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3.1 INTRODUCTION

The Pio Pico Energy Center (PPEC), proposed by Pio Pico Energy Center, LLC (PPEC LLC), is a simple-cycle electrical generating facility that is contracted under a 20-year power purchase agreement (PPA) with San Diego Gas & Electric (SDG&E) in response to their 2009 Request for Offers (RFO). The RFO was a broad solicitation for power generation that included peaking facilities, like PPEC, as well as demand-side management and generation from renewable energy resources.

PPEC, which would be owned and maintained by PPEC LLC, is designed to directly satisfy the San Diego area peaking and load-shaping generation current and long-term requirements. Key among these requirements is supporting wind and solar generation, whose overall output varies. As wind, hydro, solar, and other renewable resource output drops, PPEC can be dispatched from 'cold iron' to 300 megawatts (MW) in fewer than 10 minutes to make up the lost grid capacity. Thus, PPEC would support and allow heightened penetration of renewable energy into SDG&E's service territory.

Electric power generated at PPEC would be sold to SDG&E under a 20-year PPA between PPEC LLC and SDG&E. Design of the plant and equipment selection is based on requirements in the PPA.

The project would be located on a disturbed and development-prepared parcel within an unincorporated industrial area within San Diego County (see Figure 3.1-1, Regional Location, and Figure 3.1-2, Site Vicinity). The project site and facilities would encompass 9.99 acres of permanent improvement and would temporarily utilize 6.0 acres of laydown area. The project also has linears comprised of a natural gas pipeline having a maximum length of approximately 10,300 feet, and an electrical transmission line having a maximum length of approximately 2,650 feet. The project will also connect to water supply and discharge pipelines in the paved streets adjacent to the site. The project site is adjacent to or nearby all necessary supporting infrastructure. Specifically:

- The 230-kilovolt (kV) SDG&E Otay Mesa switchyard is located within 1,800 feet.
- An SDG&E intrastate gas transmission line is located within two miles.
- Otay Water District will provide potable and, eventually, recycled water directly to the project site through Otay Water District water lines immediately adjacent to the site.
- Sewer discharge mains area located immediately adjacent to the project site along Alta Road and Calzada de la Fuente.
- The site is easily accessible by existing primary County roads.

Photograph: View of the project site near the intersection of Calzada de la Fuente and Alta Road (northwest corner of the project site) and facing generally east. The existing Otay Mesa Generating Project, which is located directly east of the PPEC project property, is shown on the photograph.

The generating facility would include three General Electric (GE) LMS100 natural gas-fired combustion turbine generators (CTGs), each equipped with water injection to the combustors for reducing production of oxides of nitrogen (NO_x); a selective catalytic reduction (SCR) system with 19 percent aqueous ammonia (NH_3) injection to further reduce NO_x emissions; and an oxidation catalyst to reduce carbon monoxide (CO). The total net generating capacity would be approximately 300MW.

The GE LMS100 is the first intercooled gas turbine system developed especially for the power generation industry. It uses heavy-duty gas turbine and aero-derivative gas turbine technology. The LMS100 produces approximately 100MW at an efficiency rate that is approximately ten percent higher than that of other commercial simple-cycle gas turbines. The LMS100 is specifically designed for cyclic applications; it provides flexible power and ten-minute starts. Equipment locations and dimensions are depicted on Figure 3.1-3A, Site Arrangement.

The LMS100 combines GE's existing and proven frame, the MS6001FA, and GE's aero-derivative CF6-80 gas turbine technologies to provide high thermal efficiency in power generation applications. The GE CF6-80 gas turbine has over 100 million hours of operating experience in both aircraft engines and industrial applications, and the MS6001FA medium

duty gas turbine F class technology family has over 28 million operating hours in power generation and other applications. Combining the high pressure compressor technology of the CF6, the low pressure compressor technology of the MS6001FA, and the optimum design of other components and systems based on proven designs and operating experience provides the advanced design and performance of the LMS100. The LMS100 technology is GE Power's growth platform in the peaking and loading power generation market.

Electricity generated by PPEC would be delivered to an existing 230kV SDG&E switchyard located approximately 1,800 feet from the project site, as shown in Figure 3.1-3B, Site Arrangement and Potential Offsite Transmission Line Structure Locations. The 230kV connecting transmission line will be built and owned by PPEC LLC, with ownership shifting to SDG&E at the switchyard entrance.

3.2 FACILITY NEED

The project would improve reliability within the SDG&E service territory, complement the increasing use of renewable energy sources through its ten-minute start and high-efficiency characteristics, and help allow the retirement of the South Bay Power Plant.

Upon approval by the California Public Utilities Commission (CPUC), SDG&E issued an all-source RFO in June 2009. The RFO sought demand responses and supply resources to: support reliability within the SDG&E service territory; to supply energy to bundled customers; and/or to meet other portfolio needs, including Resource Adequacy (RA) requirements. The RFO sought seven different products, and PPEC LLC responded to a request for new local generation projects coming online between 2010 and 2014.

3.3 PROJECT SITE, LINEARS, AND TEMPORARY LAYDOWN AREA

PPEC consists of the project site, linears, and a temporary laydown area (Figure 3.3-1, Facility Plot Plan and Figure 3.3-3, Potential Linears). The project site is located in an unincorporated area of San Diego County known as Otay Mesa. It is comprised of a 9.99 acre parcel located in the southeast corner of the Alta Road and Calzada de la Fuente intersection. The proposed project site comprises the entire parcel with Assessor's Parcel Number (APN) 648-040-45, and the laydown area is 6.00 acres of an adjacent parcel to the south (APN 648-040-46) (Figure 3.3-2, Project Location). The existing setting within one-mile of the project site and potential transmission line routes are presented on Figure 3.3-4, Existing Setting within 1-Mile Radius of Potential Transmission Lines. The project affects the following areas:

- Plant site – 9.99 acres.
- Temporary laydown and parking area – 6.00 acres, on an adjacent parcel that is contiguous to the project site.
- Natural Gas pipeline – There are two possible routes for the gas supply pipeline. Both routes would connect to an existing SDG&E natural gas pipeline, but at different locations. Route A would extend approximately 8,000 feet south along Alta Road to near the U.S.–Mexico border, at which point it would connect to the existing SDG&E natural

gas pipeline. Route B would extend approximately 2,375 feet south along Alta Road, turn west on Otay Mesa Road, and continue approximately 7,920 feet to Harvest Road at which point it would connect to the existing SDG&E natural gas pipeline for a total of approximately 10,300 feet. The pipeline will be constructed, owned, and operated by SDG&E.

- Sewer pipeline – A short connection will be made to an existing 12-inch sewer main along Calzada de la Fuente along the north project site boundary, or to an existing 15-inch sewer main along Alta Road, along the west project site boundary.

- Stormwater pipeline – A short connection will be made from a detention pond located at the northwest corner of the project site to an existing 30-inch stormwater pipeline located along Calzada de la Fuente, adjacent to the project site.

- Power line – Two possible routes are provided for a 230kV transmission line that will connect the project into the existing 230kV Otay Mesa switchyard. Route A would begin as an overhead power line along Calzada de la Fuente, extend approximately 1,700 feet east where it would then be routed underground for approximately 400 feet into the Otay Mesa switchyard (total length of Route A would be approximately 2,100 feet). Route B would begin as an overhead power line from the eastern edge of the project site, run south approximately 550 feet, then turn east along the northern border of the parcels with APN 648-040-48 and APN 648-040-43 for 1,400 feet, and finally turn north for approximately 700 feet into the Otay Mesa switchyard (total length of Route B would be approximately 2,650 feet). The power line will be owned and maintained by the Applicant.

- Water supply pipelines – The project will make a short connection to the potable service system, either at an existing 12-inch main along Calzada de la Fuente, or at an existing 24-inch main along Alta Road. Upon the Otay Water District (OWD)'s completion of the planned Otay Mesa area recycled water system, the project will make a connection to an existing 8-inch recycled water main along Calzada de la Fuente or a new recycled water main to be constructed in Alta Road.

These features are illustrated on Figure 3.3-1, Facility Plot Plan and Figure 3.3-3, Potential Linears. The project site, laydown and parking area, and sewer, stormwater, water supply, and power line routes are located in Section 30 of Township 18 South, Range 1 East, within the USGS Otay Mesa Quadrangle, San Bernardino Base Meridian (SBBM). The natural gas pipeline Route A crosses Sections 30 and 31 of Township 18 South, Range 1 East (Otay Mesa Quadrangle, SBBM), while Route B may cross Sections 30 and 31 of Township 18 South, Range 1 East, and Sections 25 and 36 of Township 18 South, Range 1 West (Otay Mesa Quadrangle, SBBM).

3.4 SITE DESCRIPTION

3.4.1 Topography

The site topography as of December 2010 is provided on Figure 3.4-1, 2010 Site Topography. The industrial park developer will grade the property in first quarter 2011 as described in the

2009-2010 County of San Diego Grading Permit 2700-1555. This planned soil removal and grading of the property was already planned for prior to the inception of this project and will occur regardless of the submittal of this AFC or its eventual approval. Site elevation for purposes of this project will be approximately 635 feet above mean sea level (msl). This will establish the baseline conditions that this AFC is founded upon. The baseline site topography is shown on Figure 3.4-2, Baseline Site Topography.

The project preliminary grading and drainage is shown on Figure 3.4-3, Preliminary Grading and Drainage Plan.

3.4.2 Geologic Setting and Seismology

The geologic and seismologic setting of the proposed plant site is discussed below and presented in more detail in Section 5.3, Geologic Hazards and Resources.

3.4.2.1 Subsurface Conditions

The PPEC geologic study area, which generally consists of the area within two miles of the project site and associated transmission line and natural gas pipeline routes, comprises basement complex metamorphic rocks, poorly to weakly cemented nonmarine rocks, and alluvial sediments. A more detailed summary of subsurface conditions will be provided in a geotechnical investigation report based on geotechnical analysis conducted soon after the landowner completes his grading plan for the project site.

3.4.2.2 Seismology and Seismic Shaking

The PPEC site is not located within an Alquist-Priolo Earthquake Fault Zone, and no faults were identified within the PPEC geologic study area. The project site area (and all of the San Diego County area) is designated within a Seismic Zone 4, and like most of Southern California, is subject to ground shaking. The project would be designed in accordance with the 2007 California Building Code seismic design parameters, as detailed in Section 5.3.

3.4.2.3 Liquefaction Potential

Liquefaction is not known to have occurred in San Diego County. Historically, seismic shaking levels have not sufficed to trigger liquefaction, and ground failures or damage to structures has not occurred as a consequence of liquefaction. The risk of liquefaction at the project site and surrounding area is considered low. Please refer to Section 5.3, Geologic Hazards and Resources, for further details.

3.4.3 Hydrological Setting

The PPEC site is in the Otay River watershed, which is part of the San Diego Bay watershed. The site is approximately ten miles east of San Diego Bay.

The climate in the vicinity of PPEC can be characterized as semi-arid. Based on 31 years of historical records, the average annual temperature for El Cajon is 65.2 degrees Fahrenheit (°F). The El Cajon station is at elevation 400 feet msl and is approximately 15 miles north of the project site.

Precipitation in the area is characterized by long dry summers and intermittent wet periods. Based on the 31-year record of precipitation at El Cajon, the average annual precipitation is approximately 12 inches, of which approximately 90 percent occurs from November through April.

3.4.3.1 Surface Water

The project site is not located within a Federal Emergency Management Agency 100-year floodplain (Zone A). Further details on surface water are presented in Section 5.5, Water Resources.

3.4.3.2 Groundwater

Depth to groundwater underlying the PPEC site is unknown, however, results from a geotechnical investigation conducted in 1997 for the adjacent Otay Mesa Generating Project indicate that the groundwater table in the vicinity of the project site is below elevation 580 feet (See Section 5.3). The presence or lack of shallow or perched groundwater will be determined as part of the geotechnical investigation for the project site. Groundwater resources, if present, will not be accessed or used for the project.

3.5 FACILITY DESCRIPTION

3.5.1 Overview

The generating facility will consist of three GE LMS100 natural gas-fired CTGs, each equipped with water injection to the combustors for reducing production of NO_x, an SCR system with 19 percent NH_3 injection to further reduce NO_x emissions, and an oxidation catalyst to reduce CO and volatile organic compound (VOC) emissions. The total net generating capacity would be approximately 300MW. Table 3.5-1 provides a description of major equipment, and Figure 3.5-1, Site Arrangement Elevations illustrates project elevations.

TABLE 3.5-1
MAJOR EQUIPMENT INFORMATION

Description	Dimensions			
	Capacity	Length (ft)	Width (ft)	Height (ft)
Combustion Turbines (3)	103MW	130	30	40
Intercooler Heat Exchangers (3)	120 MMBtu/hr	44	15	13.5
CTG Stacks (3)	--	--	14.5 diameter	100
Variable Bleed Vents, with Silencers (3)	--	--	12	53
Hot SCR	--	70	25	35
Wet Cooling Components (12)	120 MMBtu/hr	26	14	22
Dry Cooling Components (9)		47	14	15
Raw Water Storage Tank	500,000 gal	--	54 diameter	30
Demineralized Water Storage Tank	240,000 gal	--	38 diameter	30

Description	Dimensions			
	Capacity	Length (ft)	Width (ft)	Height (ft)
Wastewater Collection Tank	95,000 gal	--	26 diameter	24
Gas Compressor Enclosure (3)	--	50	17	15

Notes:
CTG = combustion turbine generator
ft = foot (feet)
gal = gallon(s)
MMBtu/hr = million British thermal units per hour
MW = megawatt
SCR = selective catalytic reduction

Each CTG would generate approximately 100MW at summer design ambient conditions. The project would have a maximum annual capacity factor of approximately 46 percent (4,000 hours per year).

Associated equipment would include emission control systems necessary to meet the proposed emission limits. Emissions are described in Section 5.2, Air Quality.

Refer to Appendices A through F for the project's engineering design criteria.

3.5.2 Project Site Access

Access to the PPEC site would be via Calzada de la Fuente, west of the Otay Mesa Generating Project (OMGP).

3.5.3 Site Layout

The PPEC site layout, including the location and size of the plant facilities and the temporary construction parking and laydown areas, is depicted on Figure 3.1-3A, Site Arrangement, and Figure 3.3-1, Facility Plot Plan. A site elevation view of the new plant is illustrated on Figure 3.5-1, Site Arrangement Elevations. Off-site linear improvements, including the gas pipeline, and electric transmission line, are described in Section 3.3, Project Site, Linears, and Temporary Laydown Area, and shown on Figure 3.3-1, Facility Plot Plan and Figure 3.3-3, Potential Linears.

The plant facilities have been arranged for optimum use of the property and ease of operation and maintenance. Grading and drainage for the project site are shown on Figure 3.4-3, Preliminary Grading and Drainage Plan.

The maximum area of construction disturbance (i.e., in the event that the longest natural gas pipeline and transmission line routes [Route B in each case] are installed) would be approximately 32.68 acres, which is comprised of 9.99 acres for the plant site, 6.00 acres for the temporary construction laydown area, 11.82 acres for the Route B natural gas pipeline, and 4.87 acres for the Route B 230kV transmission line.

3.5.4 Power Plant Cycle

Each simple-cycle LMS100 CTG produces approximately 100MW of electricity. Output depends on inlet air ambient conditions and inlet evaporative cooling. The CTG design incorporates a compressor intercooler and increased firing temperatures to achieve high efficiency and optimum performance under high ambient temperatures. The CTGs are equipped with hot SCRs to reduce NO_x, CO, and VOC emissions.

3.5.4.1 Combustion Turbine Generator

Thermal energy is produced in the CTGs through the combustion of natural gas, which is converted into mechanical energy to drive the combustion turbine compressors and electric generators.

Three GE LMS100 CTGs were selected for the plant. The LMS100 integrates features of GE's frame and aero-derivative CTG design features. The low-pressure compressor is derived from the heavy-duty frame engine designs, and the high-pressure compressor, combustor, and power turbine components are derived from the aero-derivative designs. Each CTG consists of a stationary combustion turbine-generator and associated auxiliary equipment.

Turbine compressor inlet air is drawn through the air inlet ductwork above the combustion turbine. The inlet air filter removes dust and particulate from the intake air. During hot weather the filtered air is cooled by contact with water in the evaporative cooler section of the air inlet ductwork.

Filtered and cooled air drawn into the gas turbine low-pressure compressor section is compressed to an intermediate pressure. Compressing the air causes the air temperature to rise along with the increase in pressure. Cooling the intermediate pressure air before final compression improves the efficiency of the compression process. Hot intermediate pressure air is cooled in a water-cooled heat exchanger (intercooler), external to the compressor, before it enters the high-pressure compressor section.

Hot high-pressure compressed air from the high-pressure compressor discharge flows to the combustion turbine combustor, where high-pressure natural gas is injected into the compressed air and ignited. Water is injected into the combustor to temper the combustion temperature, which reduces the production of thermal NO_x.

Heated air and combustion gas pass from the combustor through the expansion section of the turbine, causing it to rotate. The expander draws energy from the hot compressed gases, causing them to cool as they progress through the expander.

The expander section of the turbine produces enough power to drive both the compressor and the electric generator. Integrating the intercooler between compressor stages in the LMS100, together with higher combustor firing temperatures, has resulted in gross turbine generator efficiency that is approximately ten percent more efficient than similar simple-cycle combustion turbines.

The metal acoustical enclosure, which contains the CTGs and accessory equipment, will be located outdoors. The CTGs will be equipped with the following required accessories to provide safe, reliable operation:

- Evaporative coolers (enhance hot weather performance)
- Inlet air filters (remove dust and particulate from the air)
- Metal acoustical enclosure (reduce sound emissions)
- Duplex shell and tube lube oil coolers for the turbine and generator (cool lubricating oil)
- Annular standard combustor combustion system
- Compressor wash system (cleans compressor blades and restores compressor performance)
- Fire detection and protection system
- Compressor intercooler (improves the efficiency of the compressor)
- Hydraulic starting system
- Combustor water injection system (for NO_x control and output enhancement)
- Compressor variable bleed valve vent (prevent compressor surge in off-design operation)
- The combustion gases exit the turbine at approximately 770ºF and then pass through the hot SCR system for NO_x emission control and an oxidizing catalyst for control of CO and VOC emissions. The SCR is used in conjunction with NH_3 injection for the control of NO_x emissions. A 19 percent aqueous NH_3 solution is injected into the CTG exhaust gas stream that passes over a catalyst bed, which reduces the NO_x to inert nitrogen.
- The SCR equipment includes a reactor chamber, catalyst modules, NH_3 storage, vaporization and injection system, and monitoring equipment and sensors. The NH_3 storage area will consist of a tank on a concrete pad with a boxed containment wall. After passing through the SCR, the exhaust gases exit through the attached stack.

3.5.4.2 Performance Data and Plant Efficiency

Each CTG will generate approximately 100MW under most ambient conditions. The PPEC plant will be limited to a maximum capacity factor of 46 percent, which is equivalent to 4,000 hours per year for each CTG.

The full-load performance of each CTG on a typical day (70 degrees ºF and 57 percent relative humidity) is as follows:

- Power Output 102.4.7MW at the generator terminals

- Fuel Flow 808 million British thermal units per hour (MMBtu/hr) low heating value (LHV), or 39,203 pounds per hour (lb/hr)
- Heat Rate 7,894 British thermal units per kilowatt hour (Btu/kWh) LHV

Auxiliary power loads for CTG auxiliaries and for the balance of plant equipment will reduce the net electrical power output transmitted from the generator terminals to the transmission grid. The project operating characteristics during season (i.e., Winter, Spring/Fall, and Summer) and peak periods are provided on the heat and mass balance diagrams presented on Figures 3.5-2A through 3.5-2D, and key characteristics are summarized in Table 3.5-2, Seasonal Heat and Mass Balances. Annual operating characteristics (per CTG and total plant) are presented in Table 3.5-3, Design Condition Annual Operating Characteristics.

TABLE 3.5-2
SEASONAL HEAT AND MASS BALANCES

	Winter	Spring/Fall	Summer	Peak
Conditions				
Ambient Dry Bulb, ºF	59	70	80	93
Relative Humidity, %	60	57	38	22
Performance				
CTG Output (each), MW	104.3	102.4	101.0	99.3
Heat Rate, Btu/kWh, LHV	7,856	7,894	7,926	7,964
Fuel Flow, MMBtu/hr, LHV	819	808	800	791
NO_x Water Injection, lb/hr	26,388	25,255	24,910	24,472
CT Exhaust Flow, klb/hr	1,708	1,685	1,669	1,650

ºF = degrees Fahrenheit
klb/hr = kilo pound per hour
lb/hr= pound per hour
LHV= lower heating value
MW = megawatts

TABLE 3.5-3
DESIGN CONDITION ANNUAL OPERATING CHARACTERISTICS

	Winter (per CTG)	Spring/Fall (per CTG)	Summer (per CTG)	Peak (per CTG)	Total Annual (Per CTG)	Total Annual Plant (3 CTGs)
Operating Hours	1,100	1,600	1,000	300	4,000	4,000
Fuel Consumption[1], MMBtu, LHV	900,900	1,292,800	800,000	237,300	3,231,000	9,693,000
Net Electrical Energy Produced[1], MWhr	114,730	163,840	101,000	29,790	409,360	1,228,080

MMBtu = One million Btu
MWhr = Megawatt-hour
LHV = lower heating value
[1] Assumes 500 startups and shutdowns per year.

3.5.4.3 Emissions Data

After commissioning of the CTG units, the emissions from the stack of each CTG at full-load conditions would be as follows:

- NO_x 2.5 parts per million volumetric dry (ppmvd) corrected to 15 percent oxygen (O_2)
- CO 4.0 ppmvd corrected to 15 percent O_2
- VOC 2.0 ppmvd corrected to 15 percent O_2
- NH_3 Slip 5.0 ppmvd corrected to 15 percent O_2
- Particulate matter less than 10 micrometers in diameter (PM_{10}) 5.5 lb/hr

3.5.5 Major Electrical Equipment and Systems

The net electric power generated by the PPEC facility would be transmitted to the power grid through a 230kV interconnection with the SDG&E Otay Mesa switchyard. A small percentage of electric power would be utilized on site to power auxiliaries, such as pumps, natural gas compressors, cooling fans, control systems, and general facility electric loads, including lighting, heating, and air conditioning. Some of the auxiliary power would also be converted from alternating current (AC) to direct current (DC) and would be used as back-up power for control systems and other uses.

The CTGs will generate power at 13.8kV, which will be stepped-up by fan-cooled generator step-up unit (GSU) transformers to 230kV for transmission to the utility switchyard and grid. When the units are off-line, the auxiliary power would be back-fed through each step-up and auxiliary transformer. Once the units are running, they will supply their own auxiliary power. Surge arresters will be provided at the high-voltage bushings to protect the transformers from surges on the 230kV system caused by lightning strikes or other system disturbances. The high-voltage side of the step-up transformers would be connected to gas-insulated (SF_6) circuit breakers located in the facility's 230kV switchyard.

Each subsection generally describes provisions that would be incorporated into the system's design. Specific equipment and system ratings will be established during detailed design.

3.5.5.1 Step-up Transformers

An overall one-line diagram of the PPEC facility's electrical generation and distribution system is shown on Figure 3.5-3, Electrical One-Line Diagram. The power will be generated at 13.8kV by the three power blocks, each consisting of one GE LMS100 gas turbine generator. The electricity generated at 13.8kV will be stepped up by GSU transformers to 230kV for transmission. The output of each generator will be connected by isolated phase bus to the two-winding, oil-filled GSU transformer. Surge arresters at the high-voltage bushings will protect the transformer from surges in the 230kV systems resulting from lightning strikes or other system disturbances. The transformers will be set on concrete pads with oil

containment provisions provided. A deluge type fire protection system will be provided for each step-up transformer. As recommended by the National Fire Protection Association (NFPA) 850, firewalls or separation will be installed between transformers to protect each transformer from a fire from any adjacent transformers. The firewalls will also offer a degree of protection to other equipment and structures in the immediate area.

3.5.5.2 Facility 230kV Switchyard

The facility's 230kV switchyard will consist of a 230kV radial feed type configuration, 230kV circuit breakers and disconnect switches, and structural bus supports. An outgoing 230kV generation tie line will be constructed using either Route A or Route B to connect the plant to the existing SDG&E Otay Mesa switchyard located approximately 1,800 feet east of the plant site. All equipment required to interface with the plant will be provided. As stated in Section 3.3, Route A would begin as an overhead power line along the north side of Calzada de la Fuente, extend approximately 1,700 feet east where it would then be routed underground for approximately 400 feet into the Otay Mesa switchyard (total length of Route A would be approximately 2,100 feet). Route B begins as an overhead power line from the eastern edge of the project site, would run south approximately 550 feet, then turn east along the northern border of the parcels with APN 648-040-48 and APN 648-040-43 for 1,400 feet, and finally turn north for approximately 700 feet into the Otay Mesa switchyard (total length of Route B would be approximately 2,650 feet).

3.5.5.3 Auxiliary AC Power Distribution

When the PPEC facility is shut down, SDG&E will provide electricity for the project site by back feeding from the SDG&E switchyard and tie line. When the facility generation is in operation, balance-of-plant (BOP) auxiliary power requirements will be supplied internally.

Auxiliary power to the facility loads will be distributed at 4.16kV AC by two unit auxiliary transformers. The auxiliary transformers will supply all electrical power to the BOP auxiliary equipment. The auxiliary transformers are oil-filled, two-winding, three-phase, 60 hertz (Hz) transformers with delta connected high side and wye-connected low-resistance grounded low-side windings. An off-load tap changer may be required on the GSU transformers and/or auxiliary supply transformers, as required by the connecting utility. Each auxiliary transformer's 4.16kV secondary winding will be connected by nonsegregated phase bus duct to the double ended 4.16kV switchgear through a normally closed main switchgear breaker.

The 4.16kV volt switchgear lineup will supply power to the various 4,000-volt (V) motors and to the secondary unit substation (SUS) transformers rated 4.16kV to 480V for 480V power distribution. The 4.16kV switchgear will have vacuum-operated metal-clad breakers for the main feeds. Fused contactors will be used for power distribution to the SUS transformer feeders and to 4,000 volt motors. The 4.16kV system will be low-resistance grounded to limit the maximum ground fault current.

Each auxiliary transformer will supply power to BOP and combustion turbine auxiliary loads in normal operation. Each auxiliary power transformer will be sized to accommodate the entire facility's complete auxiliary load in case there is any failure or shut down of an

auxiliary power transformer or one GSU transformer. The double ended 4.16kV switchgear will be equipped with a tie breaker for interconnecting both 4.16kV switchgear buses in case of a failure of one of the auxiliary transformers.

SUS transformers will be outdoor dry-type and will each supply 480V, three-phase power to the SUS buses through normally closed SUS main breakers. The 480V system will be high-resistance grounded to minimize the need for individual ground fault protection.

SUS transformers will each be sized to provide full 480V auxiliary load to the BOP facility loads. The 480V switchgear lineup will each be designed to be interconnected by a tie breaker in case of emergency, to supply power from only one 480V secondary substation transformer if required. Separate 480V transformers will be supplied to feed 480V loads on each CTG, the water treatment system, and the closed-cooling water system components.

SUS transformers will provide power through feeder breakers to the various large 480V motors and to motor control centers (MCCs). MCCs will distribute power to smaller 480V motors, 480V power panels, and other intermediate 480V loads. The normal supply for the two BOP MCCs will be from the SUS transformers, but automatic transfer switches will allow supply from an alternative source. MCCs will distribute power to 480-480/277V isolation transformers for 277V single-phase lighting loads. MCC fed 480V power panels will distribute power to small 480V loads.

