3.1 INTRODUCTION

The Canyon Power Plant (CPP) will consist of a nominal 200-megawatt (MW) simple-cycle plant, using four natural gas-fired General Electric LM 6000PC Sprint combustion turbines and associated infrastructure. The project site is located at 3071 East Miraloma Avenue, in a City of Anaheim (COA)-designated industrial zone. The project site and linears are shown on Figure 3-1.

The CPP and associated construction laydown areas will be located on approximately 10 acres of disturbed land located at 3071 East Miraloma Avenue. Main access to the CPP site will be at the southeast corner of the project site from East Miraloma Avenue. A second gated entrance will be accessible via East Miraloma Avenue with a third gate off the alley to the east of the site. (Total land disturbance will be approximately 10 acres.)

The existing CPP site is predominantly paved (concrete and asphalt). Principal land use for the site was food catering for a fleet of approximately 75 to 100 trucks, formerly operated by Orange County Food Service. Onsite structures include a kitchen/warehouse building, maintenance garage (9 service bays), truck wash facility (5 bays), two ice manufacturing buildings, several storage sheds, and an outdoor truck repair shop which includes storage lockers and petroleum products, all of which will be demolished as a part of the CPP project.

The following activities are not part of the CPP project:

- Three residential houses along East Miraloma Avenue have recently been removed and are not a part of this Application for Certification (AFC). The COA Risk Manager and Fire Department determined that the residential units posed security and fire risks, and therefore they were removed. A letter from the COA Risk Manager to the Public Utilities Department is included in Appendix Q.
- Soil remediation activities associated with Phase I, Phase II, and Supplemental Phase II reports. The COA, now as owner of the property, has determined that it will conduct any soil remediation activities to limit its environmental liability for future uses of the site. These activities will occur regardless of whether the CPP project obtains a CEC license.
- Installation of a temporary, 8-foot-high security fence around the perimeter of the entire 10-acre site.
- General maintenance activities including site cleanup and trash removal.

The project will include the construction and/or installation of the following components:

- **Proposed CPP site.** In addition to the four natural gas-fired GE LM 6000PC Sprint gas turbines, the plant will include generator step-up transformers (GSUs), a 69 kilovolt (kV) switchyard, onsite fuel gas compressors, a gas pressure control and metering station, a

packaged chilled water system for combustion turbine engine (CTG) power augmentation with associated heating ventilation and air conditioning (HVAC)-type four-cell cooling tower, selective catalytic reduction system (SCR) emission control systems, and other associated plant infrastructure.

- **Gas pipeline.** Natural gas will be provided via a new 3,240-foot-long, 12-inch, 350 pounds per square inch gauge (psig) gas line owned and maintained by SoCal Gas Company (SCGC), which will be connected to new onsite fuel gas compressors that will be part of the CPP facility. From the CPP site, this new pipeline will run approximately 580 feet east in East Miraloma Avenue to Kraemer Boulevard, then north 2,660 feet in Kraemer Boulevard to East Orangethorpe Avenue to connect into SCGC's transmission line L-1218 in East Orangethorpe Avenue. (Total land disturbance will be 0.219 acre.)
- **Process water.** Process water for the project will be recycled water supplied from the Orange County groundwater replenishment system (GWRS) via a new 2,185-foot-long, 14-inch pipeline utilizing a new offsite booster pump station. The water pipeline will run east of the site on the north side of East Miraloma Avenue for 1,850 feet to the new pumping station located north of the curb in the COA-owned easement of East Miraloma Avenue, then north 210 feet in new easement from the Orange County Water District (OCWD), then 125 feet easterly in new easement to the GWRS line on the western side of the Carbon Canyon Diversion Channel. There, it will connect to the 60-inch-diameter GWRS recycled water line at an existing 36-inch stub up. (Total land disturbance for both line and pumping station will be 0.246 acre.)
- **Electrical interconnection.** Underground 69 kV cables will connect from GSUs to the onsite switchyard, which will use gas-insulated switchgear (GIS). There will be four new underground 69 kV circuits leaving the site. Two will proceed underneath and to the south side of East Miraloma Avenue approximately 100 feet to rise up and connect to the existing 69 kV overhead Vermont-Yorba lines via two new transition structures. The second two 69 kV underground circuits will proceed eastward approximately 4,000 feet in East Miraloma Avenue, turn south on Miller, then proceed approximately 3,000 feet to connect to the Dowling-Yorba 69 kV line at East La Palma Avenue. (Total land disturbance for both sets of cables will be 0.489 acre.)
- **Communications.** Fiber optic cable will run in a common trench with the approximately 7,000-foot 69 kV electric cables, where it will tie into existing underground fiber optic cable for the supervisory control and data acquisition (SCADA) system.

Plant process wastewater such as blowdown from the chilled water system cooling tower, reject water from the demineralization system, and domestic sanitary wastewater, will be combined to discharge into the Orange County Sanitation District (OCSD) sewer system connection located on East Miraloma Avenue.

Stormwater will be collected onsite and treated in a solids separation and oil separation vault prior to flowing into a percolation chamber where the collected water will percolate onsite into the groundwater aquifer. During large storms that would exceed the 25-year storm event, the percolation basin will be directed via a pipe to the COA stormwater drainage system.

The plant's design will incorporate air pollution emission controls designed to meet the stringent standards required by the State and the South Coast Air Quality Management District (SCAQMD). These controls will include water injection for the combustion turbines, a SCR to control oxides of nitrogen (NO_X) emissions, and an oxidation catalyst system to control carbon monoxide (CO) and volatile organic compound (VOC) emissions.

Primary site access will be at the southeast corner of the project site from East Miraloma Avenue. A second gated entrance will be accessible via East Miraloma Avenue with a third gate off the alley to the east of the site.

The CPP parcel is approximately 10 acres. The COA owns the property. Additional information on ownership and location is presented in Sections 1.0 and 2.0.

The following sections describe the design and operation of the project and the associated electric transmission lines, natural gas supply line, and water lines. Site selection and the alternative sites considered are presented in Section 5.0, Alternatives.

3.2 FACILITY LOCATION

The CPP is located within the COA in northern Orange County. North of the project area, the COA is bordered by the City of Placentia. To the south, the COA is bordered by the Santa Ana River corridor, the City of Orange, and a small unincorporated area within Orange County. The Santa Ana River corridor runs east-west approximately one mile south of the project area. The COA in the study area is served by several major freeways. Highway 57 running north-south through the COA is located approximately a mile to the west of the project area. Highway 91 running east-west through the COA is located approximately one mile south of the project area. Directly east of the project area are several groundwater recharge facilities operated and maintained by the Orange County Water District (OCWD). Kraemer Basin, a groundwater recharge facility, is located directly east of the project area.

The CPP and associated construction laydown areas will be located on approximately 10 acres of disturbed land located at 3071 East Miraloma Avenue. Main access to the CPP site will be at the southeast corner of the project site from East Miraloma Avenue. A second gated entrance will be accessible via East Miraloma Avenue with a third gate off the alley to the east of the site. (Total land disturbance will be approximately 10 acres.)

3.3 SITE DESCRIPTION

The existing CPP site is predominantly paved (concrete and asphalt). Principal land use for the site was food catering for a fleet of approximately 75 to 100 trucks, formerly operated by Orange County Food Service. Onsite structures include a kitchen/warehouse building, maintenance garage (9 service bays), truck wash facility (5 bays), two ice manufacturing buildings, several storage sheds, and an outdoor truck repair shop which includes storage lockers and petroleum products, all of which will be demolished as a part of the CPP project.

3.3.1 Topography

The site topography is shown on Figure 3-9. The site elevation is approximately 218 feet above mean sea level and has a very slight slope in a southerly direction. The site is currently developed.

3.3.2 Geologic Setting and Seismology

The CPP site is located within the Los Angeles Basin of southern California at the northern terminus of the Peninsular Ranges geomorphic province. The Los Angeles Basin is bounded by the Santa Monica Mountains on the north, Puente Hills and Whittier Fault to the east, Santa Ana Mountains and San Joaquin Hills on the south, and Palos Verde Peninsula and coastline to the west. The tectonic shift from extension during the Miocene epoch to crustal compression to present time has uplifted the peripheral edges of the Los Angeles Basin, exposing stratigraphy in the flanks of surrounding hills and mountains (Norris and Webb, 1990).

3.3.2.1 Subsurface Conditions

A complete and comprehensive geotechnical investigation study was performed for the site and is contained in Appendix F. Fill soils in the range of approximately 1 to 2 feet thick were encountered in the soil borings. The fill soils consist of silty sand. The native soils consist of medium dense to very dense silty sand and poorly graded sand with some isolated layers of sandy silt. Buried steel conduits running along the length of the parking lot were observed. Water was not encountered within the 50-foot depth explored.

3.3.2.2 Seismic Conditions

The project site is located in the seismically active area of southern California where potential for moderate to strong seismic shaking may be generated by active faults. Faults are described as active, potentially active, or inactive. Active faults give evidence of surface displacement within Holocene time (the last 11,000 years) and have the highest potential of generating earthquakes again. In accordance with the Alquist-Priolo Earthquake Fault Zoning Act, special study zones, known as Alquist-Priolo Zones, have been established along faults

in California that are known to be active. Active faults are listed on Table 6.3-1. Potentially active faults are listed on Table 6.3-2.

Historic earthquakes that have caused substantial ground shaking in the COA include the 1857 Fort Tejon earthquake (magnitude 7.9) on the San Andreas fault, 1933 Long Beach earthquake (magnitude 6.3) along the Newport-Inglewood Fault Zone, 1987 Whittier Narrows earthquake (magnitude 5.9) on the Elysian thrust fault, 1992 Yucca Valley earthquake (magnitude 7.4), and 1994 Northridge earthquake (magnitude 6.6) which resulted in damage to the Angel Stadium of Anaheim.

3.3.2.3 Liquefaction Potential

Liquefaction potential for a site is greatest when the groundwater level is shallow, and where submerged loose, fine sands occur within a depth of approximately 50 feet or less. Liquefaction potential decreases as grain size and clay and gravel content increase. As ground acceleration and shaking duration increase during an earthquake, liquefaction potential increases.

The CPP site is within a State of California designated Liquefaction Hazard Zone.

