Annual fuel consumption in BTUs for each mode of operation, including hot restarts and cold starts.	2.8.1		
Appendix B (h) (4) (C)	Annual net electrical energy produced in MWh for each mode of operation including starts and shutdowns.	2.8.1		
Appendix B (h) (4) (D)	Number of hours the plant will be operated in each design condition in each year.	2.8.1		
Appendix B (h) (4) (E)	If the project will be a cogeneration facility, calculations showing compliance with applicable efficiency and operating standards.	n/a		
Appendix B (h) (4) (F)	A discussion of alternative generating technologies available for the project, including the projected efficiency of each, and an explanation why the chosen equipment was selected over these alternatives.	3.5.1		

Adequacy Issue: Adequate ____ Inadequate ____

DATA ADEQUACY WORKSHEET

Revision No. 0 Date ____

Technical Area: **Efficiency** Project: ____ Technical Staff: ____

Project Manager: ____ Docket: ____ Technical Senior: ____

SITING REGULATIONS	INFORMATION	AFC PAGE NUMBER AND SECTION NUMBER	ADEQUATE YES OR NO	INFORMATION REQUIRED TO MAKE AFC CONFORM WITH REGULATIONS
Appendix B (i) (1) (A)	Tables which identify laws, regulations, ordinances, standards, adopted local, regional, state, and federal land use plans, leases, and permits applicable to the proposed project, and a discussion of the applicability of, and conformance with each. The table or matrix shall explicitly reference pages in the application wherein conformance, with each law or standard during both construction and operation of the facility is discussed; and	2.9		
Appendix B (i) (1) (B)	Tables which identify each agency with jurisdiction to issue applicable permits, leases, and approvals or to enforce identified laws, regulations, standards, and adopted local, regional, state and federal land use plans, and agencies which would have permit approval or enforcement authority, but for the exclusive authority of the commission to certify sites and related facilities.	2.9		
Appendix B (i) (2)	The name, title, phone number, address (required), and email address (if known), of an official who was contacted within each agency, and also provide the name of the official who will serve as a contact person for Commission staff.	2.9		
Appendix B (i) (3)	A schedule indicating when permits outside the authority of the commission will be obtained and the steps the applicant has taken or plans to take to obtain such permits.	2.9		