The 480V MCCs and 480V power panels will provide power for the AC power supply (120/208V) system. The 480-120/208V solidly grounded dry-type transformers will provide transformation of 480V power to 120/208V power.

3.5.5.4 DC Power Supply

The DC power supply system for BOP loads will consist of one 125V DC battery bank, two 125V DC full-capacity battery chargers, ground detectors, and distribution panels. The 125V DC battery bank will feed all station DC loads and the uninterruptible power supply (UPS). Additional 125V DC systems may also be supplied as part of the CTG equipment.

Under normal operating conditions, the battery chargers will supply DC power to the DC loads. The battery chargers will receive 480V, three-phase AC power from the AC power supply (480V) system and continuously float charge the battery while supplying power to the DC loads. The ground detection scheme will detect grounds on the DC power supply system.

Under abnormal or emergency conditions when power from the AC power supply (480V) system is unavailable, the battery will supply DC power to the DC power supply system loads. Recharging of a discharged battery will occur whenever 480V power becomes available from the AC power supply (480V) system. The rate of charge will depend on the characteristics of the battery bank, battery charger, and the connected DC load during charging. However, the anticipated maximum recharge time will be 24 hours.

The BOP 125V DC system will be used to provide control power to the 4.16kV switchgear, the 480V SUSs, and critical control circuits.

3.5.5.5 Uninterruptible Power Supply System

The CTGs will also have an essential service 120V AC, single-phase, 60 Hz power source to supply AC power to essential instrumentation, controls, monitoring, critical equipment loads, and unit protection and safety systems that require uninterruptible AC power. The essential service AC system and the DC power supply system will be designed to ensure that all critical safety and unit protection control circuits always have power and can take the correct action on a unit trip or loss of plant AC power.

The essential service AC system will consist of one full-capacity inverter, a solid-state transfer switch, a manual bypass switch, an alternate source transformer and voltage regulator, and AC panel boards for each CTG.

One source of power to the system will be from the DC power supply system through the inverter to the panel boards. A solid-state static transfer switch will continuously monitor both the inverter output and the alternate AC source. The transfer switch will automatically transfer essential AC loads without interruption from the inverter output to the alternate source upon loss of the inverter output.

A manual bypass switch will also be included to enable isolation of the inverter-static transfer switch for testing and maintenance without interruption to the essential service AC loads.

3.5.5.6 Emergency Power System

In the event of a total loss of auxiliary power, or in situations when the utility transmission system is out of service, the emergency power required for emergency lighting and CTG critical loads, such as turbine lube oil pumps and jacking gear motors, will be provided from batteries.

3.5.6 Fuel Gas System

The combustion turbine generators will fire natural gas exclusively. At full load, each CTG will require up to 819 MMBtu/hr LHV of natural gas, for a total plant demand of 2,457 MMBtu/hr LHV. SDG&E will build, own, and operate a high pressure gas pipeline from SDG&E's nearby 36-inch 800-psig (per square inch gauge) gas pipeline. There are two possible routes for the gas pipeline. The gas pipeline will convey natural gas via a pipeline (up to 12 inches) that will utilize one of the following routes. Route A would extend south along Alta Road for approximately 8,000 feet to just before the U.S.–Mexico border, at which point it would connect to the existing SDG&E natural gas pipeline. Route B would extend approximately 2,375 feet south along Alta Road, turn west on Otay Mesa Road, and continue approximately 7,920 feet to Harvest Road, at which point it would connect to the existing SDG&E natural gas pipeline (total length of Route B would be approximately 10,300 feet).

Gas pressure available from SDG&E varies seasonally. The gas supply pressure at the PPEC plant boundary metering station is expected to be approximately 500 pounds per square inch (psi). The CTGs require the fuel pressure at the turbine connection to be approximately 920 psi.

To ensure adequate fuel flow and pressure for the entire project, three 50 percent of plant capacity electric-motor-driven fuel gas compressors (two operating and one installed spare) will be provided to boost the natural gas pressure as needed by the CTGs. The compressors will be reciprocating compressors that have lubricated, double-acting, single-stage, two-throw, horizontally-opposed cylinders.

To protect the compressors from liquid slugs and debris, the natural gas will be filtered and separated from entrained liquids before flowing into the compressors. Gas exiting the compressors will be cooled by a trim cooler and passed through filter coalescers and a liquid separator to prevent potential liquid ingestion into the turbine combustors.

3.5.7 Water Supply and Treatment

The Otay Water District plans to establish additional recycled water supply in the Otay Mesa area. Recycled water will be the primary source of process water for the PPEC. Process water uses include plant service water, cooling system make-up, combustion turbine injection, combustion turbine evaporative cooler make-up, and secondary fire protection water. Upon the District's commissioning of the proposed Otay Mesa area recycled water system, the project will make a connection to a recycled water main either along Calzada de la Fuente or along Alta Road.

In the event that this system is not available, the project plans to rely on potable water supplied by Otay Water District. The project would make short connections to the potable service system either at an existing 12-inch main along Calzada de la Fuente, or at an existing 24-inch main along Alta Road. Once the project's process water needs are supplied using recycled water, PPEC's permanent potable water needs would consist of drinking water, showers, sinks, toilets, eye wash stations, safety showers, and primary fire protection water. The water balance, as described in more detail in Section 5.5, Water Resources, is based on recycled water quality parameters, which presents a worst case scenario, based on volume.

Process water uses include plant service water, cooling system makeup, combustion turbine NO_x injection (after demineralization), and combustion turbine inlet air evaporative cooler makeup. The CTG injection water will be demineralized using an ultra filtration (UF) system, a reverse osmosis (RO) system, and skid-mounted ion exchange vessels. Process water will also serve as a secondary source of fire protection water.

The connection to Otay Water District potable water will supply facility drinking water, showers, sinks, toilets, eye wash stations, and safety showers in hazardous chemical areas. It will also serve as the facility's primary source of fire protection water.

3.5.7.1 <u>Facility Water Balance</u>

Up to 120 MMBtu/hr of heat rejection is required for the intercooler and lube oil coolers connected to each of the facility's LMS100 CTGs. The plant will use a partial dry-cooling system (PDCS) in a closed-loop configuration. By doing this, the heat will be rejected by first using ambient air, followed by an external water evaporation portion of the loop. This allows the plant water consumption to be dramatically decreased in two ways. First, the dry-cooling section will reduce the total amount of water evaporated during the cooling process. Second,

the closed-loop cooling allows the contaminants in the evaporative water to be concentrated to a much greater extent than in a traditional open-loop cooling system because that water does not pass through the combustion turbine equipment.

Compared to a typical open-loop system with no dry cooling, the PDCS described above will decrease the annual plant water consumption by approximately 53 percent and the wastewater production rate by 59 percent. Table 3.5-4, Daily and Annual Water Flows, shows the maximum daily, average daily, and average annual water supply and disposal flows.

Figure 3.5-4A, Water Balance Flow Diagram and Figure 3.5-4B, Water Balance Flow Values show all of the water flow streams for various operating conditions.

TABLE 3.5-4
DAILY AND ANNUAL WATER FLOWS

Flow Stream	Maximum Daily (1,000 gpd)	Average Daily (1,000 gpd)	Annual (acre-ft/yr)
Recycled Water Supply			
Cooling System Makeup	248	124	139
UF and RO Systems	315	147	165
Evaporative Cooler Makeup	255	64	71
Service Water	7	3	4
Total Process Water Requirements	825	338	379
Potable Water Supply	3	1	1
Process Wastewater			
Cooling System Blowdown	124	57	64
Oil-water Separator	26	12	13
Total Process Wastewater	150	69	77
Sanitary Wastewater	3	1	1
Total Wastewater to City Sewer	153	70	78

acre-ft/yr = acre feet per year
gpd = gallons per day
RO = reverse osmosis
UF = ultra filtration
See Figure 3.5-4A for the water balance diagram.

3.5.7.2 Water Quality

The typical expected water quality data for the recycled water and potable water are presented in Table 3.5-5 below, and discussed in Section 5.5, Water Resources.

TABLE 3.5-5
EXPECTED AVERAGE WATER QUALITY OF RECYCLED AND POTABLE WATER

Constituent	Units	Recycled Water[1]	Potable Water[2]
Conductivity	µS/cm	1,450	895
pH		6.9	8.1
Total Suspended Solids (TSS)	ppm	2	NA
Total Dissolved Solids (TDS)	ppm	887	545
Ion Chemistry, as $CaCO_3$			
Total Alkalinity	mg/L	85	122

Constituent	Units	Recycled Water[1]	Potable Water[2]
Hardness	mg/L	279	249
Calcium	mg/L	167	59
Cations			
Magnesium	mg/L	112	24
Sodium	mg/L	332	87
Potassium	mg/L	22	4.6
Bicarbonate	mg/L	85	NA
Sulfate	mg/L	245	180
Chloride	mg/L	326	89
Nitrate-Nitrite	mg/L	52	ND
Trace Metals			
Aluminum	mg/L	0.057	NA
Antimony	mg/L	<0.001	NA
Arsenic	mg/L	0.0015	ND
Barium	mg/L	0.086	NA
Beryllium	mg/L	<0.001	NA
Boron	mg/L	0.41	125
Cadmium	mg/L	<0.0005	NA
Chromium	mg/L	0.0024	NA
Cyanide	mg/L	<0.005	NA
Copper	mg/L	0.05	<1.3
Fluoride	mg/L	0.525	0.9
Iron	mg/L	0.03	NA
Lead	mg/L	0.00078	NA
Manganese	mg/L	<0.002	NA
Mercury	mg/L	<0.0002	NA
Nickel	mg/L	<0.005	NA
Selenium	mg/L	<0.005	NA
Silver	mg/L	0.0012	NA
Thallium	mg/L	<0.001	NA
Zinc	mg/L	0.09	NA
Silica, SiO_2	mg/L	12	NA

Notes:
[1] Water quality for recycled water is based on data for the Ralph W. Chapman Water Recycling Facility for 2007, 2008, and 2009 (OWD, 2008, 2009, and 2010b).
[2] Water quality for potable water is from Otay Water District, 2009 and 2010. No margin has been added to the two samples used to estimate potable water quality.
mg/L = milligrams per liter
NA = not available
ND = not detected, detection limit not available
ppm = parts per million
µS/cm = microsiemens per centimeter

3.5.7.3 Water Treatment

Cooling System Makeup Water

The planned-for makeup water will be from the Otay Water District recycled water supply with total dissolved solids (TDS) content of approximately 1,150 milligrams per liter (mg/L). Should recycled water not be available an alternative supply of potable water would be utilized until such time as recycled water is available, should there be an interruption with the primary supply. The raw water supplied by Otay Water District will be stored in a raw water storage tank. The PDCS makeup water will be pumped or gravity fed from the tank to the cooling module basins as required, replacing water lost from evaporation, blowdown, and

drift. The cooling water blowdown rate will be set to maintain approximately 5.0 cycles of concentration. The concentration limit is determined based on the water chemistry of the recycled water and is aided by the use of highly corrosion-resistant materials in the PDCS.

A chemical feed system will supply water-conditioning chemicals to the cooling water to minimize corrosion, bio-fouling, and the formation of mineral scale. Sulfuric acid is anticipated to be fed into the cooling water system in proportion to makeup water flow for alkalinity reduction to control the scaling tendency of the cooling water. The acid feed equipment will consist of a bulk sulfuric acid storage tank and two full-capacity sulfuric acid metering pumps.

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

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

In general, the cooling system water treatment system will be used to maintain the cooling water quality within the requirements of the cooling system manufacturer, as shown in Table 3.5-6, Cooling Water Quality Limits.

TABLE 3.5-6
COOLING WATER QUALITY LIMITS

Constituent	Concentration (ppm)
Alkalinity, as $CaCO_3$	100 to 500
Silica, as SiO_2	<150
Iron	<3.0
Manganese	<0.1
Sulfides	<1.0
NH_3	<50
TDS	<5000
Calcium as $CaCO_3$	<900
Chlorides, as Cl	<1,500
Sulfates as $CaCO_3$	<2,000
Nitrates, as NO_3	<300

Notes:
< = less than
NH_3= ammonia
ppm = parts per million
TDS = total dissolved solids

Demineralized Water

Raw water will be filtered and sent through an RO system to remove all of the suspended solids and most of the dissolved solids from the water. The RO system rejects approximately 28 percent of the feed water, along with the impurities that were removed. The product water from the RO system is sent through skid-mounted mixed-bed ion exchange demineralizers

and then to a demineralized water storage tank. The mixed-bed resins will be regenerated by an off-site contractor. In addition to being used for CTG NO_x control, a portion of the demineralized water will also be used for CTG compressor washing.

3.5.7.4 Wastewater Treatment and Discharge

The two process wastewater streams are cooling system blowdown and RO reject. Both of these streams will be routed to an on-site wastewater storage tank and then discharged to an adjacent sewer that connects to the Johnson Canyon Trunk Line owned and managed by San Diego County.

The PDCS external water will be concentrated by evaporative losses and will include the residues of chemicals added to the water. These chemicals control scaling and biological growth in the cooling system and corrosion of the heat exchanger tubes. Cooling water treatment will require the addition of a pH control agent (acid), a mineral scale dispersant (polyacrylate polymer or equivalent), corrosion inhibitors (phosphate based), and biocide (sodium hypochlorite and sodium bromide or equivalent). The blowdown will then be removed from the cooling system to prevent mineral scale formation on heat transfer surfaces. Table 3.5-7, Process Waste Characterization, shows the major wastewater streams and the resultant wastewater for disposal. Refer to the water balances on Figure 3.5-4A and Figure 3.5-4B for wastewater flows.

TABLE 3.5-7
PROCESS WASTE CHARACTERIZATION

Constituent	Units	Process Wastewater[1]	Industrial Wastewater Limits[2]
Conductivity	µS/cm	8.080	NA
pH		7.8	5 to 12.5
Total Suspended Solids	ppm	30	100[3]
Total Dissolved Solids	ppm	5,252	NA
Ion Chemistry, as $CaCO_3$			
Total Alkalinity	mg/L	150	NA
Hardness	mg/L	1,851	NA
Calcium	mg/L	950	NA
Cations			
Magnesium	mg/L	900	NA
Sodium	mg/L	1,882	NA
Potassium	mg/L	123	NA
Bicarbonate	mg/L	151	NA
Sulfate	mg/L	1,715	NA
Chloride	mg/L	1,850	NA
Nitrate-Nitrite	mg/L	294	NA
Trace Metals, µg/L (ppb), as Such (i.e., as chemical species identified below)			
Aluminum	mg/L	-	NA
Antimony	mg/L	-	NA
Arsenic	mg/L	-	NA
Barium	mg/L	-	NA
Beryllium	mg/L	-	NA
Boron	mg/L	-	NA
Cadmium	mg/L	-	1.0
Chromium	mg/L	-	5.0
Cyanide	mg/L	-	1.9

Constituent	Units	Process Wastewater[1]	Industrial Wastewater Limits[2]
Copper	mg/L	0.28	11.0
Fluoride	mg/L	-	NA
Iron	mg/L	0.17	NA
Lead	mg/L	-	5.0
Manganese	mg/L	-	NA
Mercury	mg/L	-	NA
Nickel	mg/L	-	13
Selenium	mg/L	-	NA
Silver	mg/L	-	NA
Thallium	mg/L	-	NA
Zinc	mg/L	0.51	24
Silica, SiO2	mg/L	68	NA

Notes:

[1] Estimated by Kiewit and based on a worse-case use of recycled water, not potable water. Process wastewater quality assumes chemical addition and materials upgrades to equipment in contact with wastewater. Trace metals given at their minimum detection limit were not propagated throughout the system. Conductivity is a field measurement but is estimated in the table.

[2] Based on City of San Diego Metropolitan Wastewater Department's Industrial Wastewater Control Program's Current Local Limits (MWD, 2006)

[3] Federal pretreatment standards for power plant discharges to a sewer system limit total suspended solids for a maximum one day at 100 mg/L and average 30-day to 30 mg/L (40 CFR 423)

mg/L = milligrams per liter

NA = not available

ND = not detected, detection limit not available

ppm = parts per million

µS/cm = microsiemens per centimeter

- = not estimated

Plant Drains and Wash-down

Area drains will be located by mechanical equipment where it is determined that oil could mix with rainwater or other water sources. The water collected by these drains will go to the oil-water separator, which separates out any oil before the effluent goes to the sewer. The oil-contaminated fluid will be pumped out by a vacuum truck on an as-needed basis and disposed of at a facility specifically qualified to handle such waste. Hazardous containments will not have drains, but they will be pumped out by vacuum pump if hazardous materials are present.

Domestic/Sanitary Wastewater

The sanitary waste drains will be sent to the San Diego County sewer line via the dedicated connection pipe that would also carry the RO rejects and cooling tower blowdown.

Stormwater Drainage

Stormwater will be managed by employing Best Management Practices (BMPs) that prevent soil erosion and impacts on surrounding vegetation. Generally, gravel will be used in lieu of concrete and asphalt paving, where possible, to allow for on-site stormwater infiltration. Remaining stormwater will be routed through culverts and swales to an onsite stormwater pond and then discharged to the Otay Mesa stormwater drainage system located along Calzada de la Fuente. See Figure 3.4-3 for the Preliminary Grading and Drainage Plan. See Section 5.5, Water Resources, for further discussion on stormwater drainage.

3.5.8 Waste Management

Waste management is the process and procedures whereby all wastes produced at PPEC will be properly collected, treated (where applicable), and disposed. Project-related wastes include wastewater, solid nonhazardous waste, and both liquid and solid hazardous waste. See Table 3.5-8, Estimated Waste Generated during Construction and Operation, for details regarding the project waste characterization and management. Refer to Section 5.14 for additional information on waste management.

3.5.8.1 Solid Waste – Nonhazardous

PPEC will produce maintenance and plant wastes typical of natural gas-fired power generation operations. Generation plant wastes 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. Recyclable materials will be taken off site. Waste collection and disposal will be in accordance with applicable regulatory requirements to minimize health and safety effects.

Construction Waste

Construction of PPEC will generate wastes typical for the construction of simple-cycle, natural gas-fired combustion turbine power generation plants. Wastes will include packing materials and dunnage, surplus excavated materials, excess materials trimmed from standard dimension materials (whether wood, metal, wire, or other basic building materials), concrete spoil, temporary weather covers, consumable abrasive and cutting tools, broken tools, parts and electrical and electronic components, construction equipment maintenance materials, empty containers, oily rags, and other solid wastes, including the typical refuse generated by workers (see Table 3.5-8).

Solid waste will be segregated, where practical, for recycling. Nonrecyclable waste will be placed in covered dumpsters and removed on a regular basis by a certified waste-handling contractor for disposal at a Class III landfill.

PPEC expects to generate less than 100 kilograms per month of hazardous waste. Hazardous wastes generated during construction and operation, if any, will be handled and disposed of in accordance with applicable LORS. Some hazardous solid waste, such as welding materials and dried paint, may also be generated. The hazardous waste will be collected in satellite accumulation containers near the points of generation. This waste will be moved daily to the contractor's 90-day hazardous waste storage area. The waste will be delivered to an authorized hazardous waste management facility before the expiration of the 90-day storage limit.

Startup will generate wastes typical of normal operation plus initial cleaning wastes, such as rags, consumable materials, and failed components. See Table 3.5-8, Solid Waste Generated During Construction and Operation, for a list of solid waste expected to be generated during construction.

TABLE 3.5-8
ESTIMATED WASTE GENERATED DURING CONSTRUCTION AND OPERATION

Waste Stream	Waste Classification	Amount	Disposal Method
CONSTRUCTION			
Paper, wood, glass, and plastics from packing materials, waste lumber, insulation, and empty nonhazardous containers	Nonhazardous	25 tons	Weekly collection for recycling and/or disposal at a Class III Landfill
Concrete	Nonhazardous	17 tons	Weekly collection/disposal at a Class III Landfill
Metal, including steel from welding/ cutting operations, packing materials, empty nonhazardous containers, aluminum waste from packing materials, and electric wire	Nonhazardous	7 tons	Recycling dumpsters. If not recyclable, then disposal at a Class III Landfill
Empty hazardous material containers – drums	Hazardous recyclable	2 cubic yards/week	Recondition, recycle, or waste disposal at Class I Landfill
Used and waste lube oil during CTG and STG lube oil flushes	Hazardous[2] recyclable	<55 gal per flush period, approximately 3-week duration	Recycle
Oil-absorbent mats from CTG and STG lube oil flushes and normal construction	Nonhazardous	1,000 sq. ft. per month, as needed	Waste disposal facility or laundry (permitted to wash rags)
Spent batteries; lead acid	Hazardous	2 batteries/yr	Recycle
Spent batteries; alkaline type, sizes AAA, AA, C, and D	Hazardous Recyclable	60 batteries/month	Recycle
CTG cleaning waste	Hazardous	1,000 gal per cleaning	Hazardous waste disposal facility or recycle
Sanitary waste-portable chemical toilets and construction office holding tanks	Sanitary	1,500 gal per week	Weekly collection (minimum) and off-site treatment/disposal
Waste oil, including used motor oil, transmission fluid, hydraulic fluid, and antifreeze	Hazardous[2]	20 gal per week	Hazardous waste disposal facility or recycle
Waste paint, thinners, and solvents	Hazardous	2 gal per week	Hazardous waste disposal facility or recycle
Oily rags	Hazardous[2]	2-3 55-gal drums	Hazardous waste disposal facility or recycled
Oil absorbents	Hazardous[2]	Less than 1 cubic yard per week	Hazardous waste disposal facility
OPERATION			
Paper, wood, plastic, cardboard, insulation, yard debris, and deactivated equipment and parts	Nonhazardous	100 lbs per week	Weekly collection for recycling and/or disposal at a Class III Landfill
Empty hazardous material containers	Hazardous	50 lbs per week	Recondition or recycle
Used hydraulic fluids, oils, grease, oily filters	Hazardous[2]	<5 gal per day	Recycle
Spent batteries	Hazardous	5 batteries per year	Recycle
Spent selective catalytic reduction (SCR) catalyst	Hazardous	250 lbs every 3 to 5 years	Recycle
Spent carbon monoxide (CO) catalyst	Hazardous	250 lbs every 3 to 5 years	Recycle
Cooling tower basin sludge	Nonhazardous	2 tons per year	Recycle or dispose at nonhazardous waste facility

Waste Stream	Waste Classification	Amount	Disposal Method
CONSTRUCTION			
Used oil from oil-water separator	Recyclable Hazardous[2]	50 gal per year	Recycle
Oily rags	Hazardous[2]	100 lbs per year	Hazardous waste disposal facility or recycled
Oily absorbent	Recyclable Hazardous[2]	55 gal per month	Recycle or hazardous waste disposal facility
Used air filters	Nonhazardous	2,000 filters every 5 years	Recycle
Sanitary wastewater	Nonhazardous	1,000 gal per day	Liquids disposed to on-site leaching field; sludge disposed to a sanitary waste disposal facility
Combustion turbine generator (CTG) periodic operational chemical cleaning	Hazardous	100 gal per cleaning (2 cleanings every 5 years)	Hazardous waste disposal facility (by licensed subcontractors)

Source: Kiewit Power Engineers, 2010.
Notes:
[1] Under California regulations.
< = less than
CTG = combustion turbine generator
gal = gallon(s)
sq. ft. = square feet
STG = steam turbine generator

Operations Waste

Operation of the PPEC facility will generate wastes resulting from processes, routine facility maintenance, and office activities (see Table 3.5-8). Nonhazardous waste during facility operation will be recycled to the greatest extent practical; a certified waste-handling contractor will remove the remainder on a regular basis.

The plant will produce maintenance and plant waste typical of power generation operations. The following types of nonhazardous solid waste may be generated: paper, wood, plastic, cardboard, broken and rusted metal and machine parts, defective or broken electrical materials, empty nonhazardous containers, and other miscellaneous solid wastes, including the typical refuse generated by workers.

Office paper, newsprint, aluminum cans, wood, insulation, yard debris, concrete, gravel, scrap metal, cardboard, glass, plastic containers, and other nonhazardous waste material will be recycled to the extent practical, and a certified waste-handling contractor will remove the remainder on a regular basis for disposal at a Class III landfill.

Hazardous waste will be accumulated at the generating facility according to California Code of Regulations (CCR) Title 22 requirements for satellite accumulation. A licensed hazardous waste hauler will collect hazardous waste with the use of a hazardous waste manifest. Waste will only be shipped to authorized hazardous waste management facilities. Biannual hazardous waste generator reports will be prepared and submitted to the California Department of Toxic Substances Control (DTSC). Copies of manifests, reports, waste analyses, and other documents will be kept on site and remain accessible for inspection for at least three years.

Waste lubricating oil will be recovered and recycled by a waste oil-recycling contractor. Spent oil filters and oily rags will be recycled. Spent SCR and oxidation catalysts will be recycled by the supplier, if possible, or disposed of in a Class I landfill. Laboratory analysis wastes will be recycled if possible, or disposed of in a Class I landfill. Please refer to Section 5.14, Waste Management, for a list of solid waste expected to be generated during operation.

3.5.8.2 Liquid Wastes – Nonhazardous

Nonhazardous liquid wastes that are nonrecoverable, such as cooling system blowdown and RO reject water, will be disposed of into the County's sewer line. Sanitary waste will also flow into this sewer line.

3.5.9 Emissions Control and Monitoring Equipment

Air emissions from the combustion of natural gas in the CTGs will be controlled using state-of-the-art systems. Emissions that will be controlled include:

- NO_x
- CO
- Particulate matter (PM)
- VOCs
- Oxides of sulfur (SO_x)

3.5.9.1 NO_x Production and Control Mechanisms

The project would control NO_x emission production during the CTG combustion and post-combustion processes. The CTG combustors will be equipped with water injection capability to reduce thermal NO_x formed during the combustion process. Water is injected into the combustor to reduce the combustion temperature, which reduces the production of thermal NO_x. NO_x concentrations in the exhaust gas emitted to the atmosphere would be 2.5 ppmvd adjusted to 15 percent O_2 from the gas turbines/SCR systems.

Post-combustion NO_x emissions control would occur through the catalyst housings on the CTG discharge (one per CTG), which are equipped with SCR catalyst modules to further reduce NO_x in the CTG exhaust gas. The SCR process will use 19 percent aqueous NH_3 as the reducing agent in the presence of high-temperature to activate the catalyst. Diluted NH_3 vapor will be injected into the exhaust gas stream via a grid of nozzles located upstream of the catalyst module. The subsequent chemical reaction on the catalyst will reduce NO_x to nitrogen and water. The resulting exhaust gas would have a NO_x concentration no greater than 2.5 ppmvd, adjusted to 15 percent O_2, on a three-hour average basis. NH_3 slip, or the concentration of unreacted NH_3 in the exiting exhaust gas, would be limited to 5.0 ppmvd adjusted to 15 percent O_2 on a dry basis. The SCR equipment will include a reactor chamber, catalyst modules, NH_3 storage system, NH_3 vaporization and injection system, and monitoring equipment and sensors.

3.5.9.2 Dry Low NO_x Combustors

Dry low NO_x combustors are not commercially proven in the LMS100 CTGs; therefore, they are not considered for this project.

3.5.9.3 CO and VOC Emissions

An oxidation catalyst will be installed within the catalyst housing to reduce the concentration of CO in the exhaust gas emitted to atmosphere to no greater than 4.0 ppmvd when adjusted to 15 percent O_2 on a dry basis.