To evaluate the liquefaction potential of the project site during the Design Basis Earthquake (DBE), the magnitude 7.5-adjusted peak ground acceleration (PGA) corresponding to the DBE, which is defined as an event with a 10 percent probability in 50 years, was computed. The magnitude 7.5-adjusted PGA of the DBE, hereinafter referred to as the liquefaction PGA, was computed probabilistically using EZFRISK, Version 7.22. The liquefaction PGA for the CPP site was calculated as 0.27g.

The liquefaction potential of the soils underlying the site during the DBE was evaluated using the liquefaction PGA, the results of the soil borings, cone penetration tests (CPTs), and the historic-high ground-water level of approximately 20 feet below the existing grade. The estimated liquefaction-induced settlement is on the order of 0.5 inch due to the DBE. However, the soils at the CPP site are relatively uniformly horizontally layered. Therefore, differential liquefaction-induced settlement would be expected to be less than 0.25 inch due to the DBE, which is considered to be insignificant.

3.3.3 Hydrological Setting

The hydrogeology of the Coastal Plain of Orange County Groundwater Basin (Orange County Basin) is summarized in California Groundwater Bulletin 118-2003 (California Department of Water Resources [DWR], 2003). The Orange County Basin underlies a coastal alluvial plain in the northwestern portion of Orange County. The basin is bounded by consolidated rocks exposed on the north in the Puente and Chino Hills, on the east in the Santa Ana Mountains, and on the south in the San Joaquin Hills. The basin is bounded by the

Pacific Ocean on the southwest and by a low topographic divide approximated by the Orange County-Los Angeles County line on the northwest. The basin underlies the lower Santa Ana River watershed.

3.3.3.1 Surface Water

The area surrounding the CPP site flows to Reach 2 of the Santa Ana River located approximately 1.5 miles south of the project site. The Santa Ana River has been improved to provide flood control and groundwater recharge. The Santa Ana River flow in Reach 2 contains natural flow, reclaimed water, and imported water (Orange County Water District [OCWD] 1999a, b). The beneficial uses of Reach 2 as designated in the Santa Ana River Basin Plan are Agricultural Supply, Groundwater Recharge, Water Contact Recreation, Non-contact Water Recreation, Warm Freshwater Habitat, and Wildlife Habitat, including Rare, Threatened, or Endangered Species. Notably, Reach 2 is exempted from the Municipal Supply beneficial use. Runoff from the CPP site will be directed to a treatment device and underground facility basin to be constructed on the southwest corner of the facility. Runoff from the CPP will only be experienced as a result of extreme precipitation events. The Carbon Canyon Diversion Channel, located approximately 2,500 feet east of the CPP site, provides flood control.

3.3.3.2 Groundwater

The project site is located within the lower Santa Ana River watershed and Orange County Water Basin (OCWB). The OCWB is divided into three sub-basins: the Yorba Linda sub-basin to the north (adjacent to the Chino Hills), the Main Basin (incorporating the COA), and the Irvine sub-basin to the south. The OCWB is managed by the OCWD, which manages water recharge systems and groundwater quality in the Orange County region (OCWD, 2004). Numerous abandoned gravel quarry pits along the Santa Ana River, including those adjacent to the CPP site, are part of the OCWD recharge facilities.

The COA receives a portion of its water from a multitude of production wells (several of which border Anaheim Lake, about 0.75 miles east northeast of CPP) and a portion from the Metropolitan Water District of Southern California (MWD). The MWD supplements the COA with water from the Colorado River and northern California.

Water that flows down the Santa Ana River, together with supplies imported from the Colorado River and State Water Project, is channeled into nine recharge basins. These lakes and ponds, with depths ranging from 50 to 150 feet, were formed by sand and gravel mining operations. The soil along this stretch of the Santa Ana River is coarse-grained and sandy. Levees have been constructed along portions of the Santa Ana River to retard the river's flow, increasing groundwater recharge efficiency through the base of the channel (OCWD, 2004).

3.4 FACILITY DESCRIPTION

3.4.1 Overview

The project will consist of four General Electric LM 6000PC Sprint Combustion Turbine Generators (CTGs) equipped with water injection to control NO_X emissions, and power augmentation. SCR and associated support equipment will be used for further NO_X control. An oxidation catalyst will also be provided for CO control. Table 3.4-1 describes the major equipment to be utilized. Additional information on plant systems is shown on plant flow diagram (Figure 3-2).

TABLE 3.4-1
MAJOR EQUIPMENT INFORMATION

Description	Capacity	Length (ft.)	Width (ft.)	Height (ft.)
Combustion turbine generators (4)	204 MW	57	14	33
SCR & CO catalyst systems (4)		60	20	34
CTG stacks (4)			12 (diameter)	86
Continuous emission monitoring system (4)		10	8	8
Chilled water system with four-cell cooling tower	5,300 tons of refrigeration	50	40	43
Fuel gas compressors (5)	48 Mmscfd	31	12	8
Fuel gas conditioning skid	48 Mmscfd	22	10	10
Generator step-up transformers (4)		21	14	16
Station service transformers (2)		7	7	6
Auxiliary transformers (2)		11	7	7
Air compressor skid		20	11	13
Aqueous ammonia storage tank	10,000 gal	42	7	10
Black start diesel generator	750 kW	19	7	9
Raw water storage tank	350,000 gal	38 dia		40
DI water storage tank	180,000 gal	32 dia		32
DI water treatment equipment area	200 gpm	60	50	20
Plant operation building (control room/admin/shop/warehouse areas)		108	68	36
Electrical equipment enclosures (2)		70 30	30 16	16 16
Raw water transfer pumps (2) (Located offsite)	500 gpm	26	15	10 (depth)

Mmscfd = million standard cubic feet per day
Gal = gallon
Gpm = gallons per minute

Each CTG will generate up to a nominal 51 MW with the use of chilled water and Sprint power augmentation. The project is expected to have an overall annual availability approaching 98 percent. The heat and water balances for the facility are shown on Figures 3-3, 3-4, 3-5, and 3-6).

Plant auxiliary equipment will include a packaged chilled water system with associated heating ventilation and air conditioning (HVAC)-type, four-chambered cooling tower for CTG power augmentation as well as SCR emission control systems necessary to meet the proposed emission limits. NO_X emissions will be controlled to 2.3 parts per million by volume, dry (ppmvd) basis corrected to 15 percent oxygen by a combination of water injection in the CTGs and SCR systems in the exhaust stack transition. CO will be controlled to 6 ppmvd at 15 percent oxygen in the CTG combustors with an oxidation catalyst system. Volatile organic compound (VOC) emissions will be controlled to 2 ppmvd at 15 percent oxygen.

3.4.2 Site Access

The CPP site is bound by East Miraloma Avenue on the south and by adjacent properties on the north, east, and west sides of the site. The proposed site access will be off of East Miraloma Avenue. The plant will utilize a main access gate and an auxiliary access gate off East Miraloma Avenue. The main gate will be used for routine plant access as well as for fire access. The auxiliary gate will normally be locked closed, however, can be used for secondary fire access and also for non-routine plant maintenance access when needed. An additional maintenance gate will be provided on the east side of the site.

3.4.3 Site Layout

The site layout is depicted on Figure 3-7 and site elevation views are depicted on Figure 3-8. The plot plan (Figure 3-7) shows the proposed location of the plant's major equipment including associated infrastructure, 69 kV switchyard, fuel gas meter station area, operations building, and proposed construction laydown area.

The facility is situated on approximately 10 acres of land. A network of roads surrounds the plant equipment for use in proposed plant operations and maintenance as well as for fire department access.

The plant facilities have been arranged for optimum use of property and cost as well as to ensure ease of operation and maintenance. Investigations and evaluations have been conducted to define the specific facility equipment requirements and the suitability of the proposed project site to accommodate these facilities.

Grading and drainage for the project is depicted on Figure 3-9.

3.4.4 Power Plant Cycle

The CPP project will utilize high efficiency aero-derivative CTGs to produce electrical energy. CTG combustion air will flow through the inlet air filters and chilled water coils (and associated air inlet ductwork), be compressed, and then flow to the CTG combustion sections. Natural gas fuel will be injected into the compressed air in the combustion sections and ignited. The hot pressurized combustion gases will then expand through the power turbine section of the CTG, causing the turbines to rotate and drive the electric generator and CTG compressor. The hot combustion exhaust gases will exit the turbine sections, enter a transition area that will house the SCR and oxidation catalyst systems, and then exit to the atmosphere through the exhaust stacks.

3.4.4.1 Combustion Turbine Generator

Thermal energy will be produced in the four CTGs through the combustion of natural gas, which will be converted into the mechanical energy required to drive the CTG compressors and electric generators. Four aero-derivative CTGs have been selected for the project. General Electric will supply these CTGs. The aero-derivative technology is the most efficient simple-cycle CTG on the market and has a documented annual availability record of 97.8 percent.

Each CTG 'system' will consist of a CTG with supporting systems and associated mechanical and electrical auxiliary equipment. The CTGs will utilize water injection for controlling NO_X emissions and for power augmentation. CTG exhaust emissions will be further reduced through the use of SCR and oxidation catalyst systems.

The CTGs will be equipped with the following auxiliary equipment to provide safe and reliable operation:

- Inlet air chilling power augmentation system
- Inlet air filters
- Acoustical enclosure
- Lube oil system
- Hydraulic control and starting system
- Water injection system
- Sprint power augmentation system
- Turbine enclosure vent fans
- Generator enclosure vent fans

- Fire detection and protection system
- Programmable logic controller (PLC)-based turbine and generator control system

Inlet combustion air will be cooled via a chilled water system to increase turbine performance during high ambient temperature conditions. The CTG also will have water injection spray evaporative inter-cooling between the low-pressure and high-pressure compressor sections as well as to the inlet of the low-pressure compressor to increase CTG performance. Water injection into the CTG combustor will be used to suppress flame temperature and thereby control NO_X emissions at the outlet of the CTG.

The exhaust stack transition will be equipped with a post-combustion control system that will use ammonia vapor in the presence of a catalyst, commonly referred to as the SCR system, to further reduce the NO_X concentration in the exhaust gases. The catalyst modules will be located between the CTG exhaust gas transition section and the exhaust stack base. Diluted ammonia vapor (NH_3) will be injected into the exhaust gas stream through a grid of nozzles located upstream of the catalyst module. The subsequent chemical reaction will reduce NO_X to nitrogen and water, resulting in a NO_X concentration of no more than 2.3 ppmvd at 15 percent oxygen in the exhaust gas. The exhaust stack transition will also include an oxidation catalyst system, which will control CO emissions to 6 ppmvd. VOC emissions will be controlled to less than 2 ppmvd. The oxidation catalyst system will be located in the ductwork between the CTG and the SCR system.