VOCs include all unburned hydrocarbons except methane. VOC emissions are low because of proper combustion controls in the CTG. No other controls are required for VOC reduction.

3.5.9.4 Particulates

Particulate emissions will be controlled by the use of natural gas, which is low in particulates, as the sole fuel for the CTGs. Particulates from cooling tower drift will also be minimized by using a partial-dry cooling system.

3.5.9.5 SOx Emissions

SO_x emissions will be controlled by the use of natural gas, which is low in sulfur, as the sole fuel for the CTGs. Utilization of SCR and oxidation catalyst promotes formation of sulfite (SO_3) from sulfur dioxide (SO_2).

3.5.9.6 Emission Monitoring

Continuous Emissions Monitoring Systems (CEMS) will sample, analyze, and record fuel gas flow rate, NO_x and CO concentration levels, and the percentage of O_2 in the stack gas. This system will generate reports of emissions data in accordance with permit requirements and will send alarm signals to the plant's control system when emissions approach or exceed preselected limits.

3.5.10 Fire Protection System

3.5.10.1 Firewater System

The fire protection system will mitigate personnel injury, loss of life, property loss, and plant downtime due to fire. The fire protection system will be connected to the Otay Water District's potable water system as its primary water source. A reduced-pressure principal backflow preventer will be used at the connection to prevent any possibility of potable water contamination with the raw (recycle) water. As a back-up to the primary fire water supply, the lower portion of the 500,000-gallon raw/service water storage tank will be reserved for fire protection. The dedicated volume in the 500,000-gallon storage tank will provide 2 hours of protection from an on-site worst-case single fire. An electric fire protection pump will activate automatically if the fire protection system pressure drops below acceptable levels.

A dedicated underground firewater distribution system with fire hydrants, sprinkler systems, and deluge systems, designed in conformance with the NFPA code, will be used to distribute the fire protection water. The system will have sectionalizing valves so that a failure in any part of the system can be isolated while allowing the remainder of the system to function properly. Fire hydrants and fixed suppression systems will be supplied from the firewater loop. Fire hydrants will be spaced at approximately 300-foot intervals around the facility in accordance with NFPA 850 and local fire codes.

In addition, the combustion turbines and associated electrical modules will be protected by a carbon dioxide (CO_2) fire protection system.

3.5.10.2 Fixed Fire Protection Systems

The fire protection water supply is shown on Figure 3.5-5, Fire Protection System. Fixed-fire protection systems will be provided for the oil-filled GSU transformers and the turbine lubrication oil system. In addition, buildings will have sprinkler systems, as required by NFPA and local fire codes. Sprinkler and fixed-spray systems will be designed and installed in accordance with NFPA 13 and NFPA 15. Electronic and electrical equipment rooms will have smoke detectors and alarms, as well as local hand held fire extinguishers.

3.5.10.3 Fire Alarm and Detection

Fire alarms will be installed in buildings in accordance with NFPA 72 and as required by local fire codes. The alarm system will include alarm annunciation and supervisory and trouble signals. Alarms will require urgent action by the plant operators. Supervisory signals indicate abnormal conditions that require investigation. Trouble signals indicate adverse conditions, such as ground fault or power supply problems, which should be rectified by qualified personnel.

3.5.10.4 Portable Extinguishers

Hand-held CO_2 and dry chemical fire extinguishers will be located throughout the plant in accordance to NFPA 10.

3.5.10.5 Miscellaneous Fire Safety Items

All material used in construction of the PPEC plant and its auxiliary systems will be free of asbestos and will meet the fire and smoke rating requirements of NFPA 255.

3.5.11 Plant Auxiliaries

3.5.11.1 Lighting

See Section 5.13, Visual Resources, for details on lighting. Lighting will be provided in the following areas:

- Interior of office, control, maintenance, and other buildings

- Exterior entrances to buildings
- Platforms and walkways
- Transformer and switchyard areas
- Plant roads
- Parking areas
- Entry gate
- Cooling system equipment

Lighting will be designed to minimize visual impacts while providing adequate lighting for normal operations and maintenance and ensuring security and safety requirements are met. Switches or motion detectors will control lighting in areas not normally accessed as part of routine operation or to ensure safety of personnel and property.

Emergency lighting fixtures with integral battery packs will be located in areas of regular personnel traffic to allow exit from areas where normal lighting has failed. In areas with major control equipment and electrical distribution equipment, emergency lighting located in these areas will suffice to allow operations to reestablish auxiliary power during a normal lighting failure.

3.5.11.2 Grounding and Lightning Protection

Electrical systems are susceptible to ground faults, lightning, and switching surges, all of which can lead to a rise in unit ground potential. This rise is a hazard to both site personnel and electrical equipment. Hence, a grounding system will be instituted to provide an adequate path to allow the dissipation of ground fault currents and thereby minimize rises in the ground potential.

The station-grounding grid will be designed with sufficient capacity to dissipate heat from the ground current under the most severe fault conditions in places of high ground fault current concentration. The grid spacing will be set to maintain safe step voltage gradients.

Bare copper conductors will be installed below grade in a grid pattern. Each junction of the grid will be bonded together by either an exothermal welding process or mechanical connectors.

Ground resistivity readings, performed as part of the subsurface investigations, will be used to determine the necessary numbers of ground rods and grid spacing to ensure safe step and touch potentials under fault conditions.

Grounding cables will be brought from the ground grid to connect to building steel and non-energized metallic parts of electrical equipment. Insulated grounding conductors to the isolated ground will be provided for sensitive control systems.

Lightning protection will be furnished for buildings and structures in accordance with NFPA 780 or Underwriters Laboratories (UL) 96 and UL 96A.

3.5.11.3 Cathodic Protection

A cathodic protection system will be present for buried carbon steel pipes and structures (except rebar). Cathodic protection will be provided by an impressed current system, a sacrificial system, or a combination of both.

3.5.11.4 Programmable Logic Controller (or Digital Control System)

The programmable logic controller (PLC) provides modulating control, digital control, monitoring, and indicating functions for the plant power block systems. The following functions will be provided:

- Controlling the CTGs and other systems in a coordinated manner
- Controlling the BOP systems in response to plant demands
- Monitoring controlled plant equipment and process parameters and delivering this information to plant operators
- Monitoring the CTG CEMS units for critical alarms and collecting data for historical logging
- Providing control displays (printed logs, operator interface) for signals generated within the system or received from input/output (I/O) signals
- Providing consolidated plant process status information through displays presented in a timely and meaningful manner
- Providing alarms for out-of-limit parameters or parameter trends, displaying this information on operator interface units, and recording on an alarm log printer
- Providing storage and retrieval of historical data

The PLC will be a redundant microprocessor-based system consisting of the following major components:

- Liquid crystal display (LCD) flat-screen displays on operator workstations
- Engineer work station
- Distributed processing units
- I/O card cabinets
- Printers
- Data link to the combustion turbines

The PLC will have redundant processing units linked to a group of operator workstations and the engineer workstation by redundant data highways. Each processor will be programmed to perform specific dedicated tasks for control information, data acquisition, and annunciation. By being redundant, no single processor failure can cause or prevent a unit trip.

The PLC will interface with the control systems furnished by the CTG supplier to provide supervisory remote control capabilities, as well as data acquisition, annunciation, and historical storage of turbine and generator operating information.

3.5.11.5 Plant Instrument and Service Air System

The plant service and instrument air system will consist of packaged air compressor skid(s) and a distribution system with a main header and branches that distribute air to various locations in the power block. The main components of the air compressor skid will include three 50 percent air compressors, two 100 percent air dryers with pre-filters and after-filters, and an air receiver.

The air compressors will be oil-flooded, air-cooled, rotary screw air compressors with a discharge pressure rated at 125 pounds psig and sized for instrument and service air capacity requirements. The compressors will be provided with inlet filters, after-coolers, totally enclosed fan-cooled (TEFC) motors, controls, automatic condensate trap, piping, and valves.

The air dryers will be heatless, dual tower, regenerative desiccant type. Coalescing pre-filters, particulate after-filters, a moisture-indicating instrument, and a regulator will be supplied with the dryer.

The air receiver will be American Society of Mechanical Engineers (ASME) code rated. Typically a vertical vessel, the receiver will have a pressure safety valve to prevent over-pressure.

The main header will distribute air from the receiver and deliver it by a network of branches from the header throughout the plant, where needed. A pressure-regulating valve will be provided at each service and utility station to prevent the service air system from degrading the instrument air pressure.

Service air headers will be routed to hose connections located at various points throughout the facility. Instrument air will be routed to locations within the facility equipment areas and within the water treatment facility where pneumatic operators and devices will be located.

3.5.12 Heating, Ventilation, and Air Conditioning

The heating, ventilation, and air-conditioning (HVAC) system will provide an acceptable environment for personnel comfort and equipment operation within the plant buildings.

Only the administration and control building will be air conditioned. The HVAC system will be designed in accordance with the California Building Code (CBC) and the Uniform Mechanical Code (UMC), as prescribed by the CCR.

Air conditioning in the control room and administrative areas will maintain a suitable environment for plant personnel. If required for proper equipment operation, humidity control will be provided in the control room.

Outside air ventilation systems will be provided for buildings where air-conditioning is not required. Electric heaters will be used for winter heating.

Every building and respective portion of the building will be supplied with fresh air in accordance with the CBC; American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) Standard 62; and the CCR.

3.5.13 Plumbing

The plumbing system will supply potable water to all plumbing fixtures and will collect and convey waste fluids to the waste collection system. The system will be designed and constructed in accordance with the California Plumbing Code.

3.5.14 Noise Emission Abatement Equipment

The PPEC facility equipment would be individually specified with source controls, such that overall noise from the facility at noise-sensitive receptors meets regulatory requirements. During normal operations, the nature of noise from the proposed facility would be essentially continuous and broadband (no tones).

Anticipated equipment source controls would include the following:

- CTGs housed within high performance acoustic enclosures
- CTG enclosures equipped with ventilation system silencers
- CTG air inlet equipped with high performance acoustical silencer
- Combustion turbine air inlet compressor equipped with a variable bleed valve silencer
- SCR and CO emission control systems with integral stack/silencer system
- Gas compressors housed within acoustical enclosures
- Water treatment equipment located within a building

3.6 CIVIL/STRUCTURAL FEATURES

This section describes the buildings, structures, and other civil/structural features that will constitute the PPEC facility, as shown on Figure 3.1-3A, Site Arrangement.

3.6.1 Overview

The power block will consist of three separate simple-cycle combustion turbine power generation trains, each consisting of one GE LMS100 CTG, an air inlet system, an intercooler and variable bleed valve silencer, an SCR system, one stack, a power control module, an intercooler motor control center, a fuel gas filter/separator, and a generator step-up transformer.

In addition to the three combustion turbine power generation trains, there will be a cooling system (PDCS), an NH_3 storage tank, natural gas compressors, a water treatment facility, and two auxiliary transformers. BOP mechanical and electrical equipment will also be present.

The major equipment will be supported on reinforced concrete foundations at grade. Individual reinforced pads at grade will be used to support the BOP mechanical and electrical equipment. The gas compressors and water treatment equipment will be in an enclosed building(s).

3.6.2 Stacks

The SCR/CO system will include an integral stack/silencer system. The stack will be a 100-foot tall self-supporting steel stack and will include the associated appurtenances, such as sampling ports, exterior ladders, side step platforms, and electrical grounding.

3.6.3 Buildings

The plant buildings will include a main plant building consisting of an administration and control area and warehouse area, a water treatment building, a firewater pump modular enclosure, switchgear modules, and gas compressor modules. Building dimensions are shown on Figure 3.1-3A, Site Arrangement. All of the buildings or modules will be supported on mat foundations or individual spread footings.

3.6.4 Transformer Foundations and Firewalls

There will be three 13.8kV to 230kV generator step-up oil-filled transformers and two 13.8kV to 4.16kV auxiliary oil-filled transformers. Each will be supported on reinforced concrete foundations at grade. Construction of a concrete retention basin around each transformer will provide oil containment in the event of a transformer failure. Concrete firewalls will be provided as required by NFPA 850 for each step-up transformer and auxiliary transformer to limit a potential transformer fire to its concrete basin area.

3.6.5 Yard Tanks

The yard water storage tanks will include the raw water storage tank (500,000 gallons), the demineralized water storage tank (240,000 gallons), and the wastewater collection tank (95,000 gallons).

The yard storage tanks will be vertical, cylindrical, field-erected, or shop-fabricated steel tanks. Each tank will be supported on a suitable foundation consisting of either a reinforced concrete ring wall with an interior bearing layer of compacted sand for the tank bottom or a reinforced concrete mat.

3.6.6 Roads

Access to the project site will be through controlled access gates. The new facility will be served by the road network shown on Figure 3.3-1, Facility Plot Plan. New roads, miscellaneous access drives, and permanent parking areas within the project site boundaries will be asphalt or aggregate surfaced roads. Surrounding the equipment will be a network of roads for fire equipment and facility maintenance access. Primary access to the site will be from Calzada de la Fuente, and the construction and laydown area access will be from Alta Road or Paseo de la Fuente.

3.6.7 Site Security

A temporary chain-link security fence surrounding the project site perimeter will enclose the new facility during construction. Upon completion of the project, a permanent chain link security fence will encompass the facility. In addition, the facility switchyard will be enclosed within a chain-link fence for the safety of the workforce. A controlled-access gate will be located at the main entrance from Calzada de la Fuente. During construction, a temporary chain-link security fence will be erected around the outside perimeter of the laydown site. This fence will be removed at the conclusion of the construction phase.

3.6.8 Site Grading and Drainage

The PPEC plant site will consist of paved roads, paved parking areas, and graveled areas. Stormwater that does not infiltrate the project site will be routed through culverts and swales to an onsite detention pond and then discharged to the Otay Mesa stormwater system along Calzada de la Fuente. Stormwater entering the property from off site will be diverted away from the plant area using ditches. The grading and drainage facilities will be designed in accordance with the San Diego County Drainage Design Manual, San Diego County Hydrology Manual, and the County of San Diego Standard Urban Stormwater Mitigation, and BMPs will be implemented to reduce erosion and remove silt. The site grading and drainage plan for the project is shown on Figure 3.4-3, Preliminary Grading and Drainage Plan. See Appendix I, Water Resources, for the detention basin calculations.

A Stormwater 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 construction of PPEC. This plan will be used at PPEC to control stormwater during the facility's construction. The plan will use BMPs such as stabilized construction entrances, silt fencing, berms, hay bales, and detention basins to control runoff from all construction areas.

3.6.9 Site Flood Issues

According to the Federal Emergency Management Agency (FEMA), the site is outside of the 100-year floodplain.

3.6.10 Sanitary System

The sanitary system will consist of a sewer connection to the existing San Diego County sewer designed to handle the sanitary flow from the administration and control building and any restrooms, located on the site. The sewer connection will be on site near the administration and control building, connecting to the linear sewer line.

3.6.11 Earthwork

Excavation activities are expected to be minimal based on previous grading activities conducted by the landowner. Excavation work will consist of the removal, storage, and/or disposal of earth, sand, gravel, vegetation, organic matter, loose rock, boulders, and debris to the lines and grades necessary for construction. Materials suitable for backfill will be stockpiled at designated locations using proper erosion protection methods.

The site is currently vacant industrial land located immediately west of the OMGP. Graded areas will be smooth, compacted, free from irregular surface changes, and sloped to drain. Cut-and-fill slopes for permanent embankments will be designed to withstand horizontal ground accelerations for Seismic Zone 4. For slopes requiring soil reinforcement to resist seismic loading, geogrid reinforcement will be used for fills and soil nailing for cuts. Slopes for embankments will be no steeper than 4:1 (horizontal:vertical). Construction will be at existing grade, which is fairly level; therefore, major cuts and fills are not anticipated.

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

Backfilling will be done in layers of uniform, specified thickness. Soil in each layer will be properly moistened to facilitate compaction to achieve the specified density. To verify compaction, representative field density and moisture-content tests will be performed during compaction. Structural fill supporting foundations, roads, and parking areas will be compacted to at least 95 percent of the maximum dry density, as determined by American Society for Testing Materials (ASTM) D698. Embankments, dikes, bedding for buried piping, and backfill surrounding structures will be compacted to a minimum of 90 percent of the maximum dry density. Backfill placed in remote and/or unsurfaced areas will be compacted to at least 85 percent of the maximum dry density.

Where fills are to be placed on subgrades sloped at 6:1 (horizontal:vertical) or greater, keys into the existing subgrade may be provided to help withstand horizontal seismic ground accelerations.

3.7 ELECTRICAL INTERCONNECTION

The new generation will be interconnected to the SDG&E transmission grid through a newly constructed transmission line, which will connect to the existing SDG&E 230kV Otay Mesa switchyard east of the facility. The transmission line route will have a right-of-way (ROW) width of 80 feet. Representative switchyard, transmission pole structures, and underground transmission line structures are presented on Figure 3.7-1A (230kV Switchyard Tubular Steel H-Frame Structure), Figure 3.7-1B (230kV Transmission Line Tubular Steel Tangent Structure), Figure 3.7-1C (230kV Transmission Line Tubular Steel Dead-End Structure), and Figure 3.7-1D (230kV Underground Cable Riser/Dead-End Structure and Duct Bank) which the PPEC proposes to use to transition the 230kV circuits to the existing switchyard.

3.7.1 PPEC Switching Station and Interconnect Specifications

The on-site interconnection facilities will consist of a switchyard, which includes the following major equipment:

- 230kV SF_6 gas-filled high-voltage circuit breakers, each rated 2,000 amperes continuous capacity (ACC), 40 thousand amps interrupting capacity (KAIC).
- 230kV, 2,000-amperes (amp), three-phase breaker disconnect switches, manually operated, each mounted horizontally upright on a low-profile steel support structure.
- 230kV, 2,000-amp three-phase line disconnect switch mounted on a low-profile switch support structure underneath a 230kV dead end/pull off structure for the new 230kV transmission line connection. This 2,000-amp switch serves as a line disconnect on the SDG&E side.
- 230kV coupling capacitor voltage transformers (CCVTs) on one-phase or three-phase steel support structures.
- All necessary yard lighting standards and lighting fixtures along with yard receptacle fixtures providing 120/240V one-phase power. One outdoor lighting panel will be installed for this.
- Drivable cable trenches and/or duct bank, and pull boxes.
- 230kV dead-end/pull off structure/switch support structures for 230kV transmission line to the SDG&E Otay Mesa switchyard. Concrete foundations for all aboveground structures, supports, and equipment.
- One main ground grid system.
- Entrance gate or gates.
- One chain-link fence system with an isolated fence ground, including entrance gates and emergency personnel gates.

- SCADA remote terminal unit (RTU) for station automation, as required by SDG&E.
- Communication hardware, including fiber-optic terminal equipment for fiber links for current differential line protection, as required by SDG&E.
- All instrumentation and control required.

The switchyard design and transmission line interconnection will be coordinated with SDG&E as required.

3.7.1.1 Conductor

The 230kV generation-tie line connecting the project to the existing SDG&E switchyard will be constructed using overhead and potentially some underground conductors, to be approved by SDG&E. Overhead conductor will be one 1113 kilo-circular mil (kcmil) aluminum conductor steel reinforced (ACSR) per phase and underground conductor will nominally be one 2300kcmil Al XLPE cable per phase.

3.7.1.2 Ground Wire

The transmission line will have shield or ground wires in place. The location of the shield wires in relation to conductors will be in accordance with best industry practices and determined by the surrounding terrain. The shield wire will be extra high-strength galvanized-steel or copper-clad steel, as determined by the location and the detailed design.

3.7.2 Transmission Structures

The transmission structures associated with the PPEC 230kV interconnecting transmission line will include 230kV pole structures designed to accommodate overhead shield/ground wire. As described above, the transmission structures will be placed within an 80-foot wide right-of-way. Refer to Figures 3.7-1A through 3.7-1D, which provide representative project transmission structure detail. Refer to Figure 3.1-3A, Site Arrangement, and Figure 3.1-3B, Site Arrangement and Potential Offsite Transmission Line Structure Locations, for potential locations of the new structures for the transmission interconnection.

3.7.3 Transmission System Evaluation

3.7.3.1 Transmission System Reliability Criteria

SDG&E performed the evaluation of the transmission system based on criteria as established by the North American Electric Reliability Council (NERC), the Western Electricity Coordinating Council (WECC), the California Independent System Operator (CAISO), and the SDG&E reliability criteria.

3.7.3.2 CAISO Interconnection Study

PPEC LLC submitted an Interconnect Application to CAISO in January 2010 for the cluster study process. The resulting studies will include work previously known as the System Impact Study and Facilities Study. The studies are underway, and are expected to provide an acceptable plan and executable LGIA for project interconnection. See Appendix H for CAISO interconnection study agreement and proof of payment.

3.7.4 Transmission Line Safety and Nuisance

3.7.4.1 Transmission Line Description

One 230kV transmission line will be routed along one of the two alternate routes, as described in Section 3.3, from PPEC to the existing SDG&E Otay Mesa switchyard. The electric effects of the high-voltage lines fall into two categories: field effects and corona effects. Field effects comprise of electric and magnetic fields. Corona is the ionization of the air that occurs at the surface of the energized conductor and suspension hardware due to very high electric field strength at the surface of the metal during certain conditions. Corona may result in radio and television reception interference, audible noise, light, and production of ozone. A transmission line's field effects are the voltages and currents that may be induced in nearby conduction objects.

3.7.4.2 Generation of Electric and Magnetic Fields

Power lines, electrical wiring, electrical machinery, and appliances all produce electric and magnetic fields, commonly referred to as electromagnetic field (EMF). The EMF produced by the alternating current from PPEC would have a frequency of 60 Hz, which means that the intensity and orientation of the field changes 60 times per second. When a conductor is energized, both an electric and magnetic field will form around the conductor directly proportional to the energization voltage and current, respectively. The magnitude of the EMF depends on the current in the conductor, geometry of the structures, degree of cancellation from other conductors, and the distance of the receptor from the conductors. Maximum magnetic fields are produced at the maximum conductor currents. Both electric and magnetic field magnitudes are inversely proportional to the distance from the conductors, meaning that EMF will attenuate as a function of distance from the conductors.

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 long-term exposure to EMF is harmful. In the absence of conclusive evidence, some states, including California, have chosen not to specify maximum acceptable levels of EMF. Instead, California mandates a program of prudent avoidance whereby EMF exposure to the public would be minimized by encouraging electric utilities to use cost-effective techniques to reduce the levels of EMF.

To reduce electric and magnetic fields, overhead transmission lines are designed to carry power over three conductors with currents and voltages that are 120 degrees out of phase with each other. Combined, the phase differences tend to cancel out the fields from the conductors. However, within a close range, such as when a person stands on the ROW under a

transmission line, one conductor will be significantly closer; hence, it will contribute a net uncancelled field at the person's location.

EMFs occur independently of one another as electric and magnetic fields at the 60-Hz frequency used in transmission lines, and both are created by electric charges. Electric fields exist when these charges are not moving. Magnetic fields are created when the electric charges are moving. The magnitude of both electric and magnetic fields falls off rapidly as the distance from the source increases (proportional to the inverse of the square of distance).

California does not have regulatory levels for electric and magnetic fields. The estimated PPEC electric field at the center of the proposed transmission line ROW is 1.8 kV/meter, and is 0.45 kV/meter at the edge of the ROW. The estimated PPEC magnetic field directly under the 230kV transmission line is 70 mG (0.07 G), and 40 mG (0.04G) at the edge of the ROW, which are well below those established by states that do have limits. Other states have established regulations for magnetic field strengths that have limits ranging from 150 mG to 250 mG at the edge of the ROW, depending on voltage.

3.7.4.3 Corona Effect

An electric field is generated in the air surrounding a transmission line conductor when the transmission line is in operation. A corona discharge occurs at the conductor surface when the intensity of the electric field at the conductor surface exceeds the breakdown strength of the surrounding air. The electrical energy released from the conductors during this process is known as corona loss and is manifested as audible noise and radio/television interference.

Corona may result in certain radio and television reception interference, audible noise, light, and production of ozone, which are described in further detail below. The effects of corona are greatest at locations on the conductor where the field is enhanced by protrusions, such as nicks, insects, or drops of water (for instance during wet weather).

3.7.4.4 Audible Noise, Radio and Television Interference, Visible Light, and Photochemical Reactions

Energized electric transmission lines can also generate audible noise by a process called corona discharge, most often perceived as a buzz or hum. This condition is usually worse when the conductors are wet. The EPRI has conducted several transmission line tests and studies that measured sound levels for several power line sizes with wet conductors (*Transmission Line Reference Book, 345 kV and Above,* EPRI 1975, 1982). *Transmission Line Reference Book, 345 kV and Above* also notes that the noise produced by a conductor attenuates (decreases) by 2 to 3 dB for each doubling of the distance from the source.

Many factors contribute to the pre-project ambient noise levels in the plant area. The project transmission line will be designed such that noise from the line will continue to be well below undesirable levels, as described below. Any noise or radio/TV interference complaints will be logged, investigated, and, to the degree possible, mitigated.

- **Audible Noise.** Corona-generated audible noise from transmission lines are generally characterized as a buzz or hum noise. The Electric Power Research Institute (EPRI) has conducted several transmission line studies that measure the sound levels for several line sizes with wet conductors (EPRI, 1975, 1982). The EPRI found that the noise produced by a conductor attenuates by 2.0 to 3.0 decibels (dB) for each doubling of the distance from the source. As previously noted, the project transmission line will be designed according to CPUC and California code, which will also serve to keep noise effects from reaching undesirable levels. Any complaints will be logged, investigated, and, to the degree possible, mitigated.

- **Radio and Television Interference.** Radio and television interference, known as gap-type noise, is caused by a film on the surface of two hardware pieces that are in contact. The film acts as an insulator between the surfaces. This results in small electric arcs that produce noise and interference. Corona-generated radio interference is most likely to affect the amplitude modulation (AM) broadcast band (535 to 1,605 kilohertz); frequency modulation (FM) radio is rarely affected. Only AM receivers located very near to transmission lines have the potential to be affected by interference. The potential for interference with radio or television use is expected to be minimal or nonexistent. This type of noise is not a problem in well-maintained transmission lines. Well-trained transmission line maintenance crews will maintain the project transmission line; therefore, problems that might occur can be readily pinpointed and corrected. As previously noted, the project transmission line will be designed according to CPUC and California code, which will also serve to keep interference effects from reaching undesirable levels. Any complaints will be logged, investigated, and, to the degree possible, mitigated.

- **Visible Light.** Corona may be visible at night as a bluish glow or as bluish plumes. On the transmission lines in the area, the corona levels are so low that the corona on the conductors usually is observable only under the darkest conditions with the aid of binoculars.

- **Photochemical Reactions.** When coronal discharge is present, the air surrounding the conductors is ionized and many chemical reactions take place producing small amounts of ozone and other oxidants. Approximately 90 percent of the oxidants are ozone, and the remaining ten percent are composed principally of nitrogen oxides.

3.7.4.5 Induced Currents and Hazardous/Nuisance Shocks

A conducting object such as a vehicle or person in an electric field will experience induced voltages and currents. The strength of the induced current will depend upon the object-to-ground resistance and the electric field strength and the size and shape of the conduction object. When a conducting object is isolated from the ground and a grounded person touches the object, a perceptible current or shock may occur as the current flows to the ground. 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 low enough to prevent vehicle short-circuit currents from exceeding 5.0 milliamperes (mA).

Similarly, magnetic fields 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. Again, a person closing an electrical loop by grounding the object at a different location will experience a shock similar to one caused by the electric field described above. The mitigation for magnetic field effects is to ensure multiple grounds for fences or pipelines, especially those oriented parallel to the transmission line.