3.4.4.2 Performance Data

Each of the four LM6000 CTGs at full load with inlet chilling and Sprint power augmentation systems in operation will produce approximately 50,900 kW at the generator terminals with a corresponding heat rate of approximately 8,511 British thermal units per kilowatt hour (BTU/kWh) lower heating value (LHV) (approximately 9,430 BTU/kWh higher heating value [HHV]). The plant overall net power output and net heat rate after accounting for plant parasitic load loads will be approximately 194 MW and 9,907 BTU/kWh (HHV) respectively. The CTG air inlet chilling system will allow the CTGs to operate at the plant maximum design output and maximum fuel efficiency irrespective of ambient temperature, which is an operational advantage for the COA.

3.4.4.3 Emissions Data

The high fuel efficiency of the plant coupled with plant design features will ensure low air emissions from the plant.

Air emissions associated with the operation of the project are presented in Table 3.4-2.

TABLE 3.4-2
AIR EMISSION RATES FOR THE CTGS AND COOLING TOWER

Pollutant	Parts per Million by Volume at 15% O_2	Turbine Pounds per Hour [1]
NO_X	2.3	4.05
SO_2 [2]	0.14	0.34
CO	6.0	6.36
VOC	2.0	1.20
PM_{10}/ $PM_{2.5}$	n/a	3.04

[1] Steady-state emission rate at 100 percent load per turbine at design conditions, 89°F, and 36 percent relative humidity.

[2] Based on annual average natural gas sulfur content of 0.25 grains of H_2S per 100 scf.

O_2 = Oxygen

SO_2 = Sulfur dioxide

PM_{10} = Particulates under 10 microns

$PM_{2.5}$ = Particulates under 2.5 microns

3.4.5 Major Electrical Equipment

The bulk of the electric power generated by the facility will be transmitted to COA's 69 kV transmission system through an onsite SF6 gas-insulated switchyard. A small amount of electric power will be utilized onsite to power auxiliaries such as gas compressors, chillers, pumps, fans, and facility electric loads including lighting and HVAC systems. In addition, battery banks and chargers will be installed to supply the direct current (DC) power for controls and backup power.

Four CTGs will generate power at 13.8 kV. An overall single-line diagram of the facility's electrical system is shown on Figure 3-10. The four 13.8 kV generator outputs will be connected from each generator bus to individual oil-filled GSUs, which will raise the voltage to 69 kV.

Each of the four generators can be synchronized either manually, or at the operator's option automatically synchronized to the transmission system. The automatic synchronizer matches the generator's frequency, phase, and voltage with the transmission system and initiates breaker close action. An independent synchronization check relay verifies synchronization before the breaker is closed.

The switchyard will be configured in a highly reliable scheme, as detailed in Section 3.4.5.2.

3.4.5.1 Step-up Transformers

Each of the four CTGs will be connected to a three-phase GSU, which will be connected to the plant's 69-kV switchyard. The four GSUs will be rated at 39/52/65 at 55 degree rise and 44/58/73 megavolt amps (MVA) at 65 degree rise with a 15 percent impedance at the base 39 MVA rating. The GSUs will be located adjacent to the CTGs with underground duct banks connecting them to the 69 kV gas-insulated switchyard. The GSU windings will be WYE-DELTA connected with 69 kV being on the WYE side.

Surge arresters will be provided at the high-voltage bushings to protect the transformers from surges on the 69-kV system caused by lightning strikes or other system disturbances. The transformers will be set on concrete pads within containment systems designed to contain the transformer oil (non-polychlorinated biphenyl [PCB]) in case of a leak or spill. Rated fire barriers will be used to separate critical equipment and to provide fire protection. The high voltage side of each step-up transformer will be connected to the COA's 69-kV gas-insulated switchyard located on the project site.

3.4.5.2 69 kV Switchyard

The proposed switchyard will consist of concrete foundations, 69 kV cable vault, 69 kV GIS, and control house for relay/communications equipment. The new 69 kV GIS substation will be installed in a double-bus double-breaker scheme configuration. The GIS equipment is to be rated at 69 kV, 2,000 ampere (A), 40 kiloamperes (kA).

The 69 kV switchyard will consist of 18 circuit breakers configured into 9 breaker bays and two main buses. Four breaker bays will be utilized to route power from the four GSUs. Additionally four bays will be utilized to facilitate connections to four transmission lines. One additional bay will be installed as a spare.

There will be four new transmission lines exiting the switchyard that will be looped into the existing 69 kV Vermont-Yorba and Dowling-Yorba lines. The proposed interconnection point with the Vermont-Yorba Line would be on East Miraloma Avenue directly south of the substation. The proposed interconnection point with the Dowling-Yorba Line would be at the intersection of La Palma Avenue and Miller Street. These interconnections will be made via two double-circuit underground 69 kV duct banks with three-phase 69 kV, 2,000 thousand circular mils (kcmil, a measure of wire gauge equal to 1/1000 inch) copper cable conductors and communication circuits used for relay and supervisory control and data acquisition (SCADA) purposes.

The COA will need to replace 27 69 kV breakers at remote stations due to increased fault current levels as a result of the CTG: at Sharp Substation, Dowling Substation, and Lewis Substation. The work will include replacement of the breakers with new 69 kV, 2000A,

40 kA breakers, foundations, disconnect switches, control cables, and relays as needed. All of this work will take place within the fence-lines of existing substations.

3.4.5.3 AC Power Distribution

Auxiliary power to the CTG power block will be supplied at 4,160 volts alternating current (AC) by a double-ended 4,160-volt (4.16 kV) switchgear lineup. Two non-PCB oil-filled 13.8 to 4.16-kV station service step-down transformers will supply primary power to the switchgear. Each of the auxiliary transformers will be sized to supply the entire plant load, in the event one of the transformers is unavailable, providing the desired redundancy.

The 4,160-volt switchgear lineup will supply power to the CTG inlet chiller compressor motors, the natural gas compressors, and to the load center (LC) transformers, and will be rated at 4,160 to 480 volts for 480-volt power distribution. The remaining services other than the chillers and gas compressors will be fed from the 480-volt bus.

The LC transformers will provide power through the feeder breakers to the 480V motors and motor control centers (MCCs). The MCCs will supply power to smaller 480V motors, power panels, and other intermediate loads. The MCCs will also supply to 480-480/277V isolation transformers to serve 277V single-phase loads.

When the generation facility needs to be restarted from a total shut down, electric power needed to start up the plant will be provided by the COA's backfeed through one of the GSUs.

3.4.5.4 DC Power Supply

The plant will have four DC supplies, each of them dedicated to specific loads. The four systems will be designed to power: CTGs, Distributed Control System (DCS), Balance of Plant, including plant UPS, and the 69 kV GIS.

1. Each CTG is equipped with two 24-volts DC battery/charger systems: 1) for its control system, and 2) a self-contained CO_2 fire protection system. Each LM6000 CTG unit has two redundant static rectifier type battery chargers to provide the charging power to the 24 volt batteries. Either of the 2 chargers, operating alone, can maintain the battery banks fully charged at all time. In addition the batteries have sufficient stored energy to supply loads for a minimum of 3 hours without recharging. The required 480-volt AC power supply will be provided from the associated motor control center (MCC) for each CTG.
2. The plant Distributed Control System (DCS) will have its independent 24V DC power supply providing the dc power for all the control circuits.
3. A common dc power supply system consisting of a 125-volt DC battery bank, two 100 percent redundant 125-volt DC full-capacity battery chargers, metering, ground fault

detectors, and distribution panels will be supplied to feed the balance-of-plant equipment. This 125-volt dc system will also be used to provide control power to the 4,160-volt switchgear, to the 480-volt load centers, and to any other critical control circuits.

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

4. The GIS switchyard will also have a dedicated 125 volt DC system, consisting of battery banks and chargers. The DC system in the GIS switchyard will be configured to back up the common (BOP) DC system discussed earlier.

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

3.4.5.5 Uninterruptible Power Supply System

The CTG power block will also have an essential service 120-volt AC, single-phase, 60-hertz (Hz) power source. This source will supply AC power to essential instrumentation, to critical equipment loads, and to unit protection and safety systems that require uninterruptible AC power. The essential service AC system and DC power supply system will be designed to ensure that critical safety and unit protection control circuits 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 an AC panel board.

The normal source of power to the system will be the DC power supply system through the inverter to the panel board. A solid-state static transfer switch will monitor the inverter output and the alternate AC source continuously. 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.

3.4.5.6 Emergency Power System

In the event of a total loss of auxiliary power, including when the utility transmission system is disconnected or out of service, the emergency power required for the emergency lighting and CTGs critical loads such as turbine lube oil pumps and jacking gear motors will be supplied from the plant battery system.

The plant will be designed to start operation without the benefit of power coming from the COA's 69 kV system. This will be achieved through the use of a 750 kW diesel generator, which will generate sufficient power at 480 volts AC to allow the plant startup and then to deliver power into the COA's 69 kV distribution system. This unit will meet SCAQMD's emissions requirements.

3.4.6 Natural Gas Fuel Supply

The CTGs will be designed to burn pipeline-quality natural gas. The maximum natural gas fuel consumption for the plant during full load operation is approximately 31,670 standard cubic feet per minute.

The natural gas pressure delivered to the plant by the SCGC is expected to be approximately 350 pounds per square inch gauge (psig). A 12-inch-diameter gas pipeline constructed, owned, operated, and maintained by SCGC will supply gas to the site. The new gas pipeline to the site will originate from a new tap located at the intersection of East Orangethorpe Avenue and Kraemer Boulevard and then head south along Kraemer Boulevard, run approximately 2,660 feet to East Miraloma Avenue, and then run 580 feet west along East Miraloma Avenue to the project site. The natural gas line will cross Canyon Creek about 200 feet south of East Orangethorpe Avenue. To get under this creek, jack and bore construction techniques will be employed in this portion of Kraemer Boulevard. The launching pit is approximately 15 feet wide by 50 feet long and the receiving pit is approximately 15 feet wide by 20 feet long. Both pits are approximately 26.5 feet deep to place the casing 5 feet below the culvert base. This crossing is expected to be on east side of Kraemer Boulevard. Open trench construction will be employed for the remainder of the route and will be 3 feet wide by 5 feet deep.