The on-site 230kV transmission interconnection and transmission line will be constructed in conformance with California Public Utility Commission (CPUC) General Order (GO) 95 requirements and Title 8 CCR 2700 requirements. In this way, hazardous shocks are highly unlikely to occur as a result of the project construction, operation, and maintenance.

3.7.4.6 Transmission Line Safety and Nuisance Laws, Ordinances, and Standards

This sections provides a list of applicable laws, ordinances, regulations, and standards (LORS) relating to transmission line safety and nuisance that apply to the proposed transmission line, substation, and engineering. Refer to Table 3.7-3 for agencies with jurisdiction to issue permits or approvals, conduct inspections, or enforce the above-referenced LORS.

TABLE 3.7-1
TRANSMISION LINE SAFETY AND NUISANCE LORS

LORS	Applicability	Conformance
Design and Construction LORS for the Proposed Transmission Line and Switchyard		
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.	Section 3.7.4.5
GO-52, CPUC, "Construction and operation of power and communication lines for the prevention or mitigation of inductive interference"	Applies to the design of facilities to provide or mitigate inductive interference.	Section 3.7.4.5
IEEE 1119, "IEEE Guide for Fence Safety Clearances in Electric-Supply Stations"	Recommends clearance practices to protect persons outside the facility from electric shock.	Section 3.7.4.5
Electric and Magnetic Fields		
Decision 93-11-013, CPUC	CPUC position on EMF reduction.	Section 3.7.4.2
GO-131D, 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.	Section 3.7.4.2
Hazardous Shock		
8 CCR 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.	Section 3.7.4.5
NESC, ANSI C2, Section 9, Article 92, Paragraph E; Article 93, Paragraph C	Covers 5 mA vehicle short circuit current limitation.	Section 3.7.4.5

LORS	Applicability	Conformance
Design and Construction LORS for the Proposed Transmission Line and Switchyard		
Communications Interference		
47 CFR 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.	Section 3.7.4.4
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.	Section 3.7.4.5

3.7.5 Transmission System Design Laws, Ordinances, Regulations, and Standards

This section provides a list of applicable laws, ordinances, regulations, and standards (LORS) that apply to the design and construction of the proposed transmission line and connection to the proposed SDG&E switchyard of the PPEC. As shown in Figure 3.5-3, the output of each CGT generator will be stepped up to 230kV, and will be connected to the project switchyard via a 1200 ampere rated, SF_6-cooled, circuit breaker. The project switchyard bus will be connected to the SDG&E PPEC substation via the 230kV interconnection, as shown on Figures 3.3-1 and 3.5-3. All transmission and interconnection facilities will be built in conformity with applicable LORS.

Table 3.7-2 lists the applicable LORS for the design and construction of the proposed transmission line and proposed connection to the SDG&E switchyard.

TABLE 3.7-2
DESIGN AND CONSTRUCTION LORS FOR THE PROPOSED TRANSMISSION LINE AND SWITCHYARD

LORS	Applicability	Conformance
ANSI/IEEE 80, "IEEE Guide for Safety in AC Substation Grounding"	Presents guidelines for assuring safety through proper grounding of AC outdoor substations.	Section 3.7.1
ANSI/IEEE 693,"IEEE Recommended Practices for Seismic Design of Substations"	Provides recommended design and construction practices.	Sections 3.5.5, 3.7.1, 3.7.2, 3.7.3, 3.7.4; and Figures 3.5.3, 3.7-1A through and 3.7-1D.
IEEE 980 "Containment of Oil Spills for Substations"	Provides recommendations to prevent release of oil into the environment.	Sections 3.5.5, 3.5.8, and 3.6.4
IEEE 998 "Direct Lightning Stroke Shielding of Substations"	Provides recommendations to protect electrical system from direct lightning strokes.	Sections 3.5.5, 3.7.1, 3.7.2, 3.7.3, 3.7.4; and Figures 3.5.3, 3.7-1A through and 3.7-1D.
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.	Sections 3.5.5, 3.7.1, 3.7.2, 3.7.3, 3.7.4; and Figures 3.5.3, 3.7-1A through and 3.7-1D.
NESC, ANSI C2, Section 9, Article 92, Paragraph E; Article 93, Paragraph C	Covers grounding methods for electrical supply and communications facilities.	Sections 3.5.11.2, 3.7.1, and 3.7.2

LORS	Applicability	Conformance
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.	Section 3.5.5 and 3.5.10.2, and Figure 3.7.1A through 3.7-1D
47 CFR 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.	Section 3.7.4.4
Title 8 California Code of Regulations (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.	Sections 3.5.5, 3.7.1, 3.7.2, 3.7.3, 3.7.4; and Figures 3.5.3, 3.7-1A through and 3.7-1D.
General Order 52 (GO-52), CPUC, "Construction and Operation of Power and Communication Lines":	Applies to the design of facilities to provide or mitigate inductive interference.	Section 3.7.4
General Order 95 (GO-95), CPUC, "Rules for Overhead Electric Line Construction"	CPUC rule covers required clearances, grounding techniques, maintenance, and inspection requirements. The rule covers all aspects of design, construction, operation, and maintenance of electric transmission line and fire safety (hazards).	Sections 3.5.5, 3.7.1, 3.7.2, 3.7.3, 3.7.4; and Figures 3.5.3, 3.7-1A through and 3.7-1D.
General Order 128 (GO-128), CPUC, "Rules for Construction of Underground Electric Supply and Communications Systems"	Applies to the design and construction of underground transmission lines. Specifically establishes requirements and minimum standards to be used for the underground installation of AC power and communications circuits.	Sections 3.5.5, 3.7.1, 3.7.2, 3.7.3, 3.7.4; and Figure 3.7-1D.
GO-131D, 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.	Section 3.7.4.2
Suggestive Practices for Raptor Protection on Power lines, April 1996	Provides guidelines to avoid or reduce raptor collision and electrocution.	Sections 3.5.5; 3.7.2 and 3.7.4; and Figures 3.7-1A through and 3.7-1D.

3.7.6 Transmission System Involved Agencies and Agency Contacts

Table 3.7-3 identifies federal, state, and local agencies with jurisdiction to issue permits or approvals, conduct inspections, and/or enforce the above referenced LORS. Table 3.7.3 also identifies the associated responsibilities of these agencies as they relate to the construction and operation of PPEC.

TABLE 3.7-3
AGENCIES WITH JURISDICTION FOR TRANSMISSION SYSTEM ENGINEERING AND DESIGN CONSIDERATIONS

Agency	Jurisdiction	Contact Information
Caltrans Department of Aeronautics	Grants permits to private heliports in California. May advise local jurisdictions regarding obstructions to helicopter navigation.	Division of Aeronautics 1120 N Street, Room 3300 Sacramento, CA 95814 916-654-4959
CEC	New transmission lines associated with thermal power plants that are 50 MW or more. (PRC § 25500).	1516 Ninth Street Sacramento, CA 95814 800-555-7794
CEC	Lines out of a thermal power plant to the interconnection point to the utility grid. (PRC § 25107).	1516 Ninth Street Sacramento, CA 95814 800-555-7794
CEC	Modifications of existing facilities that increase peak operating voltage or peak kilowatt capacity 25 percent. (PRC § 25123).	1516 Ninth Street Sacramento, CA 95814 800-555-7794
CPUC	Regulates construction and operation of overhead transmission lines. (General Order No. 95 and 131-D) (those not regulated by the CEC).	San Francisco Office (Headquarters) 505 Van Ness Avenue San Francisco, CA 94102 415-703-2782
CPUC	Regulates construction and operation of power and communications lines for the prevention of inductive interference. (General Order No. 52).	San Francisco Office (Headquarters) 505 Van Ness Avenue San Francisco, CA 94102 415-703-2782
FAA	Establishes regulations for marking and lighting of obstructions in navigable airspace. (AC No. 70/7460-1G).	Western-Pacific Region 15000 Aviation Boulevard Hawthorne, CA 90250 310-725-3550
CAISO	Provides Final Interconnection Approval.	P.O. Box 639014 Folsom, CA 95763-9014 916-351-4400
County of San Diego	Issues applicable permits, leases, or approvals to enforce LORS.	Planning and Land Use 5201 Ruffin Road, Suite B San Diego, CA 92123 858-694-2960

3.8 PIPELINES

The project includes one underground natural gas supply pipeline to be constructed and routed, as indicated on Figure 3.3-1 Facility Plot Plan.

3.8.1 Natural Gas Supply Line

Natural gas will be delivered to the PPEC plant site from a connection to an SDG&E gas transmission line. A new metering and regulator station will be provided on the project site. The gas will be metered as it enters the plant. The gas will be compressed as required and directed to each CTG. Additional flow metering will be provided at each CTG.

3.8.1.1 Description

Piping will be installed underground from the connection at the SDG&E gas transmission line to the point where it enters the project site. At the project site boundary, the piping will be routed to the aboveground gas metering and regulation station and either routed aboveground or below ground to the gas compressors. From the gas compressors, the pipeline will be routed underground to each CTG. The gas piping system will be constructed of carbon steel materials suitable for the design pressures and temperatures. Isolation and control valves will be provided as required by design, operational, and safety requirements.

3.8.1.2 Natural Gas Pipeline Routes

The PPEC project will require the construction of an off-site pipeline to supply natural gas to the project site. Two possible routes are proposed. Route A would extend south along Alta Road for approximately 8,000 feet to just before the U.S.–Mexico border, at which point it would connect to the existing SDG&E natural gas pipeline. Route B would extend approximately 2,375 feet south along Alta Road, turn west on Otay Mesa Road, and continue approximately 7,920 feet to Harvest Road, at which point it would connect to the existing SDG&E natural gas pipeline, for a total of approximately 10,300 feet (Figure 3.3-3, Potential Linears).

3.8.1.3 Buried Pipe

SDG&E will construct all gas pipelines outside of the project site limits up to and including the new metering station. Construction will primarily use an open trench method and will comply with all requirements for the protection of biological resources.

The pipeline will be constructed of carbon steel in accordance with the American Petroleum Institute (API) specifications for gas pipelines or specifications of the ASTM. The pipe will have corrosion-protection coating that is either factory- or field-applied. Joints will be welded, inspected using x-ray, and wrapped with a corrosion-protection coating.

Trenching

The trench width depends on the soil type encountered. The pipeline will be buried with a minimum 36-inch cover. The excavated soil will be piled on one side of the trench and later used for backfilling after the pipe is installed in the trench.

Stringing

The pipe will be laid out (stringing) on wooden skids along the side of the open trench during installation.

Installation

Installation consists of:

- Welding, coating, and bending of pipe

- Laying sand or fine spoil on the trench floor
- Lowering the pipe string into the trench

Welding will meet the applicable API and ASTM standards and will be performed by qualified welders. Welds will undergo radiographical inspection by an independent, qualified radiography contractor. All coatings will be checked for holidays and will be repaired before lowering the pipe into the trench.

Backfilling

Backfilling consists of returning excavated soil or slurry fill back into the trench around and on top of the pipe and up to the original grade of the surface. The backfill will be compacted to protect the stability of the pipe and minimize subsequent subsidence. Backfilling will return the trench to the original grade.

Plating

Plating consists of covering any open trenches, for safety purposes, with solid rectangular plates in areas of foot or vehicular traffic at the end of a workday. Plywood plates can be used in areas of foot traffic and steel plates on areas of vehicular traffic.

3.8.2 Pneumatic Testing

Pneumatic testing consists of plugging both open ends of a pipeline that is to be tested, filling the pipe with air up to a pressure specified by code requirements, and maintaining the pressure for a period of time.

Cleanup

Cleanup consists of restoring the ground surface by removing construction debris, grading the surface to its original state, and replanting vegetation.

Commissioning

Commissioning consists of cleaning and drying the interior of the pipeline, purging air from the pipeline, and filling the pipeline with natural gas.

Safety

Measures to ensure safety during construction and maintenance of the pipeline include complying with all applicable California Occupational Safety and Health Administration (Cal/OSHA), OSHA, and other regulations and standards as well as the contractor's specific safety plans for the project, which will address specific pipeline safety issues. This installation will also comply with all of the County of San Diego regulations, as required.

3.8.3 Sewer Line

Wastewater from the project site will be connected to either the existing 12-inch sewer main along Calzada de la Fuente along the northern project site boundary, or the existing 15-inch sewer main immediately adjacent and to the west of the project site along Alta Road.

3.9 PROJECT CONSTRUCTION

Construction of the generating facility, from site preparation and grading to commercial operation, is expected to require 16 months. The major construction schedule milestones are listed in Table 3.9-1, Project Construction Dates.

TABLE 3.9-1
PROJECT CONSTRUCTION DATES

Activity	Date
Begin Construction	February 2013
Startup and Test	March 2014
Commercial Operation	May 2014

As shown in Tables 3.9-2A and 3.9-2B, Project Workforce Projections, the average monthly and peak monthly workforce are projected to be 148 and 284, respectively, construction craft people, supervisory, support, and construction management personnel on site during construction.

Construction will typically take place between 7:00 a.m. and 5:30 p.m., Monday through Friday. 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 may continue 24-hrs per day, seven-days per week.

The peak construction site workforce level is expected to last from Month 6 through Month 10 of the construction period following commencement of construction.

TABLE 3.9-2A
PROJECT WORKFORCE PROJECTIONS

Plant Construction																	
	Months After Construction Notice-to-Proceed													Commissioning			
Discipline	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**Total**
Insulation Workers	0	0	0	0	0	0	0	8	8	8	17	4	3	0	0	0	48
Boilermakers	0	0	0	0	0	14	14	14	14	14	14	11	11	11	0	0	117
Carpenters/Cement Finishers	4	12	19	19	19	15	13	8	5	4	4	4	2	2	1	0	131
Electricians	3	11	9	9	19	28	36	53	55	51	29	17	10	5	5	5	345
Ironworkers	0	3	5	31	29	31	31	29	25	22	19	17	8	3	0	0	253
Laborers	6	11	15	20	20	20	20	20	20	17	12	8	4	3	2	2	200
Millwrights	0	0	0	7	8	13	28	41	41	41	30	9	9	1	1	1	230
Operating Engineers	8	8	8	9	9	9	9	9	9	4	1	1	1	1	1	0	87
Painters	0	0	0	0	0	4	9	9	9	4	4	2	2	2	0	0	45
Pipefitters	4	16	26	26	33	33	35	45	48	24	16	10	4	4	4	4	332
Sheetmetal Workers	0	0	0	0	0	3	6	7	9	7	7	7	2	1	0	0	49
Surveyors	4	5	5	3	3	2	2	2	2	2	2	2	2	2	0	0	38
Teamsters	4	3	5	3	2	2	2	2	2	2	2	2	1	1	1	0	34
Commissioning Group	0	0	2	2	2	2	2	2	2	2	4	5	5	5	5	5	45
Management Staff	17	21	24	35	37	40	35	35	34	34	27	25	19	13	12	12	420
Total Workforce	**50**	**90**	**118**	**164**	**181**	**216**	**242**	**284**	**283**	**236**	**188**	**124**	**83**	**54**	**32**	**29**	2,374

TABLE 3.9-2B
PROJECT WORKFORCE PROJECTIONS

Linear Piping Construction																	
Months After Construction Notice-to-Proceed																	
Discipline	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**Total**
Laborers	4	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	12
Surveyors	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	6
Teamsters	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	6
Management Staff	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	6
Total Workforce	**10**	**10**	**10**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**30**

3.9.1.1 Execution Plans – Engineering and Construction Phases

This is an engineering, procurement, and construction (EPC) type project. As such, a single general contractor will be selected for the design, procurement, and construction of the facility. The general contractor will select subcontractors for specialty work portions as needed.

Materials and supplies will be delivered to the project site by truck. Truck deliveries of construction materials and equipment will generally occur on weekdays between 6:00 a.m. and 6:00 p.m.; however, some larger heavy-load deliveries may be delivered outside those hours. PPEC site access will be controlled for both personnel and delivery vehicles.

3.10 FACILITY OPERATIONS AND MAINTENANCE

This section discusses operation and maintenance procedures that PPEC staff will follow to ensure safe and reliable, operation of the power plant, transmission system, and pipelines, consistent with environmental laws and regulations.

3.10.1 Introduction

Plant operations staff will include a total of four operators, four maintenance technicians, one environmental technician, one administrative staff member, one operations supervisor, and a plant manager. The plant will operate and be staffed 24 hours per day, seven days per week. Plant operations will be directed from a control room. All system equipment will be controlled through a programmable logic controller (PLC) or digital control system (DCS) system, and the project equipment will be integrated into this proven control system.

3.10.2 Power Plant Facility

PPEC is designed as a simple-cycle, peaking, and intermediate load facility with three LMS100 CTGs. The project will be designed to emphasize efficiency and flexibility.

3.10.2.1 Plant Operation

As an intermediate load and peaking facility, each unit will be limited to operate no more than 4,000 hr/yr. The plant will be dispatched by SDG&E in accordance with its economic dispatch procedures. The time required for startup is approximately ten minutes. The SDG&E contract allows for 500 startups and shutdowns per unit per calendar year in addition to the 4,000 hours of normal operation.

3.10.2.2 Controls

The plant control system will consist of a state-of-the-art, integrated, microprocessor-based DCS. The control system will provide for startup, shutdown, and control of plant operation limits and will provide protection for the equipment.

Interlock and logic systems will be provided via hard-wired relays or remote PLC(s).

Process switches (i.e., pressure, temperature, level, flow) used for protective functions will be connected directly to the DCS or PLCs and the protective system.

3.10.2.3 Degree of Automation

The PPEC plant will be designed with automation where practical to reduce the required actions performed by operating personnel. Through subsystem automation and use of the DCS, the number of individual control switches and indicators that confront the operator will be greatly reduced.

3.10.2.4 Centralized Control

The majority of the equipment required to support plant operation will be located in the control room and electrical equipment rooms. The control room will contain the DCS-based operator workstations and any auxiliary control panels. In addition, the control room will contain the alarm, utility, and log printers.

Local control panels or stations will be furnished where operator attention is required to set up a system for operation, or where the equipment requires intermittent attention during plant operation. Main control room indicators and control functions will be duplicated for those variables critical to plant availability.

3.10.3 Transmission System Operation and Maintenance

Transmission line facilities will be operated and maintained in accordance with industry general practice and SDG&E interconnection requirements.

3.10.4 Pipeline Operation and Maintenance

SDG&E will own, operate, and maintain the natural gas pipeline from the existing fuel gas supply lines in accordance with applicable Federal Energy Regulatory Commission (FERC) and U.S. Department of Transportation (DOT) regulations. This piping system will be inspected periodically as part of SDG&E's pipeline maintenance program.

Industrial wastewater and sanitary systems will be discharged to the San Diego County's sewer system.

3.11 FACILITY CLOSURE

Facility closure can be either temporary or permanent. Facility closure can result from two circumstances: (1) the facility is closed suddenly and/or unexpectedly because of unplanned circumstances, such as a natural disaster or other unexpected event (e.g., a temporary shortage of facility fuel) or (2) the facility is closed in a planned, orderly manner, such as at the end of its useful economic or mechanical life or due to gradual obsolescence. The two types of closure are discussed in the following sections.

3.11.1 Temporary Closure

Temporary or unplanned closure can result from a number of unforeseen circumstances, ranging from natural disaster to economic forces. For a short-term unplanned closure, where facility damage does not result in a hazardous substance release, the facility would be kept "as

is," ready to resume operations when the unplanned closure event is rectified or ceases to restrict operations.

In the event that a hazardous substance is possibly released, the project owner will notify the CEC compliance unit and follow emergency plans in accordance with the emergency Risk Management Plan (RMP). Depending upon the expected duration of the shutdown, chemicals may be drained from the storage tanks and other equipment. All waste (hazardous and nonhazardous) will be disposed of according to LORS in effect at the time of the closure. Facility security will be retained so that the PPEC facility is secure from trespassers.

3.11.2 Permanent Closure

The generation facility's anticipated life is 30 years. However, if the facility were economically viable at the end of the 30-year operating period, it could continue to operate for a longer period of time.

3.11.3 Closure Mitigation

At the time of facility closure, decommissioning will be completed in a manner that: (1) protects the health and safety of the public and (2) is environmentally acceptable. One year prior to a planned closure, the project owner will submit a specific decommissioning plan that would include the following:

- Identification, discussion, and scheduling of the decommissioning activities to include the power plant, applicable transmission lines, and other pertinent facilities constructed as part of the project.

- Description of the measures to be taken that will ensure the safe shutdown and decommissioning of all equipment, including the draining and cleaning of all tanks and the removal of any hazardous waste.

- Identification of all applicable LORS in effect at the time, and how the specific decommissioning will be accomplished in accordance with the LORS.

- Notification of state and local agencies.

- Once land is used for industrial or commercial purposes, it rarely reverts back to its natural state. Reuse of the land will be encouraged in this case, as opposed to taking additional land for future industrial or commercial purposes. If the PPEC plant site is to return to its natural state, the specific decommissioning plan will include the removal of all aboveground and underground objects and material and an erosion control plan that is consistent with sound land management practices.

In the event of an unplanned closure due to earthquake damage or other circumstances, the project owner will meet with the CEC and local agencies and submit a detailed decommissioning closure plan in a timely manner.

No decommissioning plan will be submitted for a temporary shutdown.

3.12 SAFETY, AVAILABILITY, AND RELIABILITY

3.12.1 Safety Precautions and Emergency Systems

Safety precautions and emergency systems will be implemented as part of the PPEC plant's design and construction to ensure safe and reliable operation of the facilities. Administrative controls will include classroom and hands-on training in operating and maintenance procedures and general safety items and a well-planned maintenance program. These controls will work with the system design and monitoring features to enhance safety and reliability.

Safety, auxiliary, and emergency systems will consist of lighting, grounding, DC back-up for controls, fire and hazardous materials safety systems, security systems, and natural gas, steam, and chemical safety systems. The plant will include its own utilities and services, such as emergency power, plant and instrument air, fire suppression, and potable water systems.

3.12.1.1 Safety Precautions

Worker Safety

PPEC will implement programs to ensure that compliance with federal and state occupational safety and health program requirements is maintained. In addition, PPEC will identify and implement plant-specific programs that effectively assess potential hazards and mitigate them routinely.

A complete discussion of worker safety is provided in Section 5.17, Worker Safety.

Hazardous Materials Handling

Hazardous materials will be stored and used at PPEC during construction and operation. Design and construction of hazardous materials storage and dispensing systems will be in accordance with applicable laws, regulations, and standards. Hazardous materials storage areas will be curbed or diked to contain spills or leaks.

Potential hazards that are associated with hazardous materials will be further mitigated by implementing a hazards communication (HAZCOM) program. This program involves thorough training of employees on proper identification, handling, and emergency response to spills or accidental releases.

Emergency eyewashes and showers will be provided at appropriate locations, and appropriate Personal Protective Equipment (PPE) will be provided during facility construction and operation. A detailed discussion of hazardous materials handling is presented in Section 5.15, Hazardous Materials Handling.

Security

The PPEC plant site will be enclosed with a security fence, and limited access gates will be employed. In addition to the perimeter security fence, the switchyard and transformer area will be fenced and provided with access gates. Security will be maintained on a 24-hour basis with either surveillance devices or personnel.

Public Health and Safety

The programs implemented to protect worker health and safety will also benefit public health and safety. Facility design will include controls and monitoring systems to minimize the potential for upset conditions that could result in public exposure to acutely hazardous materials. Potential public health impacts associated with operation of the project will be mitigated by development and implementation of an Emergency Response Plan (ERP); a HAZCOM Program; a Spill Prevention, Control, and Countermeasures (SPCC) Plan; safety programs; and employee training.

PPEC will coordinate with local emergency responders, provide them with copies of the plant site ERP, conduct plant site tours to point out the location of hazardous materials and safety equipment, and encourage these providers to participate in annual emergency response drills.

3.12.1.2 Emergency Systems

Fire Protection Systems

PPEC will have on-site fire protection systems and will be supported by local fire protection services. Section 3.5.10, Fire Protection System, includes a detailed description of the fire protection systems.

Portable and fixed-fire suppression equipment and systems will be included in the project. Portable fire extinguishers will be at strategic locations throughout the project site. Smoke detectors, sprinkler systems, and fire hydrants with hoses are included in the facility design. Based on a detailed design, the fixed-fire protection system may also include a CO_2 or a deluge spray system.

Employees will be given fire safety training, including instruction in fire prevention, the use of portable fire extinguishers and hose stations, and reporting fires to the local fire department. Employees will only suppress fires in their incipient stage. Fire drills will be conducted at least twice each year for each work area.

The San Diego County Rural Fire Protection District (RFPD), Community Facilities District (CFD) No. 09-1 will provide primary fire protection, firefighting, and emergency response services to the PPEC site. Both fire and emergency service will be provided out of RFPD Interim Station 22, located at 446 Alta Road, which is approximately 0.25 mile north of the project site. The estimated response time to the site is four minutes. The RFPD Fire Marshall will perform a final fire safety inspection upon completion of construction and, thereafter, will conduct periodic fire safety inspections. Prior to plant startup, the RFPD Fire Marshall will be requested to visit the project site to review project emergency response procedures.

Medical Services and Emergency Response

PPEC will have an ERP, which will address potential emergencies, including chemical releases, fires, and injuries, and will describe emergency response equipment and its location, evacuation routes, procedures for reporting to local emergency response agencies, responsibilities for emergency response, and other actions to be taken in the event of an emergency.

Employee response to an emergency will be limited to an immediate response to minimize the risk of escalation of the accident or injury. Employees will be trained to respond to fires, spills, earthquakes, and injuries. A first-aid facility with adequate first-aid supplies and personnel qualified in first-aid treatment will be on site.

3.12.2 Aviation Safety – Power Generation Stacks

The Federal Aviation Administration (FAA) regulations establish standards for determining obstructions in navigation space and set forth requirements for notification of construction. These regulations require notification of any construction over 200 feet in height above ground level. The closest airfield with commercial flights is Brown Field, approximately two miles away.

Three 100-foot tall self-supporting steel stacks with integral stack/silencer systems and associated appurtenances will be the tallest structures at the PPEC facility. A lighting system on the top of the stacks will not be required in this instance, per FAA Advisory Circular for Obstruction Marking and Lighting.

3.12.3 Facility Availability

The PPEC facility would consist of three simple-cycle gas turbines and generators that are specifically designed for peaking services. To support dispatch service, each turbine generator is commonly operated between 50 and 100 percent of its full capacity; hence, the facility will be operated to support dispatch service and automatic generation control in response to customer demands for electricity.

The facility is designed for an operating life of 30 years. Reliability and availability projections are based on this operating life. Operations and maintenance procedures will be consistent with industry standard practices to ensure the plant components' useful life span.

The overall plant availability is best defined by the Equivalent Availability Factor (EAF) which is equal to the amount of energy the plant would actually produce if called upon divided by the maximum theoretical capacity for each time period. This method takes into account unit derates as well as complete outages. The EAF for this plant is projected to be in excess of 98 percent over its operating lifetime.

The Capacity Factor (CF) is equal to the actual energy produced over a period of time divided by the maximum theoretical capacity for that time period. Based on the maximum operating load (i.e., 4,000 hours per year for each CTG), the CF would be 45.66 percent. A reasonable projection is that the plant will operate at an annual CF between 25 and 45 percent, resulting in a lifetime estimated CF of approximately 35 percent.

3.12.4 Equipment Reliability and Redundancy

The following subsections identify equipment redundancy as it applies to plant availability, and Table 3.12-1 lists equipment redundancy.