The natural gas pressure will be increased to approximately 700 psig using onsite fuel gas compressors, and then flow through a gas pressure control station and gas scrubber/filtering equipment, before entering the CTGs. The quality of natural gas expected is shown in Table 3.4-3.

TABLE 3.4-3
NATURAL GAS PROPERTIES

Typical Gas Composition	
BTU	1,014
Gravity	0.580
%N_2	0.233
%CO_2	1.433
%Methane	96.700
%C_{6+}	0.020
%Ethane	1.250
%Propane	0.256
%I-Butane	0.046
%N-Butane	0.046
%I-Pentane	0.011
%N-Pentane	0.010
Methane Calc No	102.35
Neo-Pentane	0.00
UnNormalized Total	100.01
Oxygen	0
Analysis Results	
Total Mol. Wgt.	16.78
HHV , Btu / scf	1,012
SG	0.58
LHV , Btu / scf	913.06
LHV , Btu / lb	20,593
HHV , Btu / lb	22,835
Wobbe Index	51.78
Compressibility	1.00
NO_X Scalar	0.98

3.4.7 Water Supply and Treatment

3.4.7.1 Water Balance and Supply Requirements

The CPP will require the use of water primarily for the production of high purity demineralized (DI, also deionized) water for CTG NO_X injection, for chilled water system cooling tower makeup, and for miscellaneous plant domestic services. The expected peak recycled water consumption is approximately 430 gallons per minute (gpm) based on full

load operation on a typical hot day. At this rate, total daily peak water use is approximately 413,000 gallons per day (gpd), based on 16 hours of operation at the sustained peak hourly temperature. Annual maximum recycled water consumption is expected to be approximately 74 acre-feet of GWRS water. The COA has contracted with Orange County Water District (OCWD) for the capacity to deliver up to 200 acre-feet of GWRS water per year. For purposes of this AFC, the environmental evaluation has conservatively been based on 200 acre-feet of recycled water consumption.

High quality DI water is required to operate the CTG water injection system, for CTG water wash, and CTG Sprint systems. Water filtration and demineralization equipment will be used to make DI water for distribution to the turbines as required.

3.4.7.1.1 Water Balance. A summary of the plant water processes and expected water use for the CPP project is shown on the plant water balance diagram (Figure 3-6).

A summary of the plant water usage for both the GWRS water and COA potable water is shown in Table 3.4-4.

3.4.7.1.2 Water Supply Sources. Plant raw water for process needs will come from recycled water via a new underground pumping station to be installed by the COA as part of the CPP project (see Figure 3-11). The GWRS water system consists of recycled water that is directed to existing groundwater recharge ponds near the CPP site. The GWRS water meets State of California Title 22 water quality requirements. The pumping station will include redundant 500 gpm capacity pumps and supply water via a new 14-inch pipeline routed along East Miraloma Avenue to the plant site. This line will be installed utilizing standard open trench construction practices. The trench is expected to be 3 feet wide and 5 feet deep. Electric power supply for the new pumps will be provided locally from a new pole-mounted power transformer from the COA's local power distribution system. The operation of the new pumping station will be controlled from the CPP site in response to plant water needs. The raw water will be stored onsite in a 350,000-gallon storage tank.

Domestic water services and fire water will use COA potable water. COA potable water is currently available along East Miraloma Avenue as a normally available utility. The potable water system will also serve as backup to the GWRS supply in the event the GWRS line is unavailable.

3.4.7.2 Water Quality

The Orange County Water District (OCWD) in cooperation with OCSD has developed a comprehensive water recycling program entitled GWRS. The program treats sanitary waste to develop a high quality water source. The program was developed to serve four larger objectives:

TABLE 3.4-4
PLANT WATER USAGE SUMMARY

	Maximum Daily (gal/day)	Average Daily (gal/day)	Maximum Annual (acre-ft/year)	Average Annual (acre-ft/year)
Process Water Usage				
Chiller system cooling tower makeup	167,074	142,000		
RO/Demineralizer system	246,720	241,920		
Process Water Supply				
GWRS recycled water	414,720	384,000	74	37
Domestic Water Usage				
Potable water usage	9,600	3,480		
Domestic Water Supply				
COA Municipal water	9,600	3,480	3.0	1.5
Total Water Usage	424,320	387,480	77	38.5
Wastewater				
Cooling tower blowdown	16,320	14,400		
RO system rejects	61,440	60,480		
Facilities (sanitary, etc.)	9,600	3,840		
Total	87.360	78,720	15.0	7.5

Notes:
The maximum daily use is based on 16 hours of full load operation 89ºF / 36 percent relative humidity.
The average daily use is 16 hours of the average of the full load use at 82ºF / 47 percent relative humidity.
The average annual use of 37 acre-ft is based on the COA's expected annual operating hours.
The maximum annual use of 74 acre-ft of GWRS water is based on COA'a expected maximum annual operating hours.
Ft = feet
Gal = gallon(s)
RO = reverse osmosis

- Groundwater recharge to better the quality of the existing groundwater basin
- Groundwater recharge to minimize salt water intrusion into the existing groundwater basin
- Provide industrial and commercial process water as a replacement to existing potable water sources
- Reduce the amount of treated wastewater discharged into waters of California

Because the recycled water is being used to recharge the existing groundwater basin as well as serve industrial and commercial users, the water must be treated to a very high quality. The CPP will be the first industrial user of the program but other future users have been identified by OCWD. The industrial use of the recycled water is expected to increase over time as the delivery infrastructure is expanded. CPP will be constructing a pipeline and

pumping station as one of the first industrial delivery pipelines. The GWRS water has been processed using reverse osmosis (RO) processes and is considered to be of good quality. A typical water quality analysis is included as Table 3.4-5.

3.4.7.3 Water Treatment Requirements

Process water will be provided to the CPP via the GWRS. Process water that will be used for the production of DI water will need to be treated onsite. Process water that will be used for the CTG chilled water system cooling tower makeup will not have to be treated. The CPP's process wastewater will be discharged directly into the OCSD sewer system. Approximately 50 percent of the wastewater discharged to the sewer will be conveyed to the OCSD Plant #1 where 100 percent of the water will be treated and used to replenish the GWRS. The remaining 50 percent of the wastewater discharged to the sewer will be conveyed to OCSD Plant #2 where it will be treated and then discharged to the ocean. OCSD Ordinance No. OCSD-31 (2007) specifies discharge limitations for industrial wastewater discharges to the sanitary sewer. The CPP will comply with the OCSD Ordinance by applying for coverage under Class II Wastewater Discharge Permit and by maintaining discharges within the specified discharge limitations. A copy of the draft application for the Class II Wastewater Discharge Permit is included in Appendix R.

3.4.7.4 Water Treatment Systems

Process water for DI needs will be pumped from the raw water storage tank to the first stage system RO system. RO reject water from the first stage RO unit will flow to the plant wastewater system, and the RO permeate water will flow into the second stage RO unit. RO reject water from the second stage RO will be recycled back to the first stage RO inlet for water recovery. RO permeate water from the second stage RO will flow to the mixed bed polishers to produce high quality DI water for the CTGs. The use of the two-stage RO process produces water of very high quality, however, the water still contains trace amounts of minerals. The final mixed bed polishers remove all remaining minerals in the water.

The plant will use leased mixed bed polishers, eliminating the need for onsite bulk storage and use of acid and caustic chemicals for the DI water production process.

Typically when the plant chilled water system is in operation, water will be condensed out of the ambient air as the air passes over the chilled water heat transfer coils located in the air intakes of the CTGs. This condensate is of high quality as it is simply condensed moisture from the ambient air. Recovered condensate from the chiller coils will combine with the water from the second RO and pass through the mixed bed polishers. Water from the mixed bed polishers is pumped to the DI tank for storage and use in the CTGs.

3.4.7.4.1 Makeup Water for CTG Inlet Air Chilled Water System. GWRS water supply can be used directly as makeup for the chilled water system cooling tower. The heat rejection

TABLE 3.4-5
GWRS WATER QUALITY

Constituent	Units	Minimum	Average	Maximum
Biochemical Oxygen Demand, BOD	mg/L	--	--	--
Chemical Oxygen Demand, COD	mg/L	--	--	--
Total Organic Carbon, TOC	mg/L	0.12	0.26	1.24
Total Suspended Solids, TSS	mg/L	--	--	--
Turbidity	NTU	0.02	0.2	0.3
Total coli form bacteria	cfu	0.1	0.42	46
Total plate count	MPN	--	--	--
Total Nitrogen	mg/L	1.1	2.6	4.6
Ammonia Nitrogen, NH_4-N	mg/L	0.29	1.45	2.35
Nitrate Nitrogen, NO_3-N	mg/L	0.07	0.2	2.53
Nitrite Nitrogen, NO_2-N	mg/L	0.13	0.13	0.13
Phosphate, PO_4-P	mg/L	0.01	0.02	0.4
Sulfate, SO_4	mg/L	1.25	1.78	2.55
Chloride, Cl	mg/L	5.35	7.08	9.3
Bicarbonate, HCO_3	mg/L	51.6	53.0	53.9
Fluoride, F	mg/L	0.01	0.02	0.03
Calcium, Ca	mg/L	16.7	16.8	17.0
Magnesium, Mg	mg/L	0.1	0.13	0.18
Sodium, Na	mg/L	6.42	6.78	8.38
Potassium, K	mg/L	0.51	0.58	0.7
Silica, SiO_2	mg/L	0.26	0.68	0.97
Aluminum, Al	µg/L	0.1	9.9	41
Arsenic, As	µg/L	0.2	0.71	4.8
Antimony, Sb	µg/L	0.6	0.6	0.6
Barium, Ba	µg/L	0	0	0
Beryllium, Be	µg/L	0.1	0.1	0.1
Boron, B	µg/L	0.24	0.3	0.39
Cadmium, Cd	µg/L	0.1	0.1	0.1
Chromium, Cr	µg/L	0.1	0.16	1.1
Cobalt, Co	µg/L	0.1	0.22	2.2
Copper, Cu	µg/L	0.1	13.2	28
Cyanide, CN	µg/L	0.5	6.5	46
Iron, Fe	µg/L	0.1	3.3	14
Lead, Pb	µg/L	0.1	0.26	1.6