TABLE 3.12-1
EQUIPMENT REDUNDANCY

Description	Number
CTGs	Three trains
Closed-Loop Cooling Water Pumps	Two, 100% capacity
PDCS Cooling Water Pumps	N+1 redundancy
Demineralized-RO System	Two, 60% trains
Natural Gas Compressor	Three, 50% capacity
Generator Step-up Transformers	Three (one per CTG)
Auxiliary Transformers	Two, 100% capacity

Notes:
CTG = combustion turbine generator
PCDS = partial dry-cooling system
RO = reverse osmosis

3.12.4.1 Combustion Turbine

The power block consists of three separate CTGs operating in simple-cycle mode. Each CTG power train will provide approximately 33 percent of the total facility output. The major components of each turbine generator power train consist of the following systems.

Combustion Turbine Generator Subsystems

The combustion turbine subsystems include the combustion turbine, inlet air filtration and evaporative inlet cooling system, intercooling system, generator and excitation systems, and turbine control and instrumentation. The combustion turbine consists of a compressor, intercooler system, a combustion section, and a turbine section. Compressed air from the compressor section is cooled by the intercooler and then heated by the combustion of natural gas in the combustion section. The heated compressed gasses expand in the turbine section, where the expansion turns the rotor to produce mechanical energy to drive the compressor section and the generator. Exhaust gas from the combustion turbine will be directed into an SCR system to control NO_x emissions and an oxidation catalyst to control CO emissions. The generator will be air-cooled. The generator excitation system will be a solid-state static system. A combustion turbine control and instrumentation system (interfaced with the plant control system) will cover the turbine governing system and the turbine protection system.

Control and Information System

The control system will be designed with a redundancy level such that critical controls and indications do not fail due to a single component failure. Critical functions and parameters will have redundant sensors and controls. Control systems in general, and especially the equipment protection systems, will be designed according to stringent reliability criteria.

Digital control system (DCS) microprocessors will be fully redundant with automatic tracking and switchover capability in the event of a failure of the primary microprocessor. Two fully redundant data communications networks will be provided. The system will permit either network to be disconnected and reconnected while the system remains online and in control. The control system will incorporate online, self-diagnostic features to verify proper operation of system hardware, software, and related support functions, such as control power, field contact interrogating power, and system modules in position.

The GE Mark VIe CTG control system includes controllers that are arranged in a single, dual, or triple modular redundant arrangement, depending on the criticality of the system being controlled. In addition to the Mark VIe controllers, there are independent generator monitors for vibration, fire, and gas.

Plant operation will be controlled from the operator workstations located in the control room. The operator workstations will consist of three individual LCD/keyboard workstations and one engineering workstation. Each workstation will be an independent electronic package so that failure of a single package does not disable more than one workstation. The engineering workstation will allow the control system operator interface or logic to be revised by authorized personnel.

Demineralized Water System

A demineralized water system will provide high-purity water to be used as injection water into the turbine combustor for NO_x control. The demineralized water system will consist of two 60 percent capacity RO mixed-bed demineralizer trains. Makeup water to the demineralized water system will be from a 500,000-gallon raw water/firewater storage tank. Demineralized water will be stored in a 240,000-gallon demineralized water storage tank.

Water Injection Makeup and Storage System

The water injection makeup and storage subsystem will provide demineralized water storage and pumping capabilities to supply high-purity water for water injection. Major components of the system are the demineralized water storage tank (240,000 gallons), providing approximately a 24-hr supply of demineralized water at peak load, and two full-capacity, horizontal, centrifugal, makeup water pumps.

Closed-Loop Cooling Water Systems

The closed-loop cooling water systems will provide cooling water to each combustion turbine's intercoolers and lube oil coolers. Two 100 percent capacity cooling water pumps will be the prime movers for these systems.

3.12.5 Fuel/Water Availability

3.12.5.1 Gas Supply

SDG&E will supply fuel through its gas distribution and transmission system. A new gas pipeline between the project site and existing SDG&E lines will be constructed as part of the project.

3.12.5.2 Water Availability

Process water will be readily available from Otay Water District, as described in Section 5.5, Water Resources. Refer to Appendix I for the project water supply agreement with the Otay Water District.

3.12.6 Project Quality and Control

The general contractor, the design-engineer contractor, and all significant vendors, suppliers, and subcontractors for the project will be required to develop a project-specific quality control program prior to beginning work. Each program will define quality goals, processes to measure events, and incentive programs. Quality standards will include safety and environmental compliance objectives.

3.12.6.1 Quality Assurance

The quality assurance manual will define the quality management system and processes, management responsibility and organization, project execution, and measurement methods. Other elements of the quality assurance program will include a procedure manual, standards, job quality analysis, quality tours, preventive action planning, internal and external assessment, training, and trending.

Key quality indicators will be tracked and include surveillance, deficiencies, non-conformances, weld reject rate, audit results, quality incidents, and rework. The quality indicators will be metrically measured and reported.

3.12.6.2 Quality Control Records

Quality records will be maintained during the project's detailed design phase, construction phase, and plant commissioning. Quality records include written documentation that procedures and standards are followed, including inspection and testing reports, audit checklists, audit reports, and quality incident investigation reports.

3.13 LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The applicable LORS for each engineering discipline are included as part of Appendices A through F.

3.14 REFERENCES

California Building Code (CBC). 2010. California Code of Regulations, Title 24, Part 2, Volume 2 of 2. California Building Standards Commission.

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United States of America. 14CFR1250-1258 – Fire Prevention Standards for Electric Utilities.

United States of America. 15CFR77 – Objects Affecting Navigable Airspace.

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

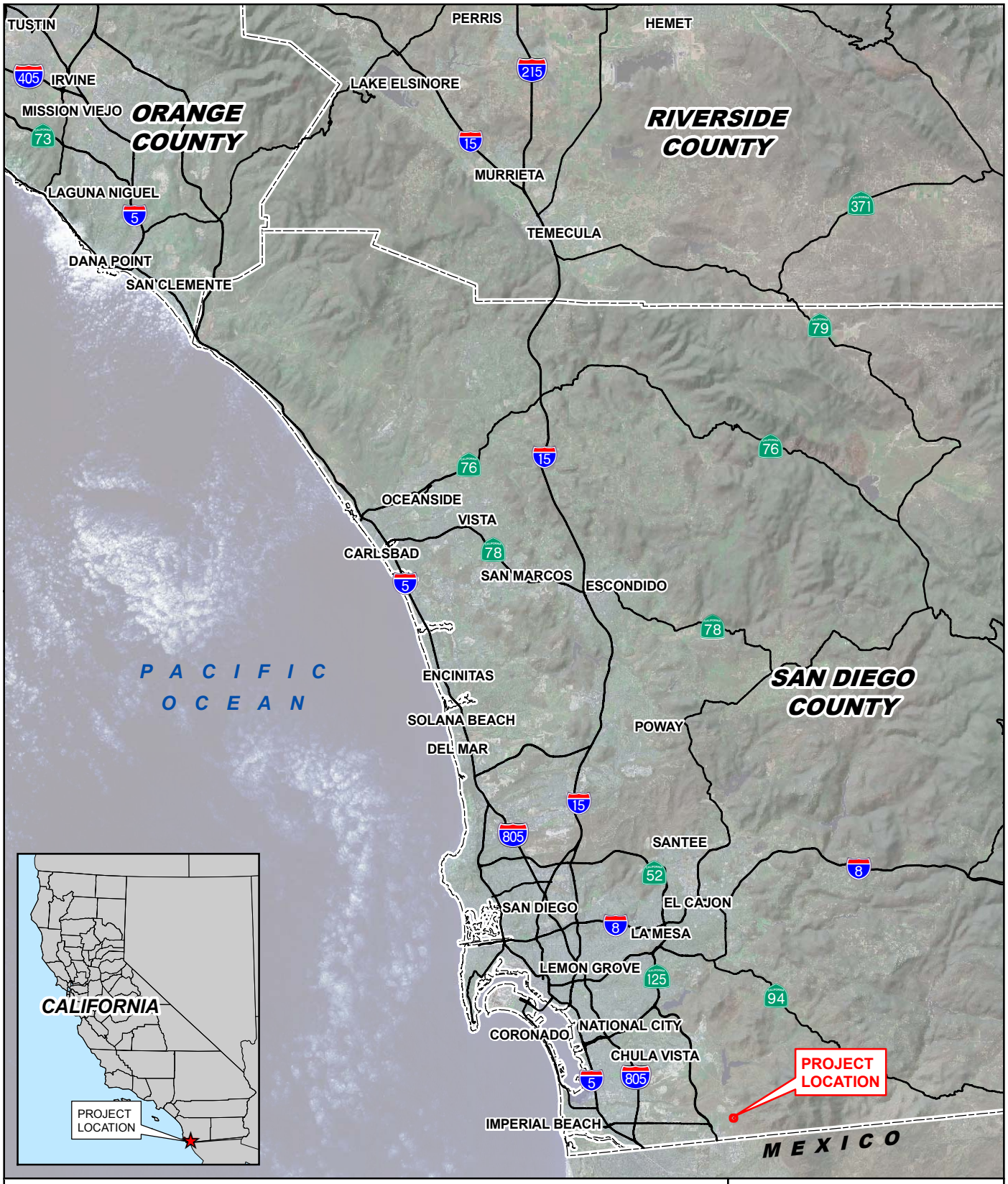


FIGURE 3.1-1
REGIONAL LOCATION

PIO PICO ENERGY CENTER

PROJECT NO.: 29874827
DATE: DECEMBER 2010

URS

Legend

Project Site

N

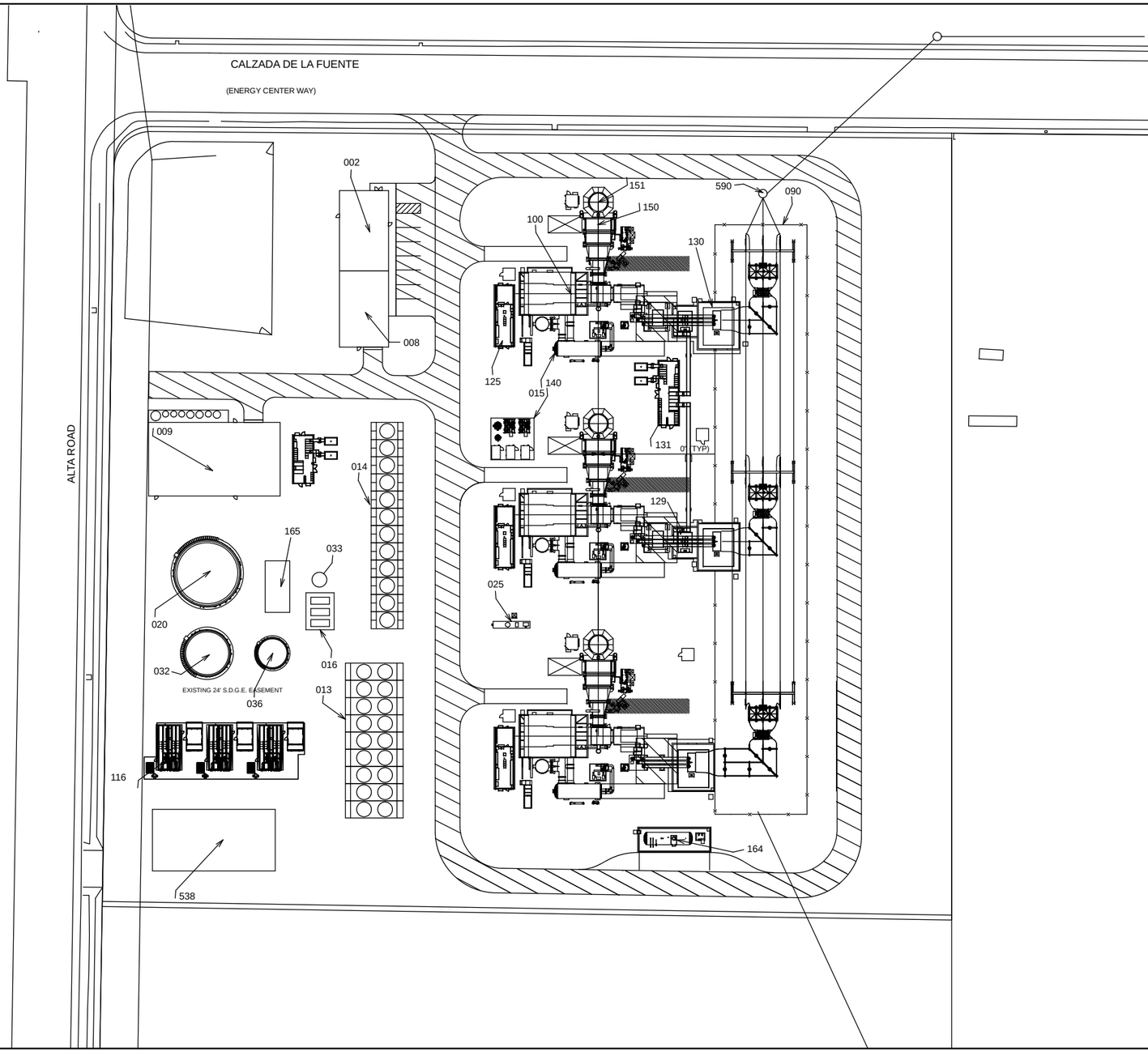
0 2,000 4,000 Feet

FIGURE 3.1-2
SITE VICINITY

PIO PICO ENERGY CENTER

PROJECT NO.: 29874827
DATE: DECEMBER 2010

URS



NO	EQUIPMENT TITLE
002	CONTROL ROOM
008	WAREHOUSE
009	WATER TREATMENT
013	DRY AIR COOLERS
014	WET AIR COOLERS
015	INTERCOOLER
016	CIRCULATING WATER PUMPS
020	SERVICE WATER TANK
025	OIL/WATER SEPERATOR
032	DEMINERALIZED WATER TANK
033	CIRCULATING WATER EXPANSION TANK
036	WASTE WATER TANK
090	PLANT SWITCHYARD
100	COMBUSTION TURBINE
116	GAS COMPRESSOR MODULE
125	CTG POWER/CONTROL MODULE
129	AUXILIARY TRANSFORMER
130	GENERATOR TRANSFORMER
131	5KV ELECTRICAL MODULE
140	AIR COMPRESSOR
150	SCR
151	STACK
164	AMMONIA STORAGE
165	FIRE WATER PUMP BUILDING
538	GAS METERING STATION
590	TRANSMISSION LINE

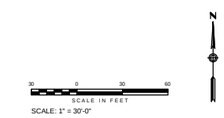


FIGURE 3.1-3A
SITE ARRANGEMENT

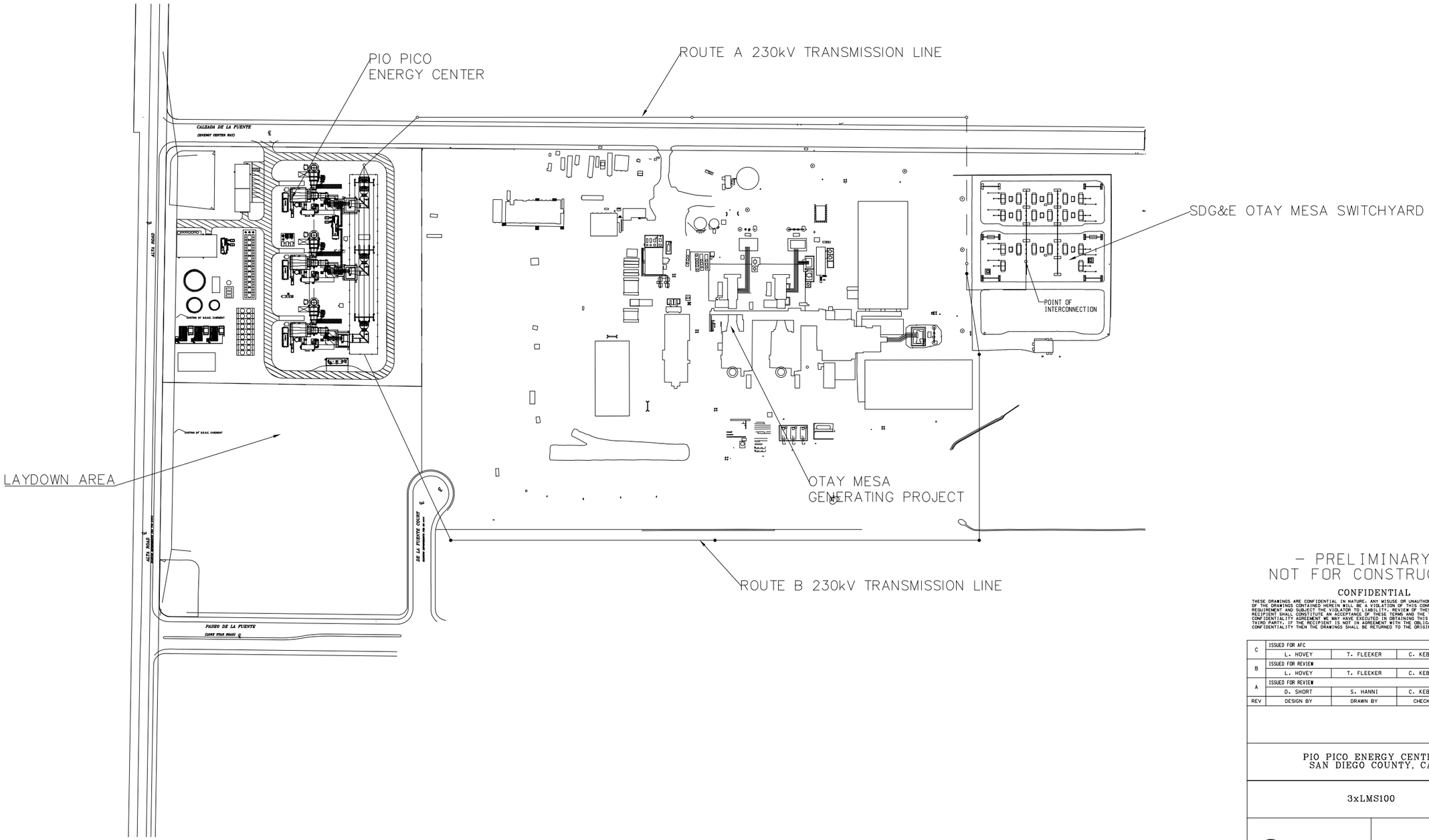
PIO PICO
ENERGY CENTER

PROJECT NO.: 29874827
DATE: DECEMBER 2010

URS

LEGEND

OVERHEAD 230KV LINE
UNDERGROUND 230KV LINE
TRANSMISSION LINE POLE



100 0 100 200
SCALE IN FEET
SCALE: 1" = 100'-0"

N

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REV	DESIGN BY	DRAWN BY	CHECKED BY	DATE
C	ISSUED FOR AFC			
	L. HOVEY	T. FLEEKER	C. KEBODEAUX	02-03-11
B	ISSUED FOR REVIEW			
	L. HOVEY	T. FLEEKER	C. KEBODEAUX	01-06-11
A	ISSUED FOR REVIEW			
	D. SHORT	S. HANNI	C. KEBODEAUX	12-21-10

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FIGURE 3.1-3B

SITE ARRANGEMENT AND POTENTIAL
OFFSITE TRANSMISSION LINE
STRUCTURE LOCATIONS

ENGINEER/DESIGN ORIGINATOR S. HANNI
LEAD ENG C. KEBODEAUX
ENG MGR 1st Int. Last Name
PROJ MGR A. HACKLER

DRAWING NUMBER
P009-041-SP-002

$$DATE$$ $$TIME$$ $$USERNAME$$ $$FILENAME$$

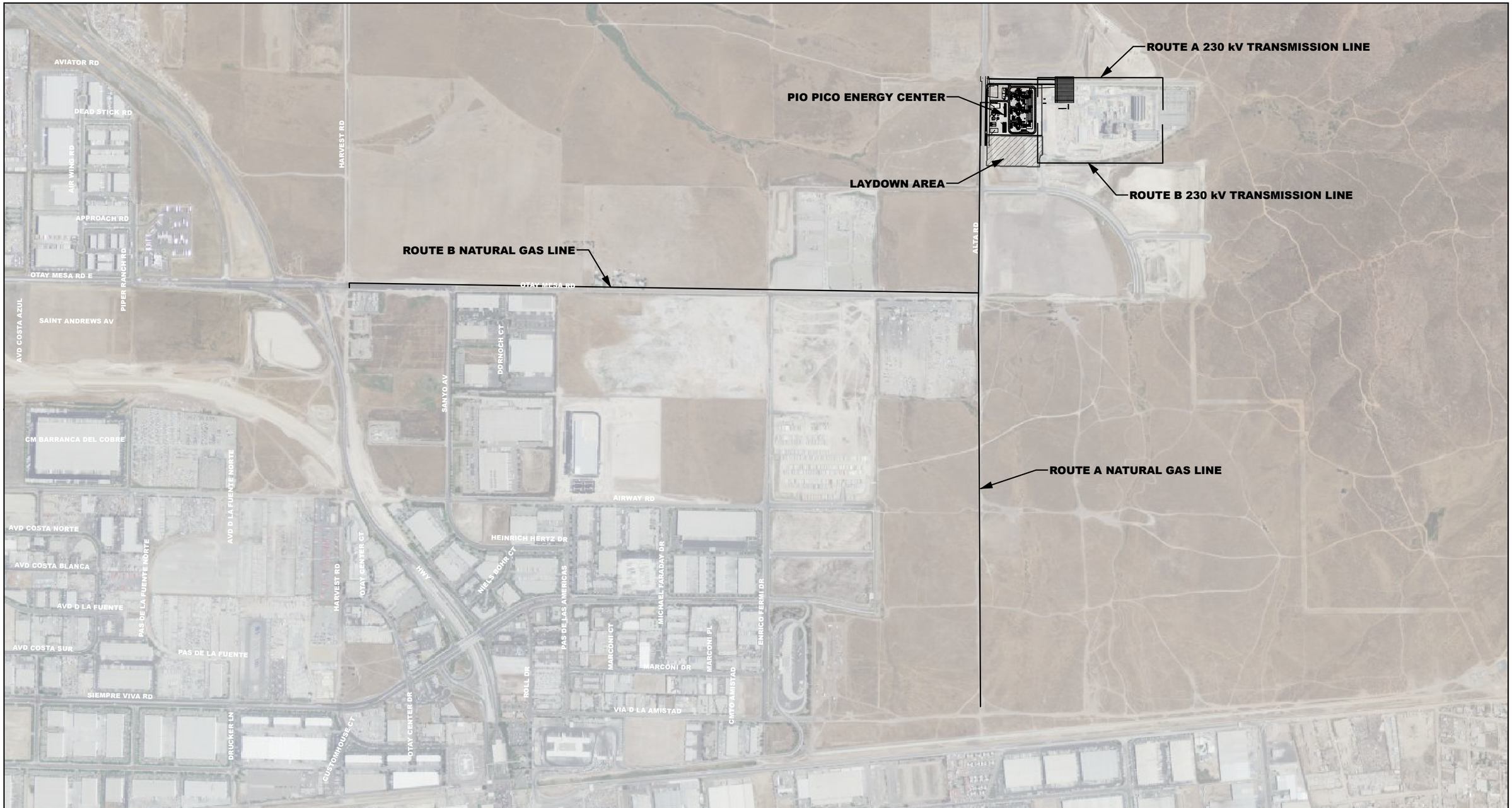
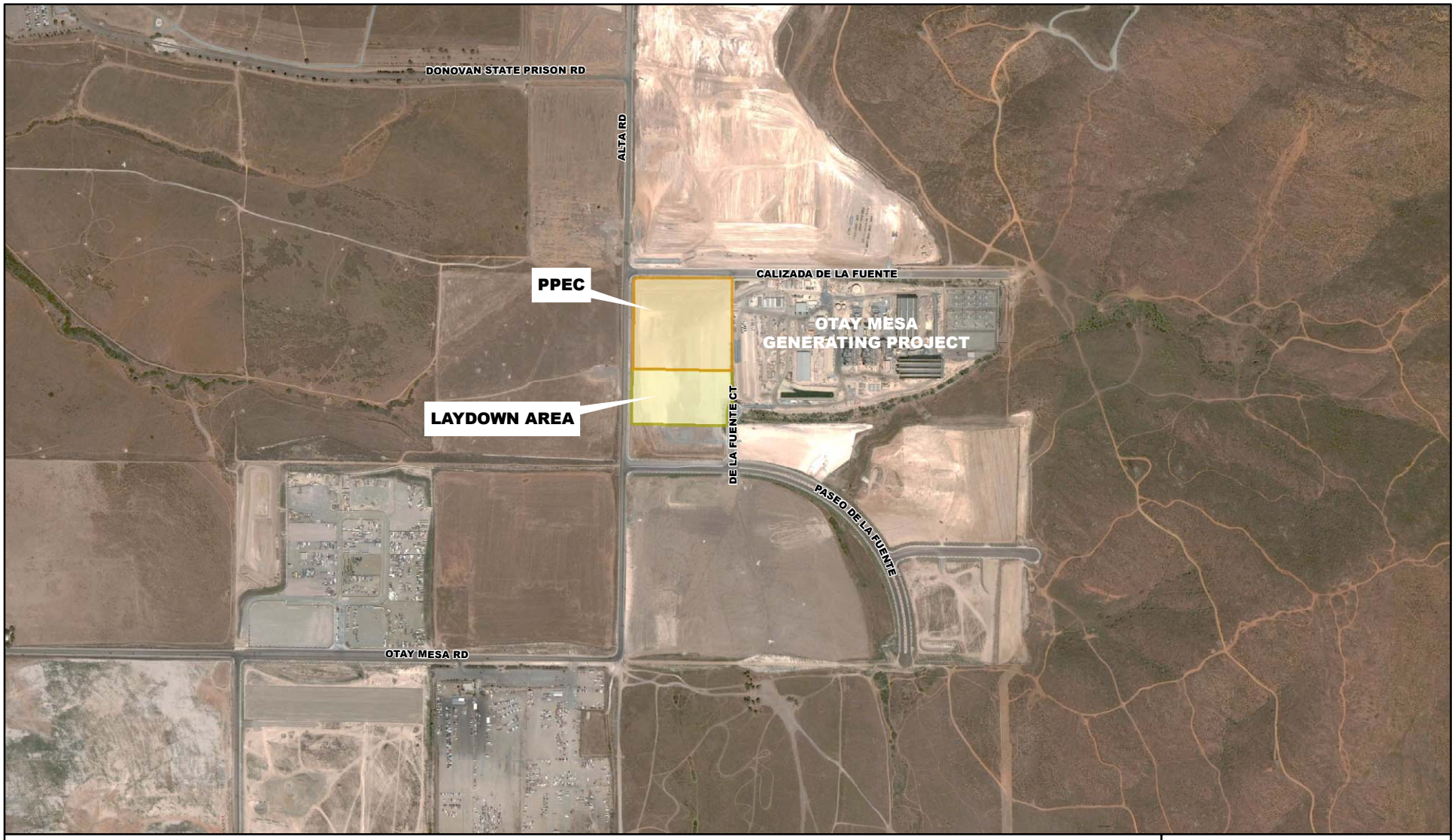


FIGURE 3.3-1
FACILITY PLOT PLAN

PIO PICO ENERGY CENTER

PROJECT NO.: 29874827
DATE: DECEMBER 2010

URS



Legend

- Project Site
- Laydown Area

N

0 500 1,000 Feet

FIGURE 3.3-2
PROJECT LOCATION

PIO PICO
ENERGY CENTER

PROJECT NO.: 29874827
DATE: DECEMBER 2010

URS

LEGEND

- Project Site
- Laydown Area
- United States/Mexico Border
- Route A 230 kV Transmission Line
- Route B 230 kV Transmission Line
- Route A Natural Gas Line
- Route B Natural Gas Line