TABLE 3.4-5 (CONTINUED)
QWRS WATER QUALITY

Constituent	Units	Minimum	Average	Maximum
Manganese, Mn	µg/L	0.1	0.73	9.2
Mercury, Hg	µg/L	0.05	0.05	0.05
Nickel, Ni	µg/L	0.1	0.1	0.1
Selenium, Se	µg/L	0.5	1.36	16
Silver, Ag	µg/L	0.1	0.18	1.6
Thallium	µg/L	0.1	0.1	0.1
Zinc, Zn	µg/L	5	5	5
Total Dissolved Solids, TDS	mg/L	59.98	65.34	74.26
MBAS	mg/L	0	0.01	0.04
Temperature	F	67.1	74.7	80.6
Organic Nitrogen, N	mg/L	0.01	0.18	1
pH	--	8.9	8.9	8.9
CO_2	mg/L	0.11	0.11	0.11
Electric Conductivity, EC	µS/cm	--	--	--
Langelier Saturation Index, LSI	--	0.14	0.15	0.16
Ryznar Index, RI	--	16.2	15.8	15.5
Total Alkalinity, TA	mg/L as $CaCO_3$	42.3	43.5	44.2
Total Hardness, TH	mg/L as $CaCO_3$	42.2	42.6	43.1

Source: OCWD
-- = not available
mg/L = milligrams/liter
NTU = Nephelometric Turbidity Unit
cfu = colony forming units
MPN = Most Probable Number
µg/L = micrograms/liter
F = Fahrenheit
µS/cm = microSiemens per centimeter
pH = potential of hydrogen

equipment for the chilled water system will consist of a four-cell mechanical draft wet cooling tower. The cooling towers that will be used are conventional HVAC galvanized steel towers that will be elevated up over the top of the water chillers for efficient use of plant space. These cooling towers are 17feet eight inches tall and, in the mounted position, the exhaust is 43 feet above grade. The cooling tower will require the use of chemical addition as well as blowdown to maintain the required chemistry in the water for proper equipment operation. It is expected that the cooling tower will be able to operate at approximately 10 cycles of concentration. The cooling towers will use sodium hypochlorite for biological growth control, sulfuric acid for pH control, and a corrosion and scale inhibitor.

3.4.7.5 Wastewater Treatment and Discharge

The wastewater discharge from the CPP will consist primarily of process wastewater as well as a minor amount of domestic sewage. The process wastewater is comprised of RO wastewater and cooling tower blowdown from the chilled water system cooling towers. The plant process wastewater will not need to be treated, because the water quality is acceptable to be sent to the OCSD sanitary sewer system. The process wastewater is basically concentrated GWRS water that has been cycled up as part of the RO reject and cooling tower evaporation processes.

The CPP's process wastewater will be discharged directly into the OCSD sewer system. Approximately 50 percent of the wastewater discharged to the sewer will be conveyed to the OCSD Plant #1 where 100 percent of the water will be treated and used to replenish the GWRS. The remaining 50 percent of the wastewater discharged to the sewer will be conveyed to OCSD Plant #2 where it will be treated and then discharged to the ocean. OCSD Ordinance No. OCSD-31 (2007) specifies discharge limitations for industrial wastewater discharges to the sanitary sewer. The CPP will comply with the OCSD Ordinance by applying for coverage under Class II Wastewater Discharge Permit and by maintaining discharges within the specified discharge limitations. A copy of the draft application for the Class II Wastewater Discharge Permit is included in Appendix R.

The expected wastewater analysis of the plant process wastewater stream is shown in Table 3.4-6.

3.4.7.5.1 Plant Drains. The CPP project will produce various wastewater streams during the course of normal plant operation. The various wastewater streams are anticipated to be as follows:

- Chilled water system cooling tower blowdown
- Water treatment plant RO reject water
- Stormwater from plant equipment containment areas
- CTG water wash waste
- Oily wastes from equipment drains

Chilled water system cooling tower blowdown and RO reject wastewater streams will be collected and drained by gravity to the plant common wastewater lift station. The lift station will contain redundant submersible pumps that will transfer the wastewater using a 3-inch diameter forced main to the existing OCSD sewer system.

TABLE 3.4-6
EXPECTED PLANT WASTEWATER QUALITY

		RO Reject		HVAC Cooling Tower Blowdown		Plant Waste Discharge	
Constituent	Units	Avg.	Max.	Avg.	Max	Avg.	Maxx
Turbidity	NTU	0.8	1.2	2.00	3	1.03	1.58
Total coliform bacteria	cfu	1.68	184			2.15	242.34
Total Nitrogen	mg/L	10.4	18.4	26.00	46	13.33	24.23
Ammonia Nitrogen, NH_4-N	mg/L	5.8	9.4	14.50	23.5	7.44	12.38
Nitrate Nitrogen, NO_3-N	mg/L	0.8	10.12	2.00	25.3	1.03	13.33
Nitrite Nitrogen, NO_2-N	mg/L	0.52	0.52	1.30	1.3	0.67	0.68
Phosphate, PO_4-P	mg/L	0.08	1.6	0.20	4	0.10	2.11
Sulfate, SO_4	mg/L	7.12	10.2	17.80	25.5	9.13	13.43
Chloride, Cl	mg/L	28.32	37.2	70.80	93	36.31	49.00
Bicarbonate, HCO_3	mg/L	212.16	215.72	530.40	539.3	272.00	284.12
Fluoride, F	mg/L	0.08	0.12	0.20	0.3	0.10	0.16
Calcium, Ca	mg/L	67.24	67.8	168.10	169.5	86.21	89.30
Magnesium, Mg	mg/L	0.52	0.72	1.30	1.8	0.67	0.95
Sodium, Na	mg/L	27.12	33.52	67.80	83.8	34.77	44.15
Potassium, K	mg/L	2.32	2.8	5.80	7	2.97	3.69
Silica, SiO_2	mg/L	2.72	3.88	6.80	9.7	3.49	5.11
Aluminum, Al	µg/L	39.6	164	99.00	410	50.77	216.00
Arsenic, As	µg/L	2.84	19.2	7.10	48	3.64	25.29
Antimony, Sb	µg/L	2.4	2.4	6.00	6	3.08	3.16
Barium, Ba	µg/L	0	0	0.00	0	0.00	0
Beryllium, Be	µg/L	0.4	0.4	1.00	1	0.51	0.53
Boron, B	mg/L	1.2	1.56	3.00	3.9	1.54	2.05
Cadmium, Cd	µg/L	0.4	0.4	1.00	1	0.51	0.53
Chromium, Cr	µg/L	0.64	4.4	1.60	11	0.82	5.80
Cobalt, Co	µg/L	0.88	8.8	2.20	22	1.13	11.59
Copper, Cu	µg/L	52.8	112	132.00	280	67.69	147.51
Cyanide, CN	µg/L	26	184	65.00	460	33.33	242.34
Iron, Fe	µg/L	13.2	56	33.00	140	16.92	73.76
Lead, Pb	µg/L	1.04	6.4	2.60	16	1.33	8.43
Manganese, Mn	µg/L	2.92	36.8	7.30	92	3.74	48.47
Mercury, Hg	µg/L	0.2	0.2	0.50	0.5	0.26	0.26
Nickel, Ni	µg/L	0.4	0.4	1.00	1	0.51	0.53

TABLE 3.4-6 (CONTINUED)
EXPECTED PLANT WASTEWATER QUALITY

		RO Reject		HVAC Cooling Tower Blowdown		Plant Waste Discharge	
Constituent	Units	Avg.	Max.	Avg.	Max	Avg.	Maxx
Selenium, Se	µg/L	5.44	64	13.60	160	6.97	84.29
Silver, Ag	µg/L	0.72	6.4	1.80	16	0.92	8.43
Thallium	µg/L	0.4	0.4	1.00	1	0.51	0.53
Zinc, Zn	µg/L	20	20	50.00	50	25.64	26.34
Total Dissolved Solids, TDS	mg/L	261.36	297.04	653.40	742.6	335.08	391.22
Organic Nitrogen, N	mg/L					0.92	5.27
pH	--			7.5 - 8.0	7.5 - 8.0	8.5 - 9.0	8.5 - 9.0
Carbon Dioxide, CO_2	mg/L	0.44	0.44	1.5	1.6	0.56	0.58
Total Alkalinity, TA as $CaCO_3$	mg/L	173.90	176.82			222.95	232.88
Total Hardness, TH as $CaCO_3$	mg/L	170.24	172.46			218.25	227.14
Cycles of concentration		4.0	4.0	10	10.0	5.1	5.3

-- = Not available
mg/L = milligrams/liter
NTU = Nephelometric Turbidity Unit
cfu = colony forming units
MPN = Most Probable Number
µg/L = micrograms/liter
F = Fahrenheit
µS/cm = microSiemens per centimeter

Plant equipment that contains oil by design such as power transformers, lube oil storage tanks, and fuel gas filter separators will be located within concrete spill-containment berms. The berms are used to contain an oil spill and also function to prevent the spread of a fire. These types of outdoor containments will collect a small amount of stormwater and plant wash-down water. Drains from this type of equipment will gravity flow to a plant process wastewater oil-water separator. This oil-water separator will be a highly efficient corrugated plant interceptor (CPI) separator designed to remove oil residues down to 10 parts per million (ppm). After passing through the oil-water separator, the wastewater will then flow to the plant wastewater lift station for eventual transfer to the sanitary sewer system.

CTG water wash waste can contain solvents or biodegradable detergents. This wastewater stream can be considered hazardous when it contains solvent-based cleaning solutions and will not be sent to the sanitary sewer system. Underground 2,000-gallon-capacity water wash tanks will be provided to collect and store CTG solvent-based wastewater. The 2,000-gallon-capacity tanks can accommodate up to approximately 10 water wash operations on each CTG. The underground tanks will be of fiberglass construction for long-term corrosion

protection and will be provided with secondary containment with leakage alarms. When the cleaning solution is a biodegradable detergent the CTG water wash waste will be sent directly to the sanitary sewer.

3.4.7.5.2 Domestic/Sanitary Wastewater. A relatively small staff will operate and maintain the plant. Therefore, a relatively small amount of domestic sewage will be generated. Domestic wastewater will flow by gravity to the plant main wastewater lift station for eventual transfer to the sanitary sewer system.

3.4.7.5.3 Stormwater Drainage. The soils underlying the CPP site are suitable to accept percolated stormwater. Stormwater will be conveyed overland via sheet flow and collected using a network of catch basins. Stormwater from the site that has the potential to come into contact with plant equipment will flow through an underground piping system to an underground-vault multi-chamber treatment device that removes sedimentation, coarse materials, and oil from the water before being directed to an underground percolation vault. Stormwater that does not have the potential to come into contact with plant equipment and is therefore not required to be treated will flow directly into the underground vault to allow for percolation back into the soil.

The percolation vault will include an overflow outlet and pipe to allow for stormwater in excess of the 25-year storm event to flow to the existing municipal storm drain system in East Miraloma Avenue. See Figure 3-9 for a diagram of this drainage system.

3.4.8 Waste Management

3.4.8.1 Solid Waste

The project will produce minimal maintenance and plant wastes typical of natural gas-fired power generation operations. An outside contractor will remove all generated wastes to the contractor's establishment for ultimate disposal. Generation plant wastes include: oily rags, broken and rusted metal and machine parts, defective or broken electrical materials, empty containers, and other miscellaneous solid wastes, including the typical refuse generated by workers.

3.4.8.1.1 Construction Waste. Construction of the CPP will involve demolition of the existing buildings and some of the associated pavement. These materials will be characterized and disposed of appropriately. Construction of the CPP will generate wastes typical for the construction of simple-cycle, natural gas-fired combustion turbine power generation plants. Typical 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, and other solid wastes, including the typical refuse generated by workers.

Solid waste will be segregated, where practical, for recycling. Non-recyclable 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.

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.

Hazardous wastes generated during construction and operation will be handled and disposed of in accordance with applicable laws, ordinances, regulations, and standards (LORS). Hazardous wastes will be either recycled or disposed of in a licensed Class I disposal facility, as appropriate.

Startup will generate wastes typical of normal operation plus initial cleaning wastes such as rags, consumable materials, and failed components. See Table 3.4-7 for a list of solid waste expected to be generated during construction.

3.4.8.1.2 Operations Waste. Operation of the facility will generate wastes resulting from processes, routine facility maintenance, and office activities. Non-hazardous waste during operation of the facility will be recycled to the greatest extent practical, and the remainder removed on a regular basis by a certified waste-handling contractor.

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

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

Hazardous waste will be accumulated at the generating facility according to California Code of Regulations (CCR) Title 22 requirements for satellite accumulation. Hazardous waste will be collected by a licensed hazardous waste hauler, using 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 Department of Toxic

TABLE 3.4-7
SOLID WASTE GENERATED DURING CONSTRUCTION

Waste Stream	Waste Classification	Amount	Treatment
Paper, wood, glass, and plastics from packing material, waste lumber, insulation, and empty non-hazardous chemical containers	Non-hazardous	50 tons	Onsite dumpsters; Waste disposal facility (Class III landfill)
Excess concrete	Non-hazardous	34 tons	Recycle or Waste disposal facility (Class III landfill)
Metal, including steel from welding/cutting operations, packing materials, empty non-hazardous chemical containers, aluminum waste from packing material, and electrical wiring	Non-hazardous	13 tons	Recycle or Waste disposal facility (Class III landfill)
Existing concrete structures, asphalt pavement, demolition of existing structures	Non-hazardous	3,000 tons	Recycle or Waste disposal facility (Class III landfill)
Oily Rags	Hazardous	2 to 3 55-gal drums	Recycled or disposed by certified oil recycler
Empty hazardous material containers-drums	Hazardous, Recyclable	2 cu. yard/week	Recondition, recycle, or Waste disposal facility (Class I)

Substances Control (DTSC). Copies of manifests, reports, waste analyses, and other documents will be kept onsite and will remain accessible for inspection for at least 3 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. See Table 3.4-8 for a list of solid waste expected to be generated during operation.

3.4.8.2 Liquid Wastes – Non-hazardous

Non-hazardous liquid wastes that are non-recoverable, such as RO reject water and chilled water system cooling tower blowdown, will be delivered to the OCSD sewer system. Sanitary wastes will also be sent to the OCSD sewer system.

3.4.9 Management and Disposal of Hazardous Material and Hazardous Waste

There will be a variety of chemicals stored and used during construction and operation of the CPP. The storage, handling, and use of all chemicals will be conducted in accordance with

TABLE 3.4-8
SOLID WASTE GENERATED DURING OPERATION

Waste Stream	Waste Classification	Amount	Treatment
SCR Catalysts Unit	Hazardous	500 lbs every 3 to 5 years	Recycled by SCR manufacturer or disposed of in Class I landfill
CO Catalyst Units	Hazardous	500 lbs every 3 to 5 years	Recycled by manufacturer
Oily Rags	Hazardous	200 lbs/year	Recycled or disposed by certified oil recycler

applicable LORS. Chemicals will be stored in appropriate chemical storage facilities, bulk chemicals will be stored in storage tanks, and most other chemicals will be stored in returnable delivery containers. Chemical storage and chemical feed areas will be designed to contain leaks and spills. Berms will allow a full-tank-capacity spill without overflowing the berms. For multiple tanks located within the same bermed area, the capacity of the largest single tank will determine the volume of the bermed area and drain piping. Berm and drain piping design will allow a full-tank-capacity spill without overflowing the berms. Drain piping for volatile chemicals will be trapped and isolated from other drains to eliminate noxious or toxic vapors.

The aqueous ammonia storage and unloading area will have spill containment and ammonia vapor detection equipment. Aqueous ammonia will be transported and stored in a 10,000-gallon tank onsite, as a 19 percent solution, by weight. The tank will be surrounded by a secondary containment berm to contain any release from the tank, and will be partially enclosed with a drain-like cover to minimize evaporation should there be a release.

Safety shower and eyewash stations will be provided adjacent to the aqueous ammonia storage tank area, chilled water system cooling tower chemical storage area, water treatment system chemical storage area, and CTG water wash chemical storage areas. Maintenance personnel will use state-approved, personal protective equipment (PPE) during chemical spill containment and cleanup activities. Personnel will be properly trained in the handling of these chemicals and instructed in the procedures to follow in case of a chemical spill or accidental release. Adequate supplies of absorbent material will be stored onsite for spill cleanup.

Electric equipment insulating materials will be specified to be free of PCBs.

A list of the chemicals anticipated for use at the facility is provided in Section 6.15, Hazardous Materials Handling. Table 6.15-1 identifies each chemical by type and intended use and estimates the quantity to be stored onsite. Subsection 6.15 includes additional information on hazardous materials handling.

The aqueous ammonia storage and unloading area will have spill containment and ammonia vapor detection equipment. Aqueous ammonia will be transported and stored in a 10,000-gallon tank onsite, as a 19 percent solution, by weight. The tank will be surrounded by a secondary containment berm to contain any release from the tank, and will be partially enclosed with a drain-like cover to minimize evaporation should there be a release.

Safety showers and eyewashes will be provided in the vicinity of all chemical storage and use areas. Hose connections will be provided near the chemical storage and feed areas to flush spills and leaks to the plant wastewater collection system.

Plant personnel will use approved PPE during chemical spill containment and cleanup activities. Personnel will be properly trained in the handling of these chemicals and instructed in the procedures to follow in case of a chemical spill or accidental release. Adequate supplies of absorbent material will be stored onsite for spill cleanup.

A list of the chemicals anticipated to be used at the generating facility and their locations is provided in the Hazardous Materials Handling section (Section 6.15). This list identifies each chemical by type, intended use, and estimated quantity to be stored onsite.

3.4.10 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. Section 6.2, Air Quality, includes additional information on emission control and monitoring, which is summarized below. The air emission rates for the CTGs are summarized in Section 3.8, Facility Operation. Air emissions from the combustion of natural gas in the CTGs will be controlled using state-of-the-art emission control and reduction technology.

3.4.10.1 NO_X Production and Control Mechanisms

The GE LM6000 turbine combustors will utilize DI water injection to control NO_X emissions in the turbine exhaust to 25 ppmvd at 15 percent oxygen. The turbine control system automatically regulates the amount of water needed as a function of turbine MW load. The project will employ an SCR system to control NO_X concentrations in the exhaust gas emitted to the atmosphere to 2.3 ppmvd at 15 percent oxygen from the gas turbines. The precise SCAQMD requirement is based on an International Standards Organization (ISO) performance that produces no more than 0.080 pounds of NO_X per MW-hr. The 2.3 ppmvd is equivalent to that requirement for the CPP project. The SCR process will use a 19 percent solution of aqueous ammonia. Ammonia slip, or the concentration of unreacted ammonia in the exhaust gas, will be limited to 5 ppmvd at 15 percent oxygen. The SCR equipment will include a reactor chamber, catalyst modules, ammonia storage system, ammonia vaporization and injection system, and monitoring equipment and sensors. Final stack emissions will be monitored with a state-of-the-art continuous emissions monitoring system.

3.4.10.2 NO_X Formation

Atmospheric NO_X is considered to be primarily a combination of nitrogen oxide (NO) and nitrogen dioxide (NO_2). NO_X emissions are formed during the fuel combustion process where atmospheric nitrogen and oxygen molecules disassociate in the presence of high flame temperatures and recombine to form NO_X. NO_X emissions do not form in significant amounts until the flame temperature reaches approximately 2,800ºF.

The CTGs will utilize water injection into the combustion chamber to reduce the peak flame temperature thereby reducing the formation of NO_X in the combustor. SCR will be used to further reduce the NO_X levels in the outlet stack to final permitted levels.

3.4.10.3 CO and VOC Emissions

CO generated within the turbine combustor is controlled by advanced combustion controls. Final stack CO emissions will be further reduced to permitted levels with state-of-the-art combustion technology and the use of an oxidation catalyst system. VOC emissions will be controlled with advanced combustion controls and the oxidation catalyst system. CO from the SCR system will be limited to 6 ppmvd at 15 percent oxygen.

3.4.10.4 Particulates

Particulate emissions will be controlled using good combustion controls and natural gas as the sole fuel for the CTGs. In order for the CPP to be eligible to purchase emission credits from the SCAQMD Priority Reserve bank, the PM_{10} emissions from the new generating units must be no higher than 0.060 pounds per megawatt-hour, corrected to 59°F, 60 percent relative humidity, and 14.7 pounds per square inch, absolute (psia), except during startups and shutdowns as specified in the permit.

3.4.10.5 Emission Monitoring

The CPP will be provided with state of the art continuous emissions monitoring systems (CEMS) including data acquisition system. The CEMS will record fuel gas flow rate and monitor the emissions of NO_X, CO, and oxygen at the exhaust stack. This system will generate reports of emissions data in accordance with air permit requirements and will send alarm signals to the control room if the level of emissions approaches or exceeds pre-selected limits.