N

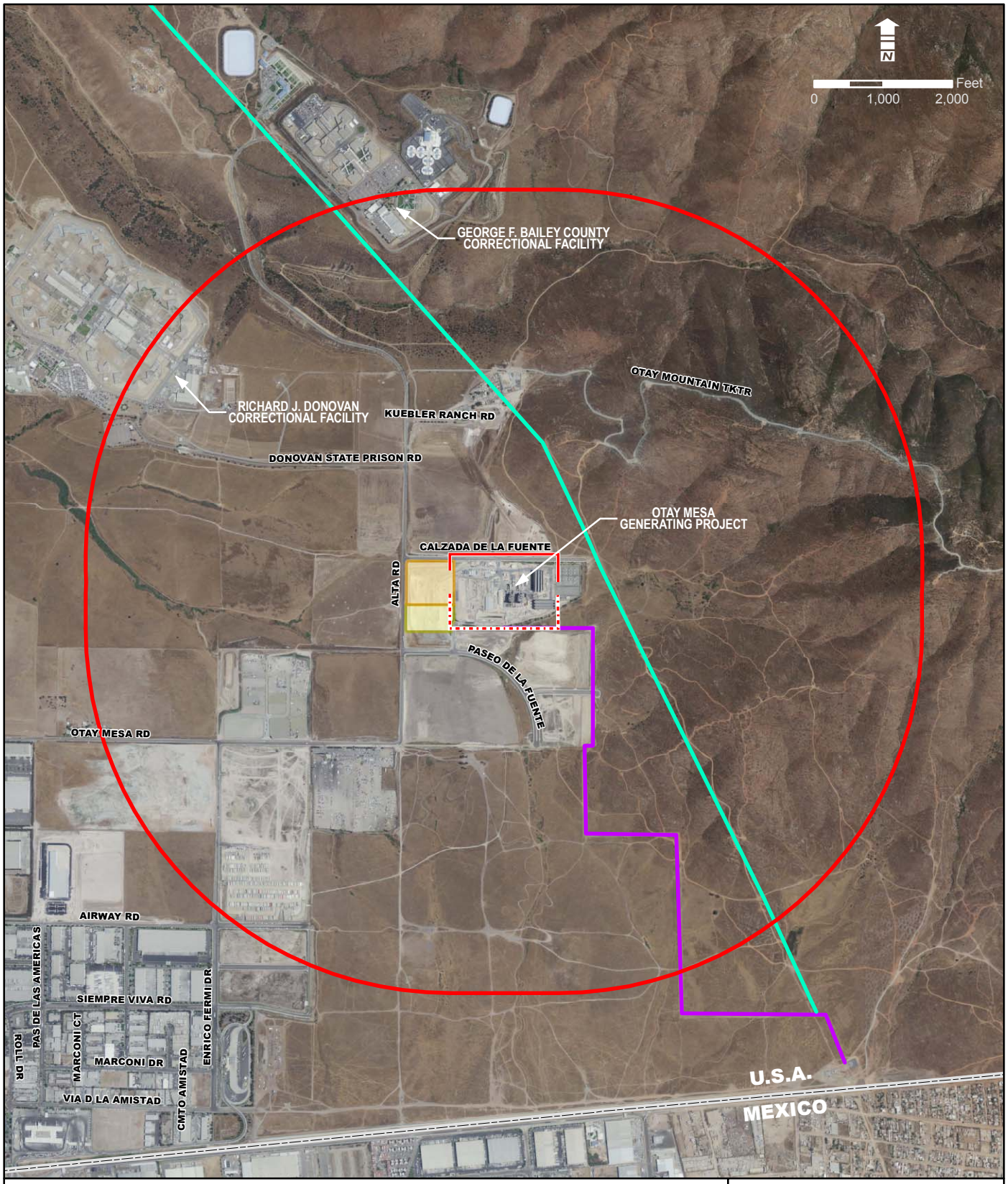
0 750 1,500 Feet

FIGURE 3.3-3
POTENTIAL LINEARS

PIO PICO ENERGY CENTER

PROJECT NO.: 29874827
DATE: NOVEMBER 2010

URS



Legend

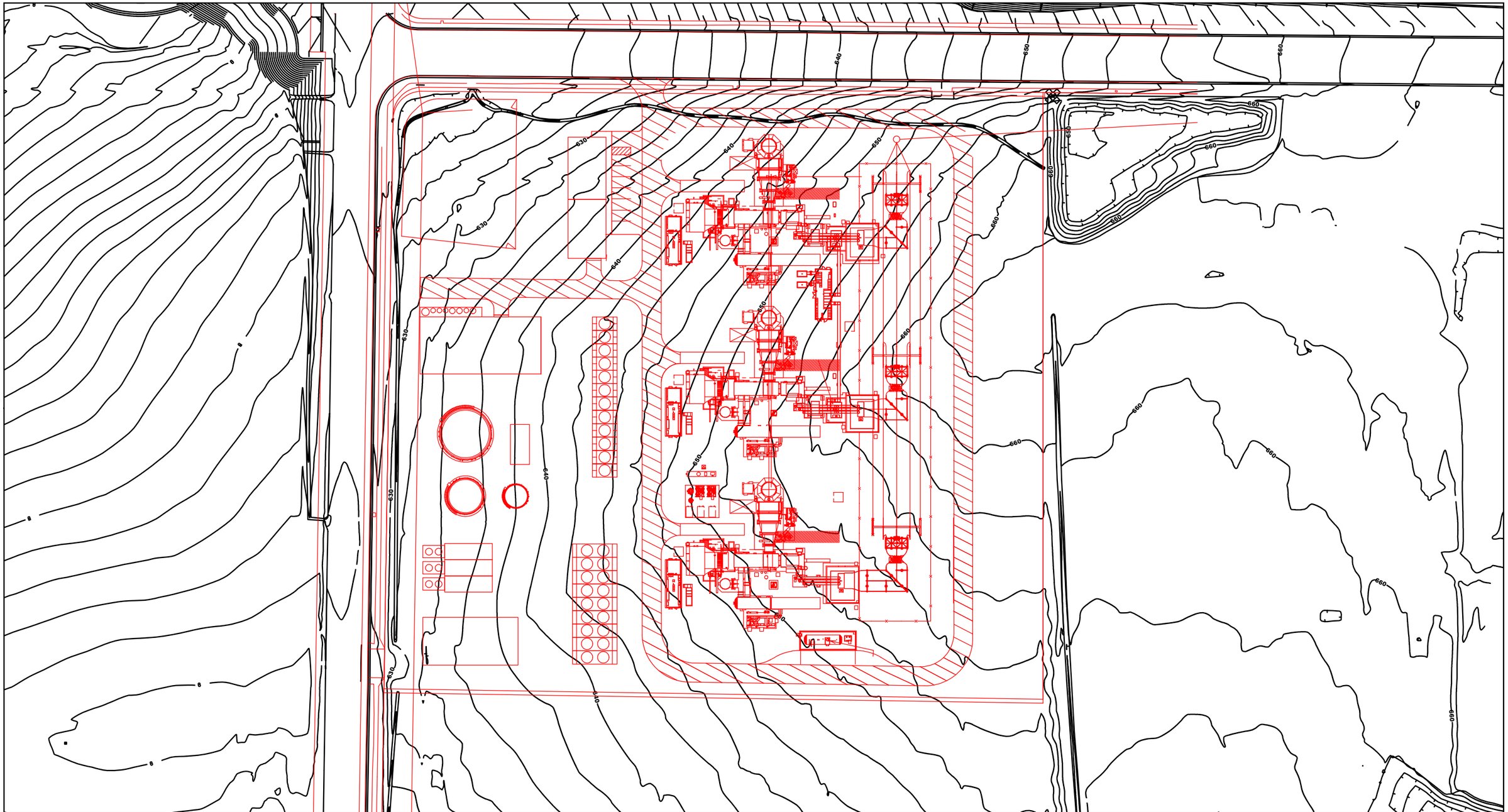
- 1-Mile Radius of Potential Transmission Lines
- Project Site
- Laydown Area
- Existing 230 kV Transmission Line
- Existing Natural Gas Line
- Route A 230 kV Transmission Line
- Route B 230 kV Transmission Line

FIGURE 3.3-4
EXISTING SETTING WITHIN 1-MILE RADIUS OF POTENTIAL TRANSMISSION LINES

PIO PICO ENERGY CENTER

PROJECT NO.: 29874827
DATE: DECEMBER 2010

URS



Legend

Potential Project Site

Existing Topography

N

0 50 100 Feet

FIGURE 3.4-1

2010 SITE TOPOGRAPHY

PIO PICO ENERGY CENTER

PROJECT NO.: 29874827

DATE: DECEMBER 2010

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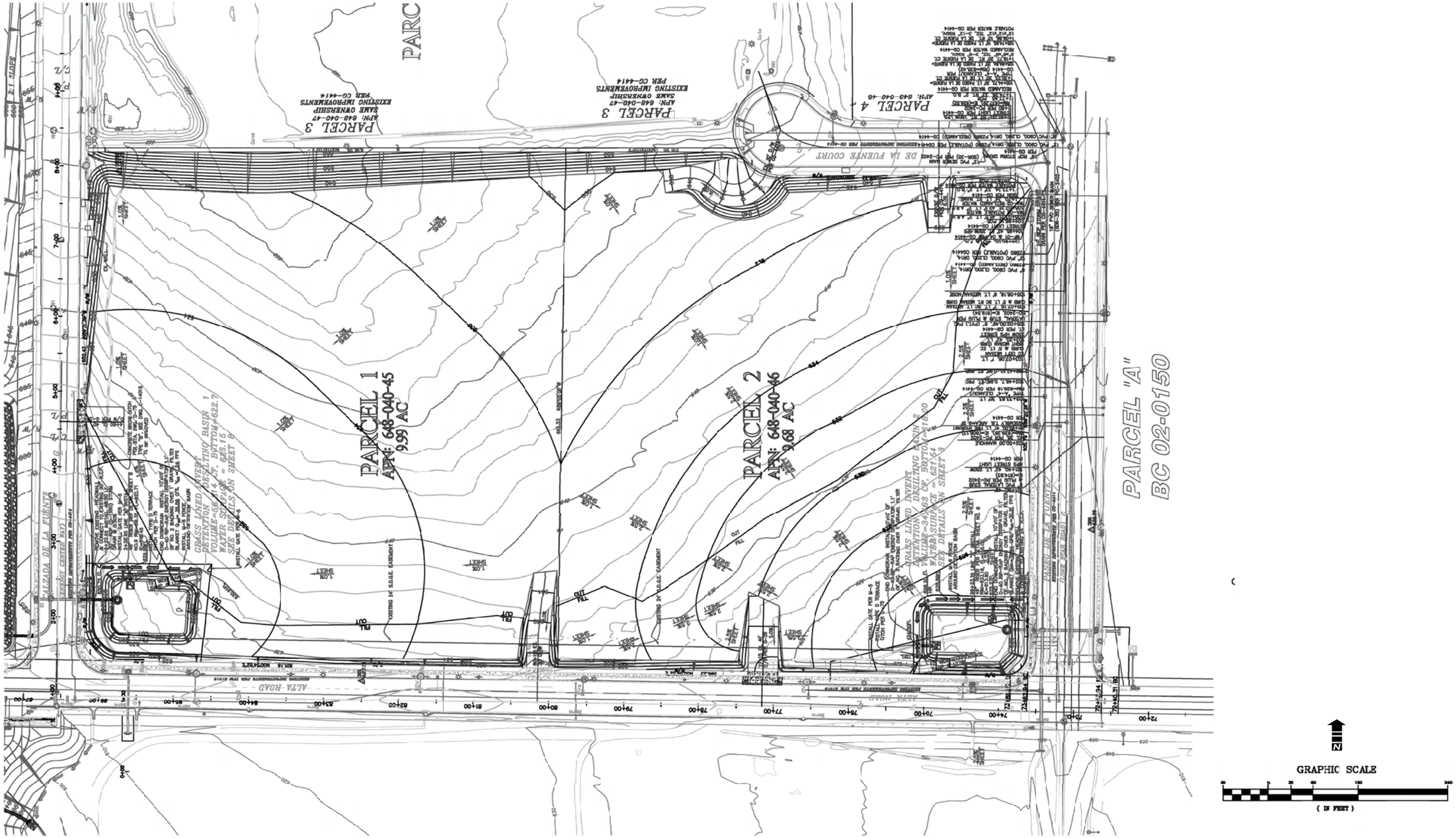


FIGURE 3.4-2
BASELINE SITE TOPOGRAPHY

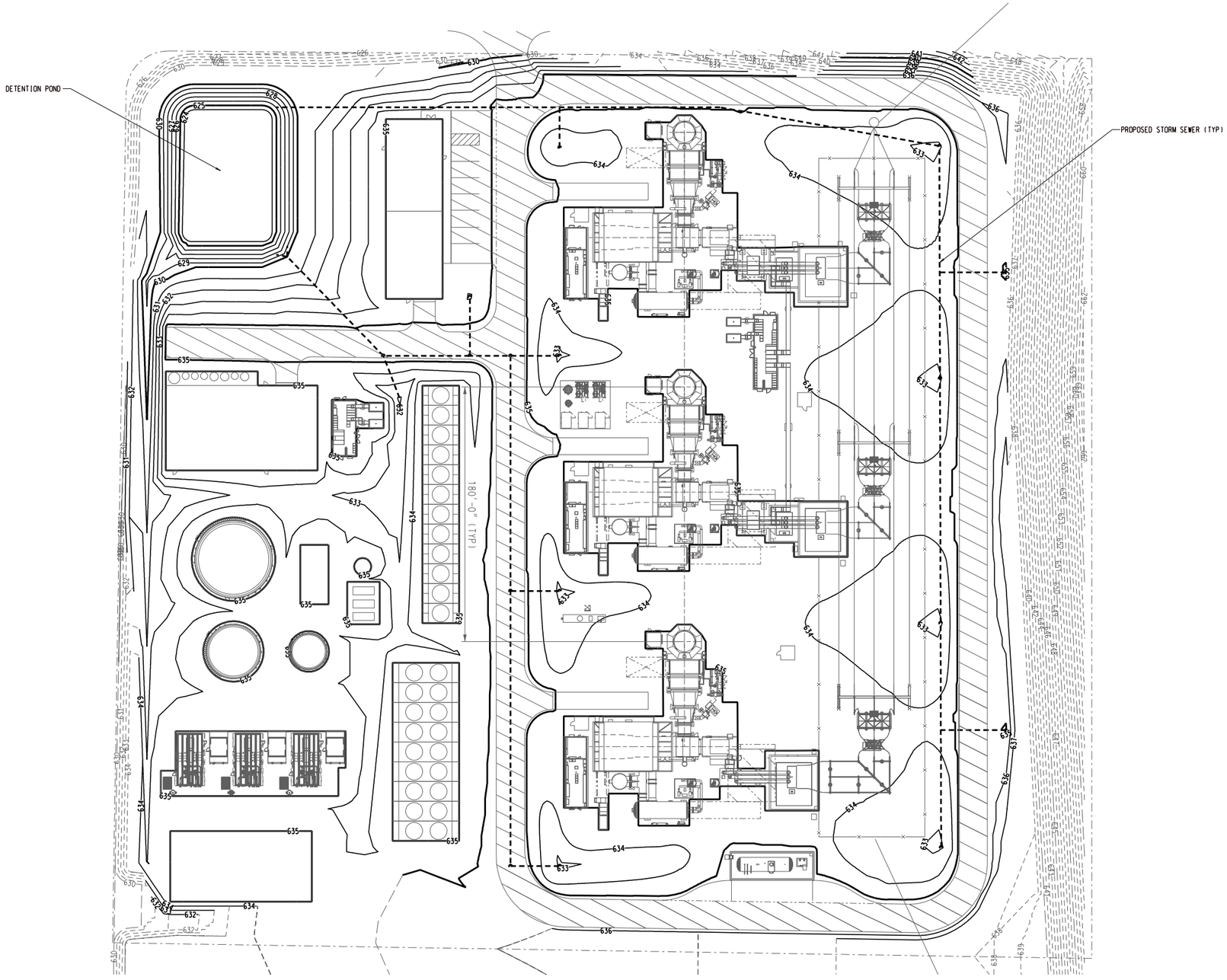
PIO PICO
ENERGY CENTER

PROJECT NO.: 29874827
DATE: DECEMBER 2010

URS

NOTES:

1. ALL SLOPES GREATER THAN 3:1 SHALL HAVE EROSION PROTECTION.
2. PERMANENT PLANT AREA: 9.99 AC.
3. PERMANENT PLANT VOLUME: CUT 6,530 CY: FILL 11,900 CY



30 0 30 60
SCALE IN FEET
SCALE: 1" = 30'-0"

N

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REV	DESIGN BY	DRAWN BY	CHECKED BY	DATE
C	ISSUED FOR REVIEW S. BADDELEY	S. BADDELEY	S. HANNI	12-21-10
B	ISSUED FOR REVIEW S. BADDELEY	S. BADDELEY	S. HANNI	12-03-10
A	ISSUED FOR REVIEW S. BADDELEY	S. BADDELEY	S. HANNI	11-05-10

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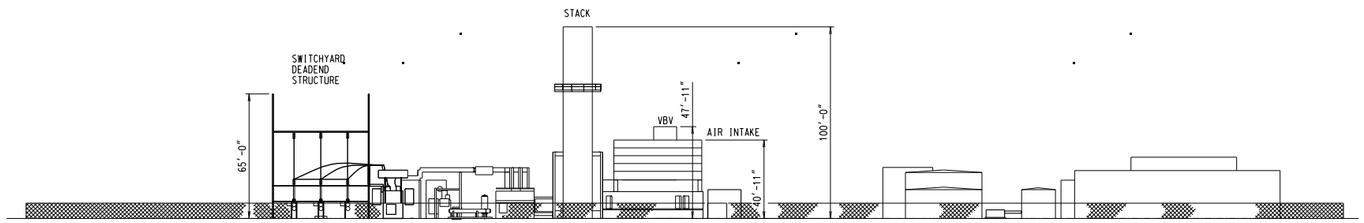
FIGURE 3.4-3

PRELIMINARY GRADING AND DRAINAGE PLAN

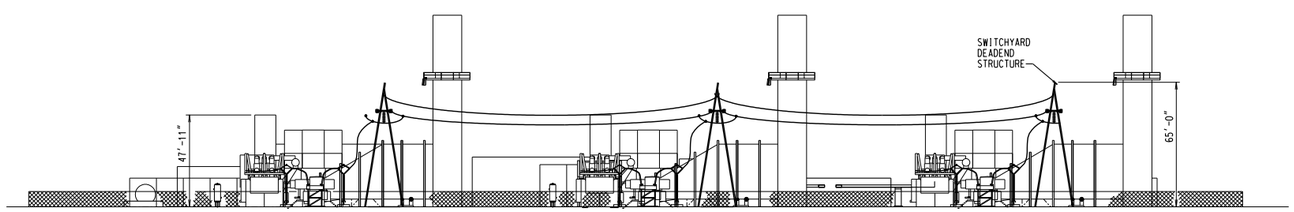
ENGINEER/DESIGN ORIGINATOR	S. BADDELEY
LEAD ENG	
ENG MGR	C. KEBODEAUX
PROJ MGR	E. ELAM

DRAWING NUMBER
P009-041-CG-002

2009041-CG-002.dgn 12/21/2010 9:30:20 AM scott.baddeley



ELEVATION LOOKING SOUTH



ELEVATION LOOKING WEST

30 0 30 60
SCALE IN FEET
SCALE: 1" = 30'-0"

SEE TAB A FOR NOTES AND LEGEND ONLY

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REV	DESIGN BY	DRAWN BY	CHECKED BY	DATE
G	ADDED FENCE C. KEBODEAUX	T. FLEEKER	C. KEBODEAUX	OPEN
F	REMOVED SOUNDWALL; REVISED SITE LOCATION D. SHORT	M. ROSAS	C. KEBODEAUX	12-22-10
E	REVISED FOR PERMIT; REVISED STACK HEIGHT B. BROWN	S. HANNI	E. ELAM	09-03-10
D	REVISED FOR PERMIT B. BROWN	S. HANNI	E. ELAM	08-13-10
C	ISSUED FOR PERMIT B. BROWN	S. HANNI	E. ELAM	08-12-10
B	ISSUED FOR REVIEW			05-28-10
A	ISSUED FOR REVIEW			05-13-10

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FIGURE 3.5-1

OPEN

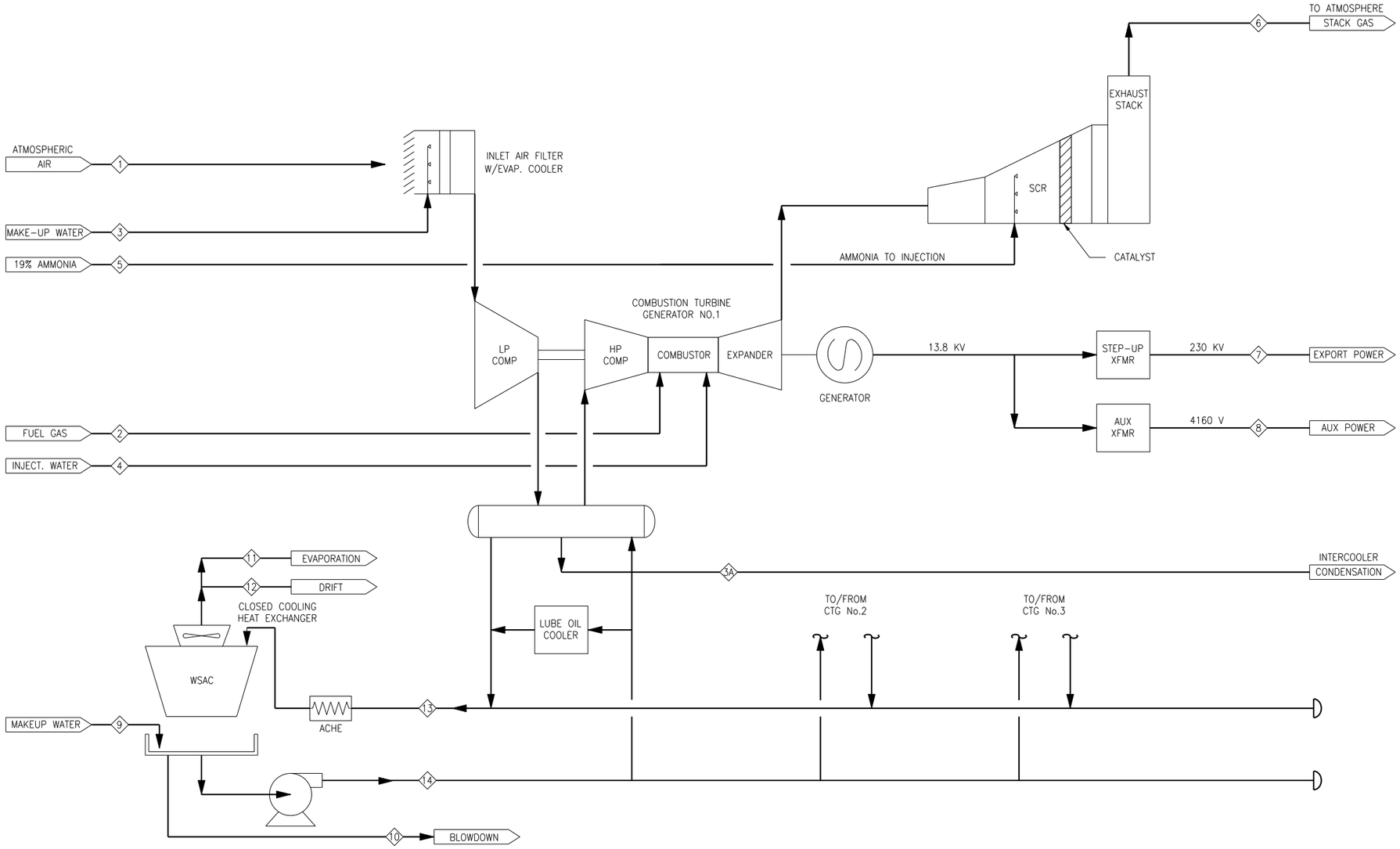
SITE ARRANGEMENT
ELEVATIONS

ENGINEER/DESIGN ORIGINATOR P. WEST
LEAD ENG B. BROWN
ENG MGR E. ELAM
PROJ MGR ---

DRAWING NUMBER
P009-041-EL-001

NOTES

1. STREAM DESIGNATION ◇6
2. COMBUSTION TURBINE GENERATOR GROSS OUTPUT AT 100% LOAD AND THE GIVEN AMBIENT CONDITION IS 102,350 KW EACH.
3. AMBIENT CONDITION 70^F DB/60^F WB.
4. VALUES ARE FOR CTG'S AT 100% LOAD WITH EVAPORATIVE COOLING ON.



HEAT AND MATERIAL BALANCE FOR NOTE 3 AMBIENT CONDITION

		ONE COMBUSTION TURBINE GENERATOR									THREE (3) COMBUSTION TURBINE GENERATORS														
	UNITS	1	2	3	3A	4	5	6	7	8	1	2	3	3A	4	5	6	7	8	9	10	11	12	13	14
FLOW	lb/hr	1,625,068	39,203	46,500	4,680	25,255	182	1,684,846			4,875,204	117,609	139,500	14,040	75,765	546	5,054,538			89,000	42,500	127,000	39	4,800,000	4,800,000
FLOW	gpm			93.0	9.4	50.5	0.4						279	28.1	151.5	1.1				178	85	254	0.08	9,600	9,600
TEMPERATURE	^F	70	212	80	80	100	80	787			70	212			100	80	787			65	85			114	85
LHV HEAT INPUT	mmBtu/hr		808									2,424													
GROSS POWER	KW								102,351	2,250								307,053	6,750						
Gr.LHV HEAT RATE	Btu/kwhr								7894									23,682							

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REV	DESIGN BY	DRAWN BY	CHECKED BY	DATE
B	UPDATED FOR REVISED SITE			
	C. KEBODEAUX	T. FLEEKER	B. BROWN	OPEN
A	ISSUED FOR PERMIT			
	B. BROWN	S. HANNI	E. ELAM	08-12-10

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SAN DIEGO COUNTY, CA

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Kiewit Power
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Lenexa, Kansas 66219

FIGURE 3.5-2A

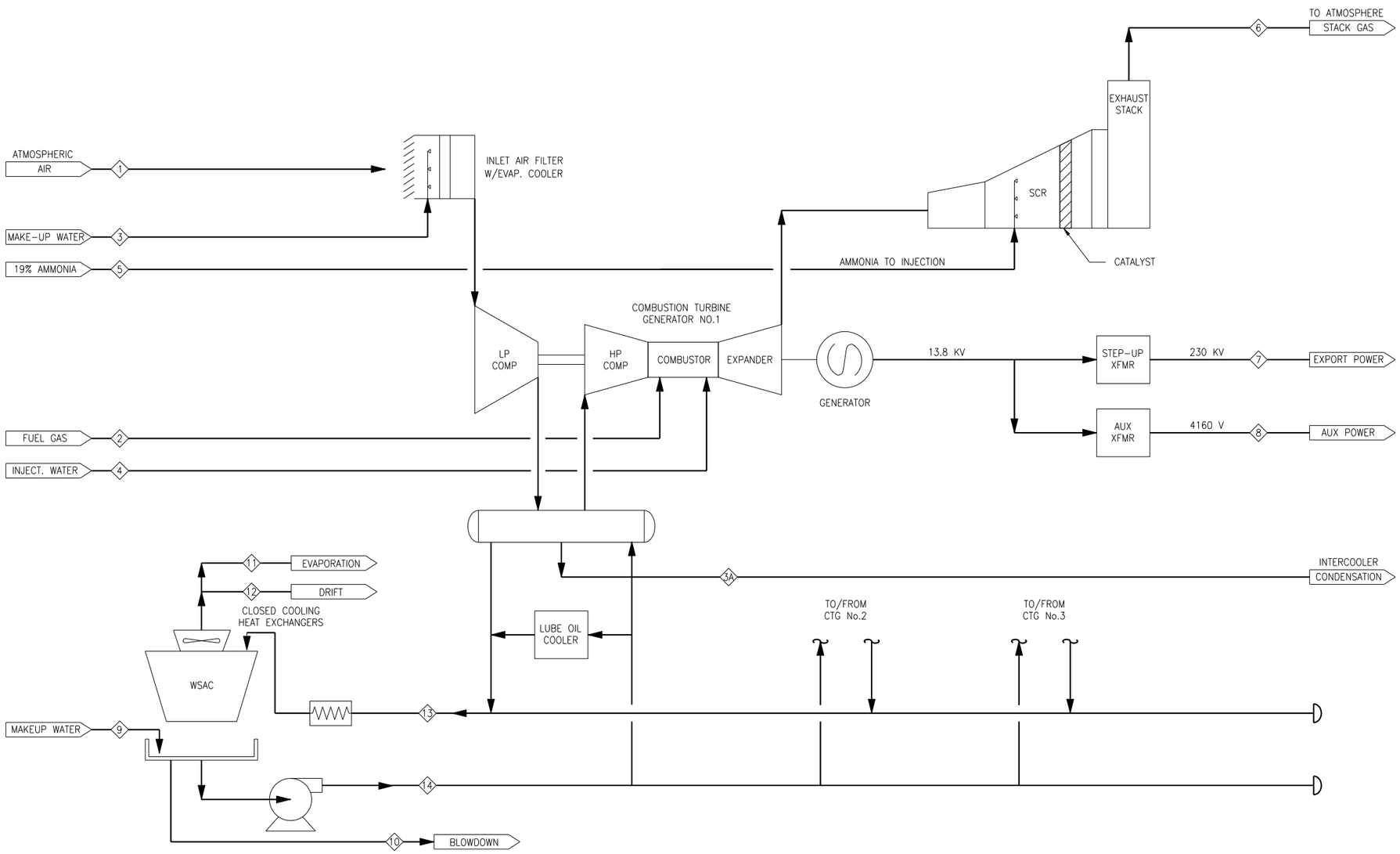
HEAT AND MASS BALANCE
SPRING/FALL

ENGINEER/DESIGN ORIGINATOR S. HANNI
LEAD ENG B. BROWN
ENG MGR E. ELAM
PROJ MGR ---

DRAWING NUMBER
P009-041-HMBS/F-001

NOTES

1. STREAM DESIGNATION ◇6
2. COMBUSTION TURBINE GENERATOR GROSS OUTPUT AT 100% LOAD AND THE GIVEN AMBIENT CONDITION IS 100,990 KW EACH.
3. AMBIENT CONDITION 80^F DB/63^F WB.
4. VALUES ARE FOR CTG'S AT 100% LOAD WITH EVAPROATIVE COOLING ON.



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REV	DESIGN BY	DRAWN BY	CHECKED BY	DATE
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	C. KEBODEAUX	T. FLEEKER	B. BROWN	OPEN
A	ISSUED FOR PERMIT			
	B. BROWN	S. HANNI	E. ELAM	08-12-10

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FIGURE 3.5-2B

HEAT AND MASS BALANCE
SUMMER

ENGINEER/DESIGN	
ORIGINATOR	S. HANNI
LEAD ENG	B. BROWN
ENG MGR	E. ELAM
PROJ MGR	1st Int.Last Name

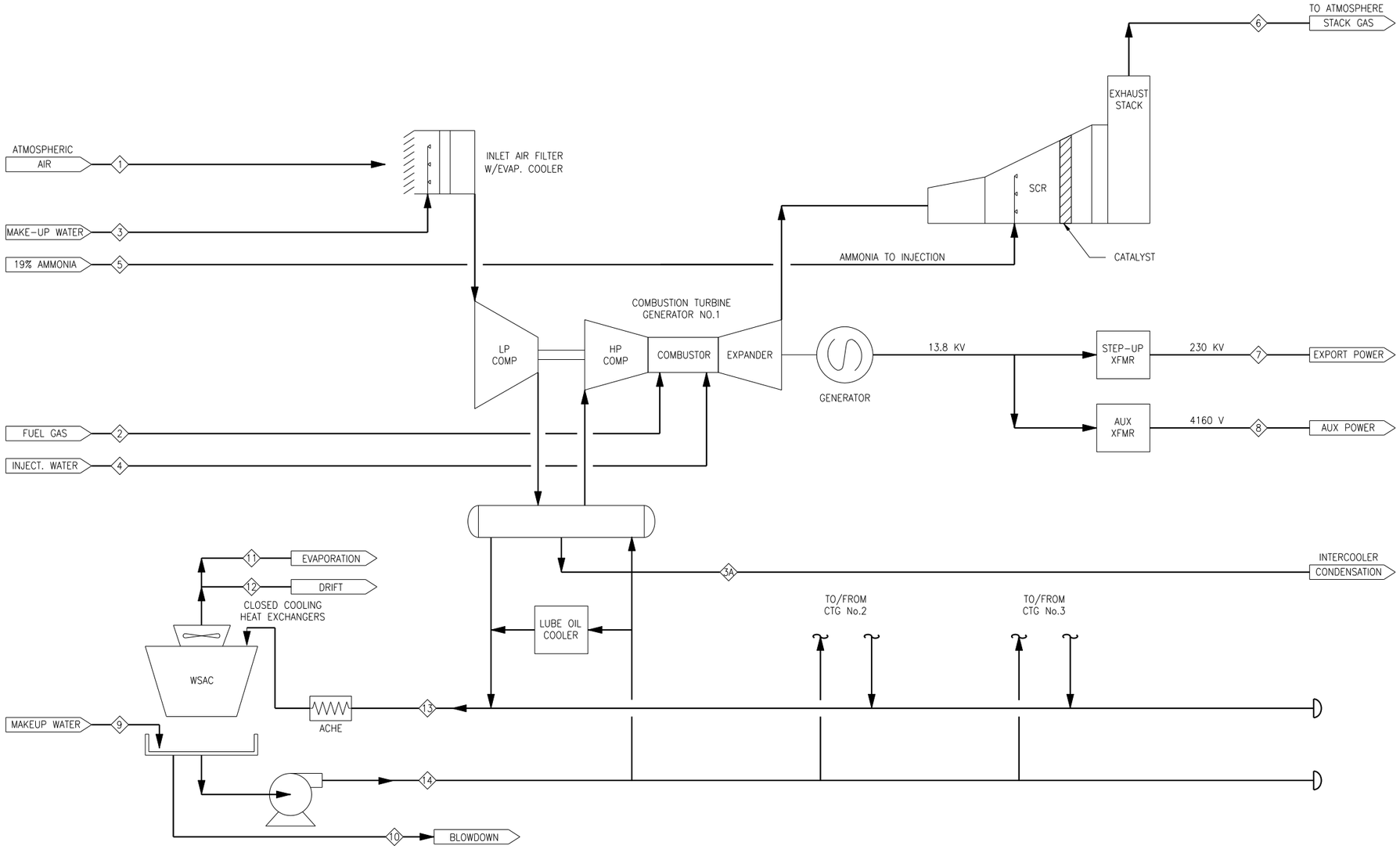
DRAWING NUMBER
P009-041-HMBS-001

HEAT AND MATERIAL BALANCE FOR NOTE 3 AMBIENT CONDITION

		ONE COMBUSTION TURBINE GENERATOR									THREE (3) COMBUSTION TURBINE GENERATORS														
	UNITS	1	2	3	3A	4	5	6	7	8	1	2	3	3A	4	5	6	7	8	9	10	11	12	13	14
FLOW	lb/hr	1,611,310	38,835	81,000	5,760	24,910	182	1,669,295			4,833,930	116,505	243,000	17,280	74,730	546	5,007,885			88,500	44,500	155,500	39	4,800,000	4,800,000
FLOW	gpm			162	11.5	49.8	0.4						486	34.6	149.5	1.1				177	89	311	.08	9,600	9,600
TEMPERATURE	^F	80	212	80	80	100	80	790			80	212			80	80	790			75	85			119	85
LHV HEAT INPUT	mmBtu/hr		800									2,400													
GROSS POWER	KW								100,994	2,250								302,982	6,750						
Gr.LHV HEAT RATE	Btu/kwhr								7,926									23,778							

NOTES

1. STREAM DESIGNATION ◇6
2. COMBUSTION TURBINE GENERATOR GROSS OUTPUT AT 100% LOAD AND THE GIVEN AMBIENT CONDITION IS 99,300 KW EACH.
3. AMBIENT CONDITION 93^F DB/65^F WB
4. VALUES ARE FOR CTG'S AT 100% LOAD WITH EVAPORATIVE COOLING ON.



HEAT AND MATERIAL BALANCE FOR NOTE 3 AMBIENT CONDITION

		ONE COMBUSTION TURBINE GENERATOR									THREE (3) COMBUSTION TURBINE GENERATORS														
	UNITS	1	2	3	3A	4	5	6	7	8	1	2	3	3A	4	5	6	7	8	9	10	11	12	13	14
FLOW	lb/hr	1,593,927	38,370	127,000	7200	24,472	180	1,649,569			4,781,781	115,110	381,000	21,600	73,416	540	4,948,707			92,500	51,500	192,500	39	4,800,000	4,800,000
FLOW	gpm			254	14.4	48.9	0.4						762	43.2	146.7	1.2				185	103	385	.08	9,600	9,600
TEMPERATURE	^F	93	212	80	80	100	80	794			93	212			80	80	799			80	85			119	85
LHV HEAT INPUT	mmBtu/hr		791									2,373													
GROSS POWER	KW								99,305	2,250								297,915	6,750						
Gr.LHV HEAT RATE	Btu/kwhr								7964									23,892							

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A	ISSUED FOR PERMIT			
	B. BROWN	S. HANNI	E. ELAM	08-12-10

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FIGURE 3.5-2C

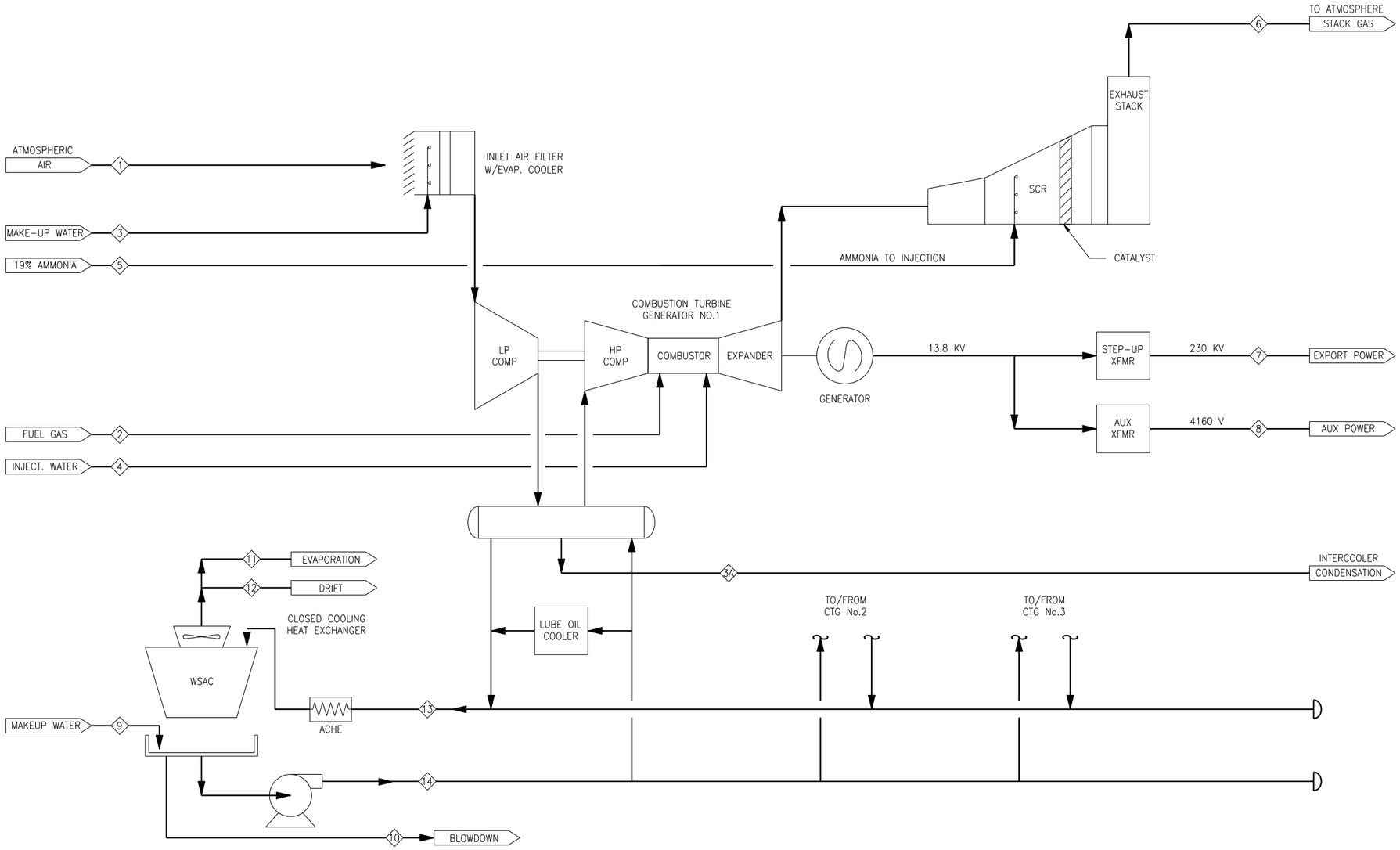
HEAT AND MASS BALANCE
PEAK

ENGINEER/DESIGN
ORIGINATOR S. HANNI
LEAD ENG B. BROWN
ENG MGR E. ELAM
PROJ MGR ---

DRAWING NUMBER
P009-041-HMBP-001

NOTES

1. STREAM DESIGNATION ◇6
2. COMBUSTION TURBINE GENERATOR GROSS OUTPUT AT 100% LOAD AND THE GIVEN AMBIENT CONDITION IS 104,300 KW EACH.
3. AMBIENT CONDITION 59^F DB/51^F WB.
4. VALUES ARE FOR CTG'S AT 100% LOAD WITH EVAPORATIVE COOLING OFF.



HEAT AND MATERIAL BALANCE FOR NOTE 3 AMBIENT CONDITION

		ONE COMBUSTION TURBINE GENERATOR									THREE (3) COMBUSTION TURBINE GENERATORS														
	UNITS	1	2	3	3A	4	5	6	7	8	1	2	3	3A	4	5	6	7	8	9	10	11	12	13	14
FLOW	lb/hr	1,642,160	39,755	0	0	26,388	184	1,708,303			4,926,480	119,265	0	0	79,164	552	5,124,909			107,500	42,500	95,900	39	4,800,000	4,800,000
FLOW	gpm	———	———	0.0	0.0	52.8	0.4						0.0	0.0	158.4	1.1				215	85	191	0.08	9,600	9,600
TEMPERATURE	^F	59	212			100	80	783			59	212			80	80	763			60	85			113	85
LHV HEAT INPUT	mmBtu/hr		819									2,457													
GROSS POWER	KW								104,302	2,250								312,906	6,750						
Gr.LHV HEAT RATE	Btu/kwhr								7,856									23,568							

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	B. BROWN	S. HANNI	E. ELAM	08-12-10

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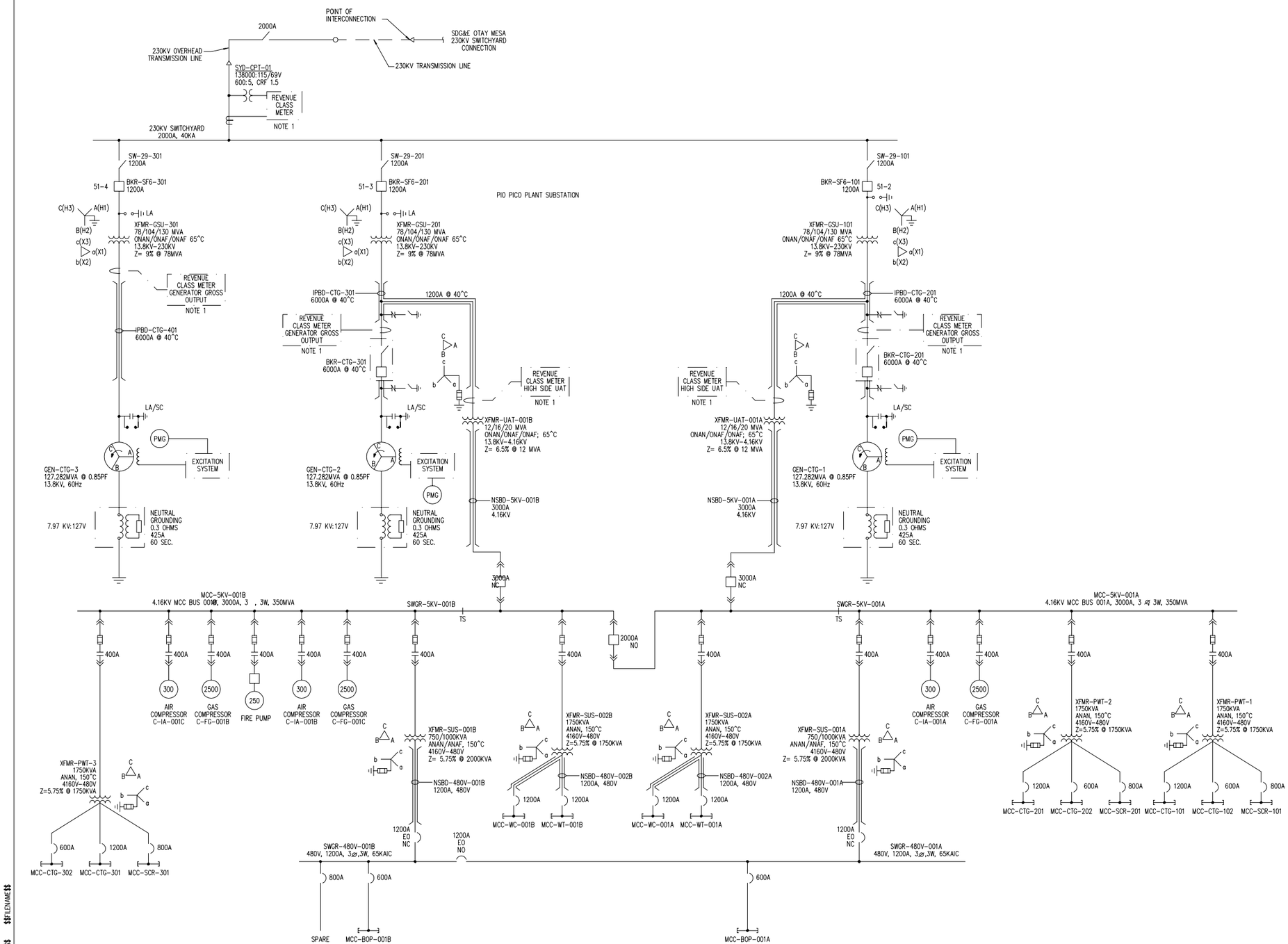
FIGURE 3.5-2D

HEAT AND MASS BALANCE
WINTER

ENGINEER/DESIGN
ORIGINATOR S. HANNI
LEAD ENG B. BROWN
ENG MGR E. ELAM
PROJ MGR ---

DRAWING NUMBER
P009-041-HMBW-001



NOTES

1. ALL METERS & CT'S CAL-ISO QUALITY.
2. ALL BREAKER RATINGS ARE FRAME SIZE ONLY.

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REV	DESCRIPTION	DWN	CHK	APP	DATE
F	ISSUED FOR REVIEW				01-04-11
E	ISSUED FOR REVIEW				12-21-10
D	ISSUED FOR REVIEW				12-17-10
C	ISSUED FOR REVIEW				08-19-10
B	ISSUED FOR AFC				05-13-10
A	PRELIMINARY				date

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FIGURE 3.5-3

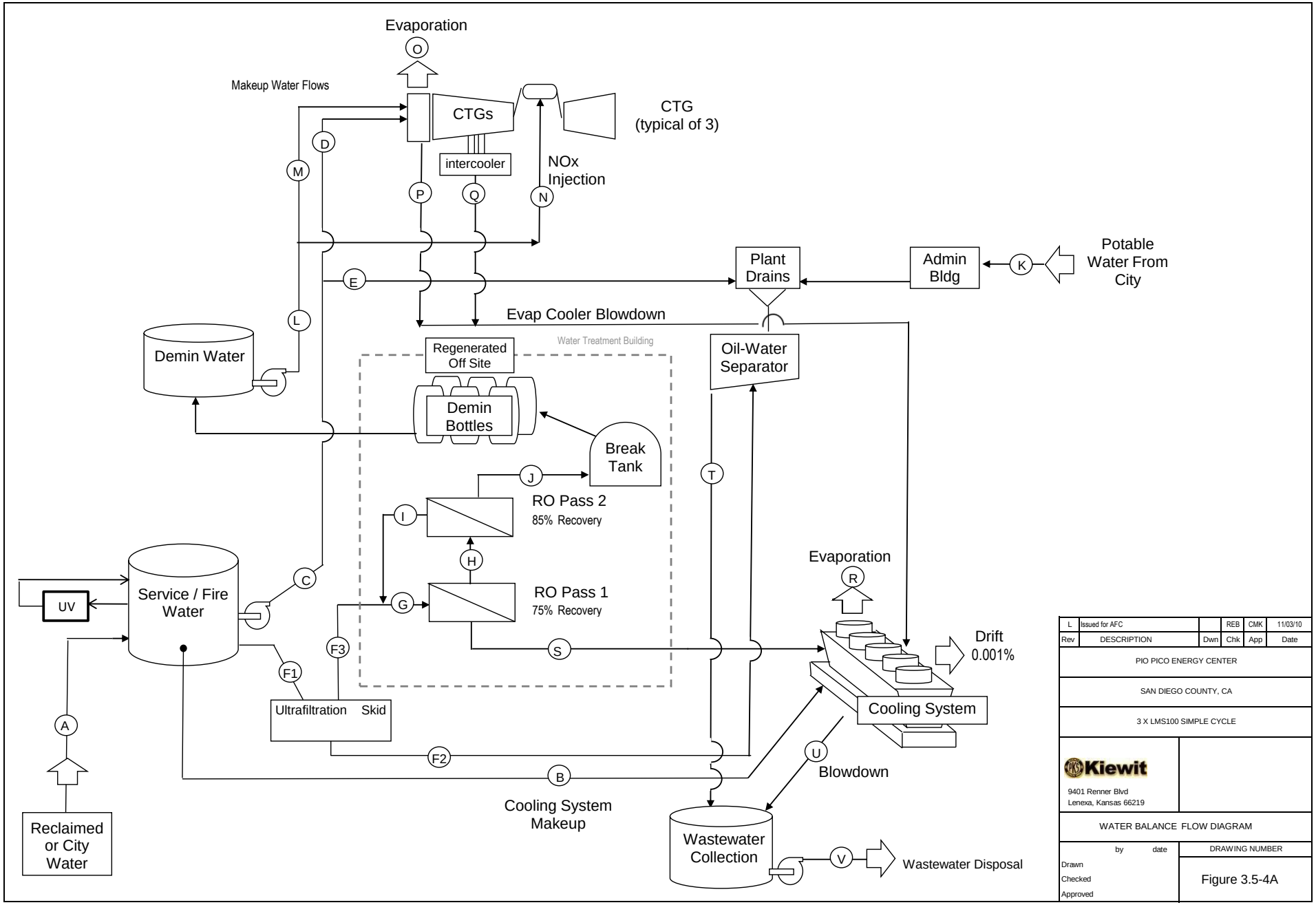
OVERALL ONE-LINE DIAGRAM

	by	date
DESIGNED		
DRAWN		
CHECKED		
APPROVED		

DRAWING NUMBER

P009-041-E0-001

$$DATE$$ $$TIME$$ $$USERNAME$$ $$FILENAME$$



Rev	DESCRIPTION	Dwn	Chk	App	Date
L	Issued for AFC		REB	CMK	11/03/10

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SAN DIEGO COUNTY, CA

3 X LMS100 SIMPLE CYCLE

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WATER BALANCE FLOW DIAGRAM

	by	date	DRAWING NUMBER
Drawn			Figure 3.5-4A
Checked			
Approved			

	CASE	ISO	Average High	Summer High	Peak Hour	Peak Day Average
	Ambient Temperature	59	70	80	93	82
	Wet Bulb Temperature	51	60	63	65	63
	Relative Humidity, %	60	57	38	22	38
	Ambient Pressure	14.36	14.36	14.36	14.36	14
	Gross Turbine Output, MW	104.3	102.4	101.0	99.3	100.7
	Inlet Air Cooler Status	Off	On	On	On	On
	Description CTs in service	3	3	3	3	3
A	Water Required by Plant	452	497	564	658	573
B	Required Makeup to Cooling System	215	178	177	185	172
C	Service Water Flow	5	98	167	259	182
D	Service water to evap coolers	0	93	162	254	177
E	Washdown hose use	5	5	5	5	5
F1	UF System Feed	232	222	219	215	218
F2	UF System Backwash	12	11	11	11	11
T	Oil/Water Sep Effluent	19	18	18	18	18
F3	RO System Feed	220	211	208	204	208
G	RO Pass 1 Inlet Flow	248	238	234	230	234
H	RO Pass 2 Inlet Flow	186	178	176	173	175
I	RO Pass 2 Reject to Pass 1	28	27	26	26	26
J	RO Product Water	158	152	149	147	149
S	RO rejects	62	59	59	58	58
K	Potable water to admin bldg	2	2	2	2	2
L	Demineralized Water Flow	158	152	149	147	149
M	Demin water to evap coolers	0	0	0	0	0
N	NOx injection	158	152	149	147	149
O	Evap cooler evaporation	0	19	32	51	35
	Evap cooler Cycles of Concentration	1.25	1.25	1.25	1.25	1.25
P	Evaporative cooler blowdown	0	74	130	203	142
	Evap cooler Total Makeup	0	93	162	254	177
	Evap cooler makeup demin fraction	0%	0%	0%	0%	0%
Q	Intercooler condensation	0	28	35	43	36
	Heat Rejection (MMBtu/hr)	118	123	124	126	124
	Percent Dry Cooling	71%	63%	56%	46%	54%
R	Cooling System Evaporation	191	254	311	385	322
	Cooling System Cycles of Concentration	3.25	4.00	4.50	4.75	4.75
U	Cooling System Blowdown	85	85	89	103	86
	Cooling System Total Makeup	277	339	400	488	408
V	Wastewater Flow	104	103	107	121	104
						Annual
	Annual Operation hours	1,100	1,600	1,000	300	4,000
	Water Used Acre-ft	92	147	104	36	378
	Water Saved, compared to Acre-ft	139	173	92	23	427
	100% evaporative cooling %	60%	54%	47%	39%	53%
	Wastewater Disposal Acre-ft	21	30	20	7	78