3.4.11 Fire Protection and Safety Systems

The project will rely on both onsite fire protection systems and local fire protection services.

3.4.11.1 Fire Water System

The CPP design will include a plant fire water loop with two independent points of water supply from the municipal water supply system off of East Miraloma Avenue. The plant fire water loop will provide for water supply for plant sprinkler systems, water deluge systems, and for fire hydrants. The anticipated fire flow needed for the site per the California Fire Code (CFC) is 1,500 gpm based on a 15,000-square-foot plant operations building which is fully fire sprinkler protected. See Figure 3-12, which illustrates the fire protection plan design.

3.4.11.2 Fixed Fire Protection Systems

A summary of the plant fire protection systems and equipment is as follows:

1. Fire separation walls will be used for the GSUs.
2. Fire separation walls will be used for auxiliary transformers.
3. Each LM6000 CTG is provided with a self-contained CO_2 flood fire protection system. The system is a pre-engineered system provided by GE as part of the turbine-generator package. The CO_2 flood system protects the turbine enclosure and generator enclosure.
4. The CTG auxiliary skid (lube oil and hydraulic skid with 391-gallon lube oil storage tank and 40-gallon hydraulic oil storage tank) that comes with the CTG is not enclosed and is not protected by the CTG CO_2 flood system. The CTG auxiliary skid sits adjacent to the CTG with no fire barrier separation. Due to its proximity to the CTG with no separation, the CTG auxiliary skid will be contained within a concrete spill berm to contain an oil fire and protected by a water spray deluge system as recommended in National Fire Protection Association (NFPA) 850.
5. Each GSU transformer will be contained within a concrete spill-containment berm to contain an oil fire. The top of the containment berm will utilize a 12-inch-thick layer of nominal 1.5-inch-diameter round river rock to suppress an oil fire in accordance with Factory Mutual recommendations.
6. Each auxiliary transformer will be contained within a simple concrete spill berm to contain an oil fire.
7. The two-story plant operations building (which includes the control room, administration area, warehouse, and maintenance shop area) will be protected with a combination of wet pipe and dry pipe preaction sprinkler systems. The administration area, warehouse area, and maintenance area will be protected with wet pipe sprinkler systems. The control room area will be protected with a dry pipe preaction sprinkler system. Also, building interior fire separation walls will be 2-hour rated as recommended in NFPA 850.

8. The 69kV gas-insulated switchyard control house will be protected by a dry fire suppression and detection system in accordance with NFPA recommendations as well as COA codes. A DuPont FE-25 fire suppression system will be provided for the two zones of the building: relay and communication panels, and the battery room.
9. The plant electrical equipment enclosures (EEE) housing the plant switchgear and motor control centers will be protected by a dry fire suppression and detection system in accordance with NFPA recommendations as well as COA codes. A DuPont FE-25 fire suppression system will be provided for the buildings to protect the electrical equipment.
10. Natural gas is used as the fuel for the plant. The incoming utility gas pipeline will include an automatic fail-closed fire-safe valve. The valve can be automatically closed via the plant fire detection system as well as manually closed remotely by the plant operators in response to a fire situation and/or conditions within the plant.
11. The area located within the fuel gas compressor sound walls will be designed as an explosion proof Class 1, Division 2 area in accordance with the National Electric Code.

3.4.11.3 Fire Alarm and Detection

The plant design will include a central fire alarm monitoring panel located in the main plant control room. The fire alarm panel will continuously monitor all plant fire protection systems and alert the control room operator in the event of a fire. In the event of a fire alarm, the panel will also send a direct fire alarm signal to the COA Fire Department as well as the COA power dispatch control office.

3.4.11.4 Portable Extinguishers

Portable hand-held multi-use fire extinguishers will be located within buildings and throughout the plant in accordance with NFPA recommendations and local fire department requirements.

3.4.11.5 Miscellaneous Fire Safety Items

In the event of a major fire, plant personnel will be able to call upon the COA Fire Department for assistance. The Hazardous Materials Risk Management Plan (see Section 6.15, Hazardous Materials Handling) for the plant will include all information necessary to permit firefighting and other emergency response agencies to plan and implement safe responses to fires, spills, and other emergencies.

3.4.12 Plant Auxiliaries

3.4.12.1 Lighting

Plant lighting will be provided for the following areas:

- Interior of the buildings including control room, plant operations building, maintenance shop
- Exterior at the entrances to buildings
- Switchyard and transformers
- Entry gates, roadways and parking areas
- General yard lighting within the plant site for operation and maintenance

The lighting system will provide maintenance personnel with illumination under normal conditions. The generation equipment is located inside a metal enclosure with wide access doors, so egress under emergency conditions will not require emergency lighting. The system also will provide 120-volt convenience outlets for portable lamps and tools.

In order to minimize plant light effects to the general public, light fixtures that are located up high on plant equipment such as the SCR stacks and elevated chilled water system cooling towers will be provided with on/off switches such that the lights are normally off at night when not needed. These lights can be manually turned on as required in the event that nighttime maintenance activities are required.

3.4.12.2 Grounding and Lightning Protection

The electrical system will be susceptible to ground faults, lightning, and switching surges that can transmit high-voltage spikes which would be a potential hazard to site personnel and electrical equipment. The station grounding system will be designed and installed per industry standards to protect personnel and equipment from excessive voltages generated by short-circuit currents and lightning discharges. The plant ground grid will provide an adequate path to dissipate energy and permit a conduction path for the current.

3.4.12.3 Cathodic Protection

Passive cathodic protection systems will be used and designed to control the electrochemical corrosion of underground metallic piping and equipment.

3.4.12.4 Freeze Protection

Freeze protection will not be required.

3.4.12.5 Distributed Control and Information System

The CPP project will be provided with a state-of-the-art plant DCIS. The DCIS will provide operational control, monitoring, and indicating functions for the plant mechanical and electrical systems. The following system control features will be provided by the plant DCIS:

- Remote plant startup, shutdown, load control, and systems monitoring from the COA dispatch center
- Controlling the CTGs and auxiliary systems in a coordinated manner
- Controlling the balance-of-plant systems in response to plant demands
- Monitoring controlled plant equipment and process parameters and delivering this information to plant operators via human-machine interface (HMI) computer screens and keyboards
- Provide printed plant operational status logs from signals generated within the control system
- Providing alarms for out-of-limit parameters or parameter trends, displaying on alarm monitors, and recording on an alarm log printer
- A sequential event recorder to be provided with a resolution of 1 millisecond for post-trip analysis
- Storing and retrieving historical data

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

- Operator consoles
- Engineer work station
- Distributed processing units
- Input/output (I/O) cabinets
- Historical data unit
- Printers

3.4.12.6 Plant Compressed Air System

The plant will be provided with a complete compressed air system providing instrument-quality air for the operation of control valves and instrumentation as well as plant air for maintenance activities. Compressed air will be provided using redundant oil-free rotary screw air compressors. The compressors will be sized to serve the entire plant needs. Air

used for control valves and instrumentation must be of high quality and will be filtered and dried to -40 ºF pressure dew point using redundant desiccant air dryers. The compressed air will be stored for use in an air receiver.

3.4.13 Heating, Ventilation, and Air Conditioning

Plant buildings will be heated, ventilated, and/or air conditioned as necessary for proper plant operation.

The two-story plant operations building will house the plant main control room as well as administration areas. The building will also contain a warehouse area for storage of maintenance items as well as contain a machine shop area to allow for onsite maintenance activities. The control room, administration areas, and shop area will be air conditioned. The warehouse area will be electrically heated and power ventilated.

The plant electrical equipment enclosure buildings as well as the switchyard control building will be air conditioned.

3.4.14 Plumbing

The plant operations building will be provided with complete plumbing systems as needed and designed in accordance with the California Plumbing Code as amended by the COA requirements.

3.5 FACILITY CIVIL/STRUCTURAL FEATURES

3.5.1 Overview

The major equipment for the CPP project will supported on mat reinforced concrete foundations. Buildings as well as smaller plant auxiliary equipment will be supported on reinforced concrete spread footings. Reinforced concrete drilled piers are anticipated to be used for the support of pipe racks and light poles or where spread footings may not be useable due to space requirements.

3.5.2 Stacks

The SCR exhaust stacks will be constructed of carbon steel. The SCR equipment along with the exhaust stacks will be founded on reinforced concrete mat foundations.

3.5.3 Buildings

3.5.3.1 Plant Operations Building

The plant operations building will be a conventional, commercial, metal, wood, or masonry building supported on a reinforced concrete spread footing.

3.5.3.2 Electrical Equipment Enclosure Building

The EEE building will be a pre-engineered metal building that will be slightly elevated such that the plant power and control wiring can be accessed through the bottom of the building from underground duct banks. The EEE building will be supported by reinforced concrete drilled piers to allow sufficient space for the underground duct banks to enter the building.

3.5.3.3 Switchyard Control Building

The switchyard control building will be a pre-engineered metal building that will be slightly elevated such that the plant control wiring can be accessed through the bottom of the building from underground duct banks. The building will be supported by reinforced concrete drilled piers to allow sufficient space for the underground duct banks to enter the building.

3.5.4 Chilled Water System

The chilled water system water chiller enclosure and associated four-chamber cooling tower will be supported on a reinforced concrete mat foundation. The cooling towers will be located above the water chiller enclosure and supported by a structural-steel elevated-frame system.

3.5.5 Fuel Gas Compressors

The fuel gas compressors will be supported on reinforced concrete mat foundations. The compressor foundation system will be specifically designed for vibration loading conditions as a result of the reciprocating compressors.

The fuel gas compressors will be surrounded by an acoustical wall system designed to absorb noise. The acoustical wall system will be supported by reinforced concrete drilled piers.

3.5.6 Transformer Foundations and Fire Walls

The plant power transformers will be supported on reinforced concrete mat foundations. Transformers that contain oil will also be provided with reinforced concrete spill-containment berms. Where needed, power transformers will be provided with fire wall separation barriers.

3.5.7 Chemical Storage Areas

The chilled water system cooling towers and plant DI water treatment system will require the use of various chemicals. Large quantities of stored chemicals will not be needed for this type of peaking facility, therefore, large fixed bulk storage tanks will not be needed. All operational chemicals for the plant will be stored using smaller capacity portable tanks. All chemical storage tanks will be supported on reinforced concrete spread footings and will be provided with spill-containment berms.

3.5.8 Perimeter Wall

The 10-acre CPP site will be bounded by a 20-foot-high masonry wall. This will utilize either spread footings or drilled piers for structural support. The wall will be incorporated into the stormwater drainage design.