Notes:

1) All Flows are displayed in GPM
2) Based on GE APPS performance
3) Ultrafilter recovery rate 95%
4) RO 1st Pass Recovery Rate 75%
5) RO 2nd Pass Recovery Rate 85%
6) Overall RO Recovery Rate 72%
7) Cooling System Drift 0.0010%
8) Service Water Use, gpm 5
9) Annual Capacity Factor 46%
10) Annual Water Savings 53%
compared to 100% evaporative cooling
11) Operating hours are estimated
to maximize operation at higher temperatures

L	Issued for AFC		REB	CMK	11/03/10

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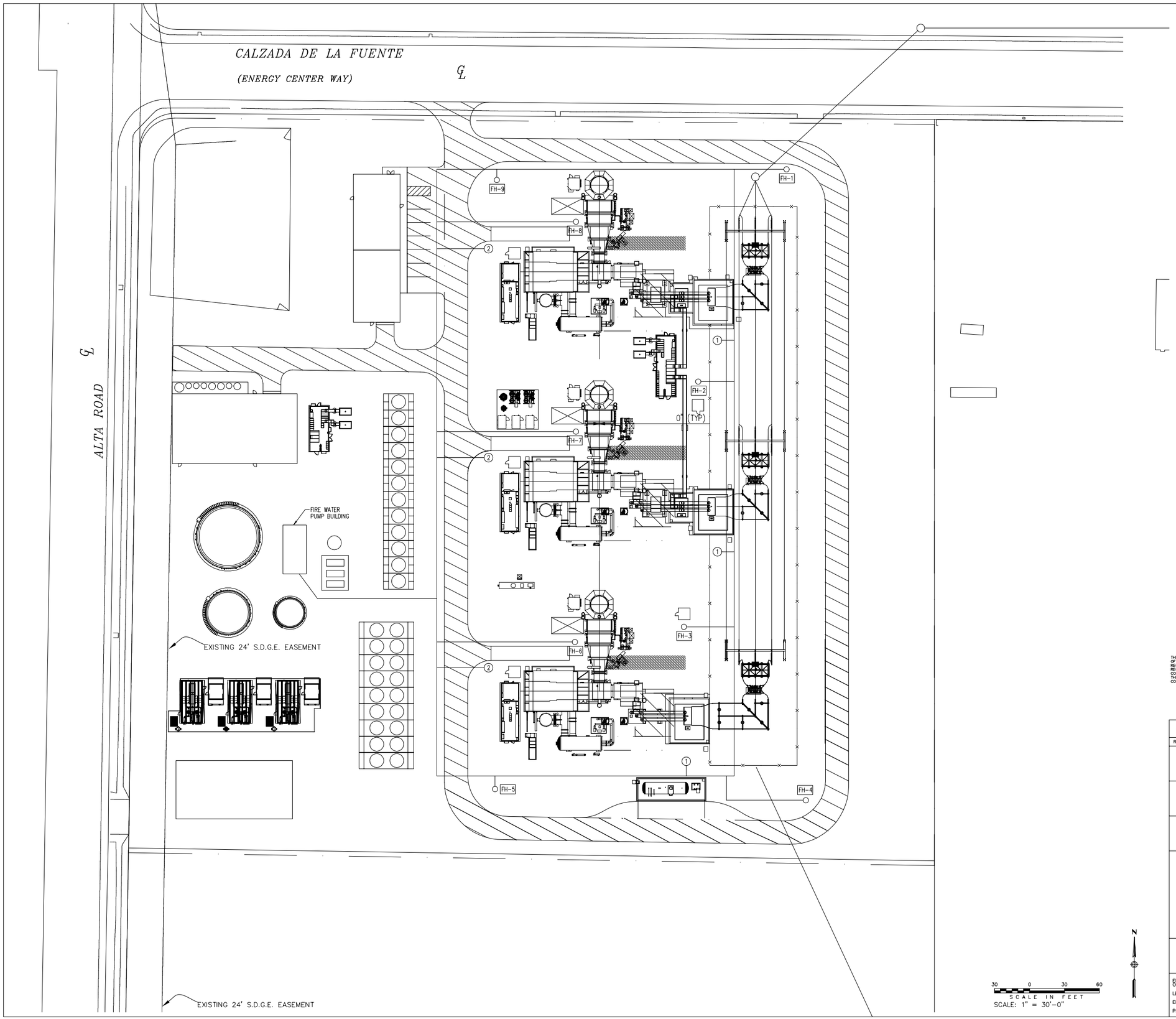
WATER BALANCE FLOW VALUES

by date DRAWING NUMBER

Drawn
Checked
Approved

Figure 3.5-4B



LEGEND

1. GSU DELUGE SYSTEM (TYP)
2. LUBE OIL SKID (TYP)

FH-X FIRE HYDRANT (TYP)

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REV	DESIGN BY	DRAWN BY	CHECKED BY	DATE
A	PRELIMINARY			12-21-10

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FIGURE 3.5-5

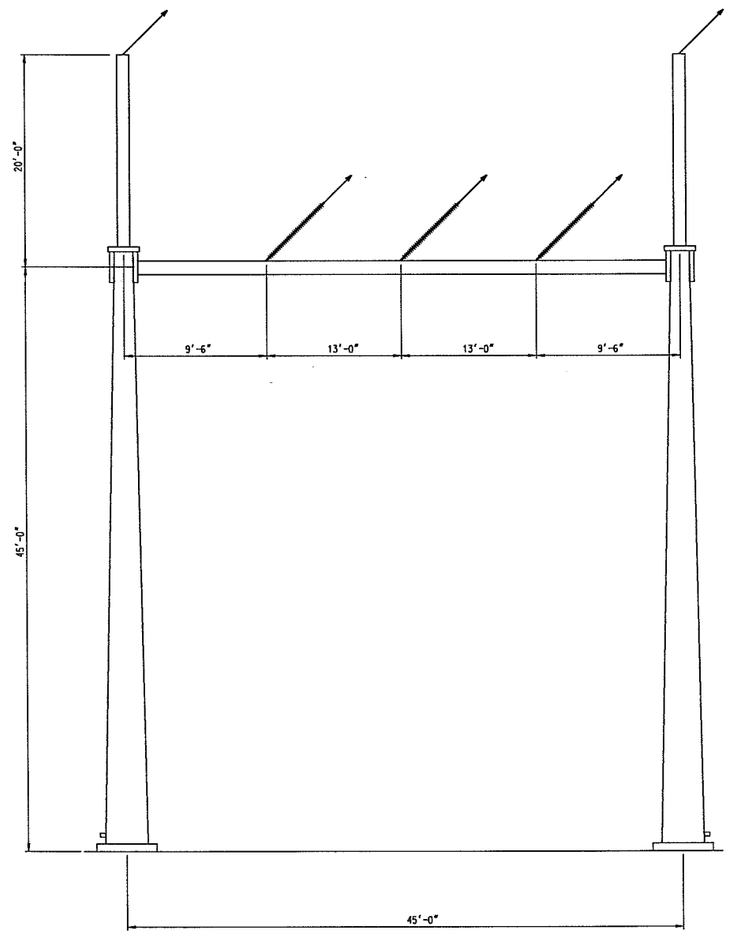
FIRE PROTECTION SYSTEM

ENGINEER/DESIGN ORIGINATOR
LEAD ENG
ENG MGR
PROJ MGR

DRAWING NUMBER
P009-041-FP-001

NOTES

1.



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REV	DESCRIPTION	DWN	CHK	APP	DATE
A	PRELIMINARY	TEF	DPM	SM	01-18-11

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FIGURE 3.7-1A

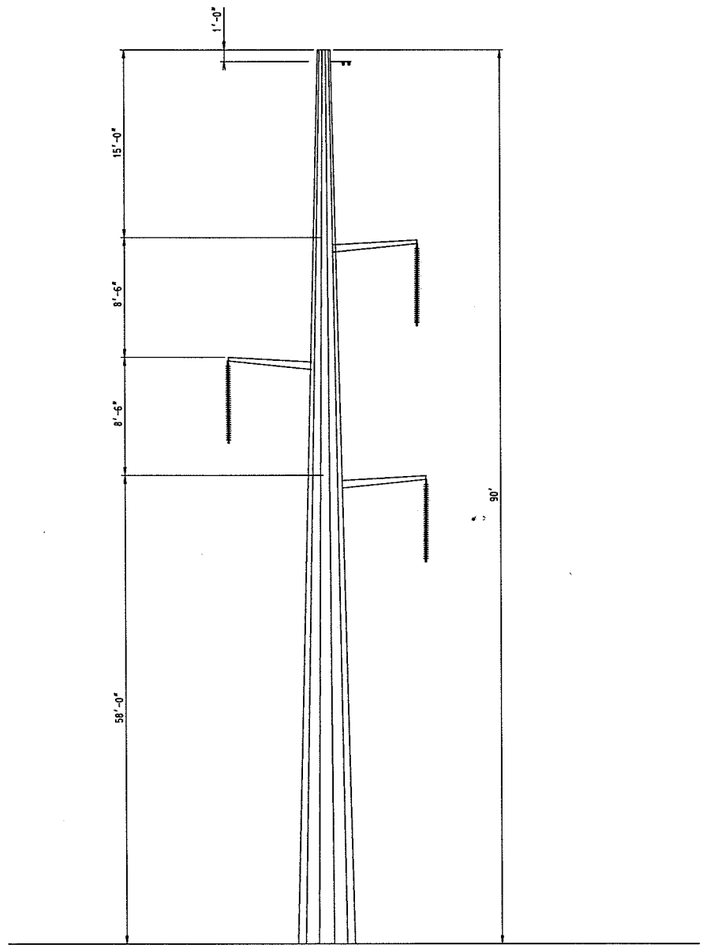
230KV SWITCHYARD TUBULAR
STEEL H-FRAME STRUCTURE

	by	date
DESIGNED	TEF	01-17-11
DRAWN	TEF	01-17-11
CHECKED	DPM	01-18-11
APPROVED	SM	01-18-11

DRAWING NUMBER
P009-041-PDS-700

NOTES

1.



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REV	DESCRIPTION	DWN	CHK	APP	DATE
A	PRELIMINARY	TEF	DPM	SM	01-18-11

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Lenexa, Kansas 66219

FIGURE 3.7-1B

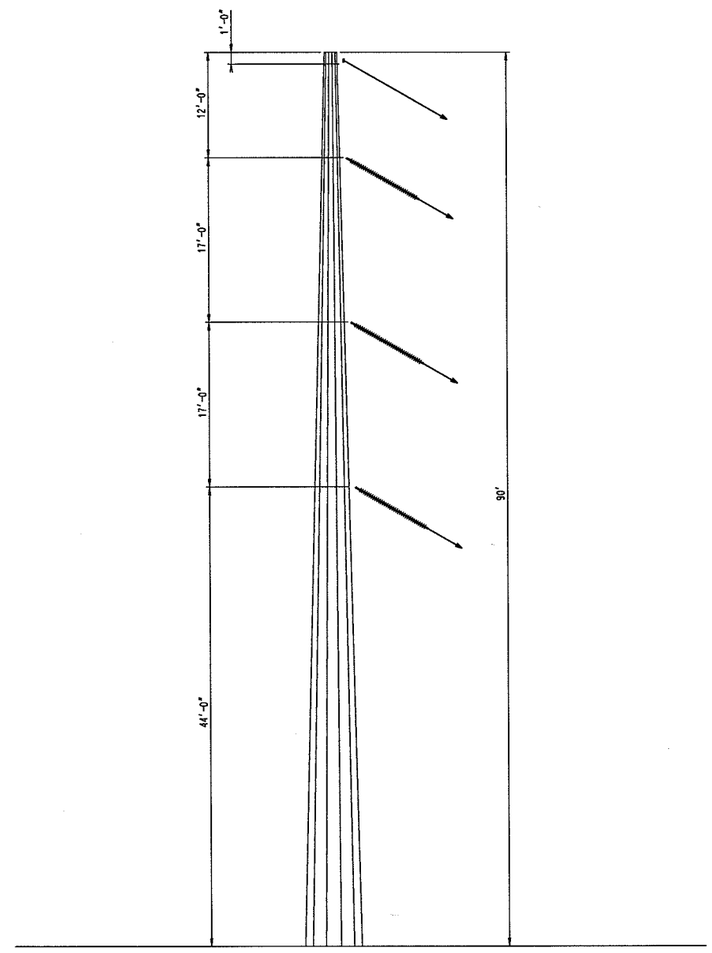
230KV T-LINE TUBULAR
STEEL TANGENT STRUCTURE

	by	date
DESIGNED	TEF	01-18-11
DRAWN	TEF	01-18-11
CHECKED	DPM	01-18-11
APPROVED	SM	01-18-11

DRAWING NUMBER
P009-041-PDT-900

NOTES

1.



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REV	DESCRIPTION	DWN	CHK	APP	DATE
A	PRELIMINARY	TEF	DPM	SM	01-18-11

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FIGURE 3.7-1C

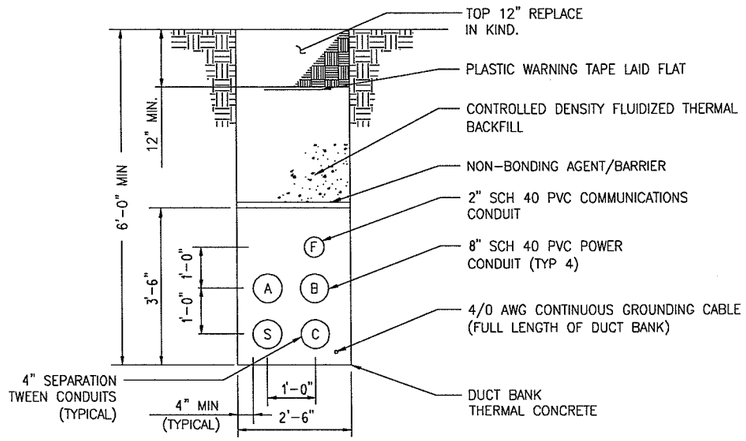
230KV T-LINE TUBULAR
STEEL DEAD-END STRUCTURE

	by	date
DESIGNED	TEF	01-18-11
DRAWN	TEF	01-18-11
CHECKED	DPM	01-18-11
APPROVED	SM	01-18-11

DRAWING NUMBER
P009-041-PDT-902

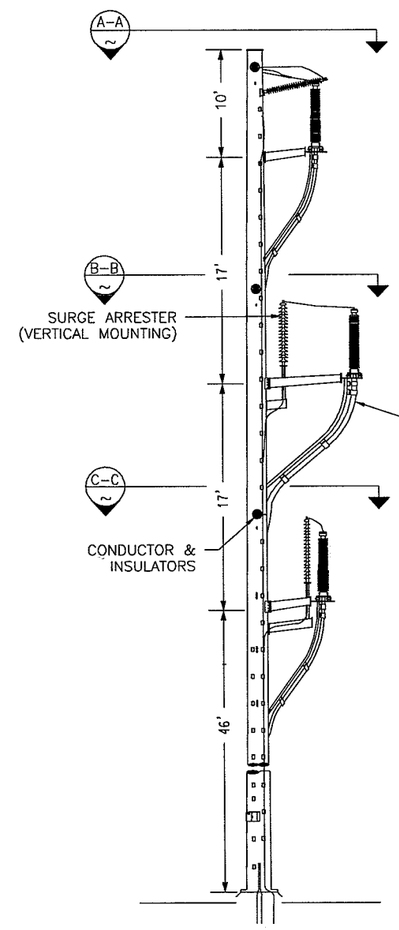
NOTES

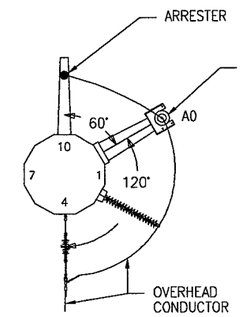
1.



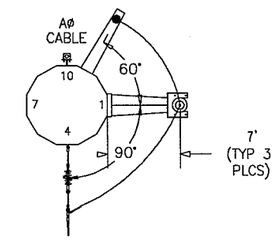
TYPICAL 230 KV DUCT BANK

SCALE: NTS

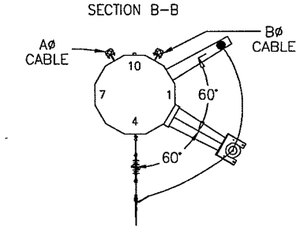




SECTION A-A



(+L)
SECTION B-B



SECTION C-C

230 KV UG CABLE RISER STRUCTURE

SCALE: NTS

WITH ARM SUPPORTS FOR TERMINATORS AND ARRESTORS IN VERTCIAL POSITIONS

-PRELIMINARY-
NOT FOR CONSTRUCTION

CONFIDENTIAL

THESE DRAWINGS ARE CONFIDENTIAL IN NATURE. ANY MISUSE OR UNAUTHORIZED DISTRIBUTION OF THE DRAWINGS CONTAINED HEREIN WILL BE A VIOLATION OF THIS CONFIDENTIALITY REQUIREMENT AND SUBJECT THE VIOLATOR TO LIABILITY. REVIEW OF THESE MATERIALS BY RECIPIENT SHALL CONSTITUTE AN ACCEPTANCE OF THESE TERMS AND THE TERMS OF ANY UNDERLYING CONFIDENTIALITY AGREEMENT WE MAY HAVE EXECUTED IN OBTAINING THIS INFORMATION FROM A THIRD PARTY. IF THE RECIPIENT IS NOT IN AGREEMENT WITH THE OBLIGATION OF CONFIDENTIALITY THEN THE DRAWINGS SHALL BE RETURNED TO KIEWIT POWER ENGINEERS.

REV	DESCRIPTION	DWN	CHK	APP	DATE
A	PRELIMINARY	EJS	DPM	SM	01-18-11

PIO PICO ENERGY CENTER
SAN DIEGO COUNTY, CA

3xLMS100

Kiewit

Kiewit Power
9401 Renner Boulevard
Lenexa, Kansas 66219

FIGURE 3.7-1D

230KV UG CABLE RISER / DEADEND STRUCTURE AND DUCT BANK

	by	date
DESIGNED	TEF	01-17-11
DRAWN	TEF	01-17-11
CHECKED	DPM	01-18-11
APPROVED	SM	01-18-11

DRAWING NUMBER

P009-041-PDS-512

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.	Sections 1.1, 1.2, 3.1, 3.5.1,3.5.4, 3.5.6, 3.5.7, 3.10.2, and 4.3		
Appendix B (h) (4) (A)	Heat and mass balance diagrams for design conditions for each mode of operation.	Section 3.5.4.2 Figures 3.5-2A through 3.5-2D		
Appendix B (h) (4) (B)	Annual fuel consumption in BTUs for each mode of operation, including hot restarts and cold starts.	Section 3.5.4.2, and 3.10.2.1 Table 3.5-3		
Appendix B (h) (4) (C)	Annual net electrical energy produced in MWh for each mode of operation including starts and shutdowns.	Section 3.5.4.2 Table 3.5-3		
Appendix B (h) (4) (D)	Number of hours the plant will be operated in each design condition in each year.	Section 3.5.4.2 Table 3.5-3		
Appendix B (h) (4) (E)	If the project will be a cogeneration facility, calculations showing compliance with applicable efficiency and operating standards.	Not applicable		
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.	Sections 3.1 and 4.3		

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	Not applicable		
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.	Not applicable		
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.	Not applicable		
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.	Not applicable		

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.	Sections 1.1, 3.4, and 3.6.		
Appendix B (h) (1) (B)	A discussion of any measures proposed to improve adverse site conditions.	Sections 3.4 and 3.6.		
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		
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;	Section 3.5.4 Table 3.5.1 Figures 3.1.3 and 3.3.1		
Appendix B (h) (1) (D) (ii)	The heat dissipation system;	Sections 3.5.7.1 and 3.5.7.3		
Appendix B (h) (1) (D) (iii)	The cooling water supply system, and, where applicable, pre-plant treatment procedures;	Section 3.5.7 Figures 3.5-4A and 3.5-4B		

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) (iv)	The atmospheric emission control system;	Section 3.5.9		
Appendix B (h) (1) (D) (v)	The waste disposal system and on-site disposal sites;	Section 3.5.8		
Appendix B (h) (1) (D) (vi)	The noise emission abatement system;	Section 3.5.14		
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	Sections 3.5.5 and 3.7		
Appendix B (h) (1) (D) (ix)	Other significant facilities, structures, or system components proposed by the applicant.	N/A		

Adequacy Issue: Adequate ____ Inadequate ____

DATA ADEQUACY WORKSHEET

Revision No. 0 Date ____

Technical Area: **Project Overview**

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 1.0 through 5.18 Appendices A through R		
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 1.0 through 5.18 Appendices A through R		
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	Section 3.14 Section 5.2.9 Section 5.3.6 Section 5.4.6 Section 5.5.8 Section 5.6.7 Section 5.7.8 Section 5.8.8 Section 5.9.6 Section 5.10.7 Section 5.11.8 Section 5.12.10 Section 5.13.8 Section 5.14.8 Section 5.15.8 Section 5.16.8 Section 5.17.8 Section 5.18.8		
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.	Table of Contents Section 7.0		

Adequacy Issue: Adequate ____ Inadequate ____

DATA ADEQUACY WORKSHEET

Revision No. 0 Date ____

Technical Area: **Project Overview**

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
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.	Sections 1.1, 1.2, 3.3, 3.5.6, 3.5.7, and 3.5.9		
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 3.3		
Appendix B (a) (1) (C)	A description of and maps depicting the region, the vicinity, and the site and its immediate surroundings.	Sections 3.1 and 3.3 Figures 3.1-1, 3.1-2, 3.3-2, and 3.3-4		
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.	Figures 5.13-10 through 5.13-17.		
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 M		
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.	Table 3.9-1		

Adequacy Issue: Adequate ____ Inadequate ____

DATA ADEQUACY WORKSHEET

Revision No. 0 Date ____

Technical Area: **Project Overview**

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
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.	Sections 1.4 and 6.0		
Appendix B (a) (3) (B)	A list of all owners and operators of the proposed electric transmission facilities.	Section 3.3		
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).	Sections 1.4, 2.3, 3.1, and 6.0		
Appendix B (b) (1)	In a section entitled, "Generation Facility Description, Design, and Operation" provide the following information:	--		
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;	Figures 3.1-3A, 3.1-3B, 3.3-1, and 5.9-5		
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 3.3-1 and 3.5-1		

Adequacy Issue: Adequate ____ Inadequate ____

DATA ADEQUACY WORKSHEET

Revision No. 0 Date ____

Technical Area: **Project Overview**

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
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	Sections 3.5 through 3.12		
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.	Sections 3.6 and 4.0		
Appendix B (b) (2)	In a section entitled, "Transmission Lines Description, Design, and Operation" provide the following information:	--		
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 3.3-4		
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.	Figures 5.13-10 through 5.13-17.		

Adequacy Issue: Adequate ____ Inadequate ____

DATA ADEQUACY WORKSHEET

Revision No. 0 Date ____

Technical Area: **Project Overview**

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
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 3.7		
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 4.0		
Appendix B (e) (1)	A discussion of how facility closure will be accomplished in the event of premature or unexpected cessation of operations.	Section 3.11		

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.	Sections 1.1, 1.2, 3.1, 3.2, 3.4, 3.5, 3.12, and Section 5 resources analyses.		
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.	Sections 3.5.6 and 3.12.5		
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;	Sections 3.5.1 and 3.12.3		
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;	Sections 3.3, 3.5.4, 3.5.5, 3.5.6, 3.5.7, 3.5.8, and 3.5.9.		
Appendix B (h) (3) (B) (iii)	Geologic and flood hazards, meteorologic conditions and climatic extremes, and cooling water availability;	Sections 3.4.1, 3.4.2, 3.4.4, 3.5.7, and 3.12.4.2.		
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	Sections 3.12.4 and 3.12.6		
Appendix B (h) (3) (B) (v)	For technologies not previously installed and operated in California, the expected power plant maturation period.	N/A		

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 (i) (1) (A)	Tables which identify laws, regulations, ordinances, standards, adopted local, regional, state, and federal land use plans, leases, and permits applicable to the proposed project, and a discussion of the applicability of, and conformance with each. The table or matrix shall explicitly reference pages in the application wherein conformance, with each law or standard during both construction and operation of the facility is discussed; and	Section 3.13		
Appendix B (i) (1) (B)	Tables which identify each agency with jurisdiction to issue applicable permits, leases, and approvals or to enforce identified laws, regulations, standards, and adopted local, regional, state and federal land use plans, and agencies which would have permit approval or enforcement authority, but for the exclusive authority of the commission to certify sites and related facilities.	Section 3.13, and Appendix A through F		
Appendix B (i) (2)	The name, title, phone number, address (required), and email address (if known), of an official who was contacted within each agency, and also provide the name of the official who will serve as a contact person for Commission staff.	Section 3.13, and Appendix A through F		
Appendix B (i) (3)	A schedule indicating when permits outside the authority of the commission will be obtained and the steps the applicant has taken or plans to take to obtain such permits.	Section 3.13, and Appendix A through F		

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.	Sections 1.0, 2.0, and 3.7.4		
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.	Sections 3.3, 3.5.5, and 3.7 Figures 3.1-1, 3.1.3B, 3.3-1, 3.3-3, 3.3-4, and 3.7-1A through 3.7-1D		
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.	Section 3.7.4		
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.	Section 3.7.4		

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	Section 3.7.4.6 Table 3.7-1		
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.	Sections 3.7.4.6 and 3.7.5 Table 3.7-3		
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.	Table 3.7-3		
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.	Sections 3.7.4.6 and 3.7.5		

Adequacy Issue: Adequate ____ Inadequate ____

DATA ADEQUACY WORKSHEET

Revision No. 0 Date ____

Technical Area: **Transmission System 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) (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.	Section 2.0, Section 3.2		
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.	Section 3.3, Section 3.5.5, and Section 3.7		
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	Section 3.5.5 and Section 3.7 Figures 3.1-3B, 3.5-3, and 3.7-1A through 3.7-1D		

Adequacy Issue: Adequate ____ Inadequate ____

DATA ADEQUACY WORKSHEET

Revision No. 0 Date ____

Technical Area: **Transmission System 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 (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.	Section 3.5.5 and Section 3.7		
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.	Section 3.7 and Appendix H		
Appendix B (i) (1) (A)	Tables which identify laws, regulations, ordinances, standards, adopted local, regional, state, and federal land use plans, leases, and permits applicable to the proposed project, and a discussion of the applicability of, and conformance with each. The table or matrix shall explicitly reference pages in the application wherein conformance, with each law or standard during both construction and operation of the facility is discussed; and	Section 3.7.5 and Table3.7-1		

Adequacy Issue: Adequate ____ Inadequate ____

DATA ADEQUACY WORKSHEET

Revision No. 0 Date ____

Technical Area: **Transmission System 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 (i) (1) (B)	Tables which identify each agency with jurisdiction to issue applicable permits, leases, and approvals or to enforce identified laws, regulations, standards, and adopted local, regional, state and federal land use plans, and agencies which would have permit approval or enforcement authority, but for the exclusive authority of the commission to certify sites and related facilities.	Section 3.7.5 and Table3.7-1, and Section 3.7.6 and Table 3.7-2		
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.	Table 3.7-2		
Appendix B (i) (3)	A schedule indicating when permits outside the authority of the commission will be obtained and the steps the applicant has taken or plans to take to obtain such permits.	Section 3.7.3.2		