3.5.9 Water Storage Tanks

Plant water storage tanks will include the raw water storage tank and the DI water storage tank. These tanks will be supported on reinforced concrete foundations.

3.5.10 Roads

The CPP facility will be accessible via two separate plant access roadways off of East Miraloma Avenue as well as an auxiliary entrance off of the alley on the east side of the site. Within the plant, a perimeter roadway system will allow operations and maintenance access to all areas. The plant roadways will be of asphalt concrete construction and be designed to handle the loading conditions of large tractor-trailer trucks.

3.5.11 Site Security

The CPP site will be bounded by a 20-foot-tall masonry wall as the primary security feature of the plant. The main plant entrance will feature a hydraulically actuated security gate that can be opened and closed remotely from the plant main control room. A video camera surveillance system will enable plant operators will be able to monitor the main access gate area as well as other critical plant areas from the control room. The COA offsite electrical dispatch center will also have access to the plant security surveillance system in the event the plant is unstaffed. A site security plan will be prepared prior to operation.

3.5.12 Site Grading and Drainage

The plant site will consist of paved equipment areas, paved roads, and paved parking areas. Concrete equipment pads will be set a minimum of six inches above adjacent pavement elevations. The site shall be graded such that sheet flow away from buildings and structure

foundations is at a 1 percent slope. Gutter/swale areas shall be graded at a minimum 0.5 percent slope. It is expected that the entire 10-acre site will be disturbed during the construction and construction laydown process.

The stormwater system will be designed to handle a 25-year storm event in accordance with COA standards. The elevation of plant buildings and equipment will be such that the buildings and equipment do not flood in the event of a 100-year storm.

Stormwater collected in the alley area outside the site boundary on the east side of the facility will sheet flow to the COA's municipal stormwater system in East Miraloma Avenue as currently designed.

Both the water quality treatment vault and separate percolation basin will manage stormwater runoff from the improved site. The system will be sized to collect and process stormwater flows consistent with the 25-year storm event. Stormwater flows in excess of the 25-year event will be directed (via an overflow pipe system) to the existing COA's municipal storm sewer in East Miraloma Avenue.

The site grading and drainage plan for the project is shown on Figure 3-9.

A Stormwater Pollution Prevention Plan (SWPPP) will be prepared prior to construction of the CPP; a draft is included in Appendix N. This SWPPP will be utilized at the site to control and minimize stormwater-related pollution that may result during construction of the facility. The plan will use best management practices (BMPs) such as stabilized construction entrances, silt fencing, berms, hay bales, and temporary detention basins as needed to control stormwater runoff from construction areas.

3.5.13 Site Flood Issues

According to the Federal Emergency Management Agency (FEMA) the site is located within a designated 100-year floodplain. Plant buildings and equipment will be located at an appropriate elevation such that the buildings and equipment do not flood during a 100-year storm event.

3.5.14 Sanitary System

The small amount of sanitary sewage generated on the CPP site will be sent to the OCSD sanitary sewer system located in East Miraloma Avenue.

3.5.15 Earthwork

The excavation work will consist of removal, storage, and reuse of the native soils. The native soils underlying the CPP site are primarily sandy soils and are generally suitable to

accept the loading from the plant foundations without the need for support piles. The upper layers of native soil are considered to be loose sandy material. Generally, the upper soils will need to be locally removed, re-compacted, and then reused as engineered fill.

Materials suitable for backfill will be stockpiled at designated locations using proper erosion-protection methods. The excess soils removed as a result of excavations for equipment foundations and piping and electrical trenches will be re-used onsite to raise the finished grade of the site to achieve proper storm drainage. It is anticipated that the plant earthwork design will result in a balanced site. That is, little if any of the native soils will need to be removed from the site, nor should offsite soils need to be brought into the site. The plant finished grade will be 1 to 2 feet higher than the existing, level site, therefore, major cuts and/or fills will not be necessary. The estimated quantity of total excavations is 8,600 cubic yards. The quantity of fill needed to raise the site to achieve proper stormwater drainage is approximately 5,000 cubic yards. Excess soils will be used onsite as part of the plant's final grading plan to prevent the need to off-haul soils.

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. Structural fill used to support foundations, roads, and parking areas will be compacted to at least 95 percent of the maximum dry density as determined by the American Society for Testing Materials (ASTM) rule D-1557. Backfill for piping, utilities, and around structures will be compacted to a minimum of 90 percent of maximum dry density. Backfill placed in remote areas will be compacted to at least 85 percent of the maximum dry density. Field density and moisture content tests will be performed during compaction activities to confirm that these standards are achieved.

Sub-grades and base courses for plant roads will be prepared and compacted in accordance with California Department of Transportation (Caltrans) standards. Testing will be in accordance with applicable ASTM and Caltrans standards.

3.6 PIPELINES

3.6.1 Natural Gas Supply Line

3.6.1.1 Description

As part of the project, natural gas fuel will be delivered by SCGC from an existing nearby main transmission line supplying the area. A new underground gas pipeline is required to serve the site. Onsite there will be a gas metering and regulator station located in the southeast corner of the property where the gas enters the CPP property. There will also be a gas compression station located in the northeast corner of the site.

3.6.1.2 Pipeline Route

Construction of the new underground SCGC 12-inch line and will travel 3,240 feet to the site. The new line will connect to its transmission L-1218 in Orangethorpe Avenue at the intersection with Kraemer Boulevard, proceed 2,660 feet southward in Kraemer Boulevard, then run 580 feet west along East Miraloma Avenue to the site.

This route is nearly a direct route from SCGC's transmission line to the project.

3.6.1.3 Buried Pipe

The natural gas pipeline will be buried in the city streets of Kraemer Boulevard and East Miraloma Avenue. The metal buried pipe will be designed with a cathodic protection system, designed to control the electrochemical corrosion of metal piping buried in the soil. Depending upon the corrosion potential and the site soils, either passive or impressed current cathodic protection will be provided.

3.6.2 Water Supply Pipeline

The main source of raw water for plant process needs will be the recycled water pumping station located on East Miraloma Avenue 2,185 feet east of the site. This new pipeline will be 14 inches in diameter and constructed of purple PVC pipe to denote that it is a recycled water pipeline. A pumping station will be required at the recycled water tie-in location to boost water pressure to the site.

3.6.3 Potable Water Line

Potable water lines will connect to the existing COA municipal potable water system in East Miraloma Avenue. The COA potable water system will also provide fire water to the site for fire protection. There will be two potable water connections from the COA to the CPP. This will establish an underground fire water loop around the major power plant equipment, buried in the site's paved loop access road.

3.7 PROJECT CONSTRUCTION

Construction of the generating facility from site preparation, demolition, and grading, to commercial operation is expected to take approximately 12 months. Major milestones are listed in Table 3.7-1.

Construction access will be via East Miraloma Avenue.

TABLE 3.7-1
PROJECT SCHEDULE MAJOR MILESTONES

Activity	Date
AFC Filed	Fourth Quarter 2007
EPC Contractor Selected	Fourth Quarter 2008
AFC License Granted	First Quarter 2009
Construction Complete, Commissioning	Second Quarter 2010
Project Complete	Third Quarter 2010

AFC = Application for Certification
EPC = engineering, procurement, and construction

Normal construction will most likely be scheduled between 6 a.m. and 8 p.m., Monday through Friday. During construction and startup of the project, some activities may continue 24 hours per day, 7 days per week. Table 3.7-2 identifies the construction equipment to be used and its expected duration onsite.

3.7.1 Project Schedule and Workforce

The peak workforce on the project during construction will be approximately 225 people, including construction craft persons as well as supervisory, support, and construction management personnel (see Section 6.10, Socioeconomics). Table 3.7-3 provides an overview of worker disciplines and the expected timeframe for each over the 12-month construction and commissioning period.

3.7.2 Execution Plans – Engineering and Construction Phases

The plant construction will be executed as an engineering, procurement, and construction (EPC) project by a general contractor. For quality assurance planning purposes, there are several EPC project activities that apply to specific periods of time during the project. The selected EPC contractor must closely coordinate the activities of the detail design engineer with the contractor, to streamline multiple activities and meet the schedule. Some of these activities include:

- Definition of requirements and engineering analyses
- Preparation of calculations, drawings, and lists needed to describe, illustrate, or define systems, structures, or components
- Compilation and documentation of the contractual, technical, and quality provisions for procurement specifications for plant systems, components, or services
- Confirmation that the manufacturers conform to the provisions of the procurement specifications

TABLE 3.7-2
CONSTRUCTION EQUIPMENT ONSITE

	Months After Notice to Proceed														Construction	
Description	1	2	3	4	5	6	7	8	9	10	11	12	Total	HP	hr/day	PM_{10} Each
Grader	1	1	1										3	100-175	7	0.06
Dozer	3	2											5	100-175	7	0.42
Scraper	1												1	175-300	7	0.83
Vibrator	1	1											2	25-50	7	0
Loader	3												3	50-100	7	0.18
Forklift			1	2	3	3	3	3	3	3	2		23	50-100	7	0.19
Backhoe	3	4	4	3	2	1	1	1	1	1			21	50-100	7	0
Crane		1	1	2	3	4	4	3	2	1			21	175-300	7	0.04
Field truck (3/4T)	1	1	1	1	1	2	2	2	2	1	1	1	16	On-road	7	0.13
Dump truck	2	2	2	1	1								8	On-road	7	0.19
Water truck	1	1	1	1	1	1	1	1	1	1			10	On-road	7	0.3
Service truck	1	1	1	1	1	1	1	1	1				9	On-road	7	0.09
Fuel Truck	1	1	1	1	1	1	1	1	1	1			10	On-road	7	0
Boom truck				1	1	1	1	1	1	1			7	On-road	7	0
Concrete pump	1	2	3	3	2	1	1						13	On-road	7	0
Port air compressor	1	1	1	1	1	1	1	1	1	1			10	25-50	7	0
Port. electric generator light plant	1	1	1	1	1	1	1	1	1	1			10	25-50	7	0
Total	21	19	18	18	18	17	17	15	14	11	3	1	172			

Trucks to Project Site:
15 – Light delivery truck traffic daily estimate
3 – Heavy Haul Truck average delivery per day estimate (all deliveries averaged over 5 months)
10 – Heavy Haul Truck peak delivery per day estimate (all deliveries averaged over 1.5 months)
287 – Total heavy equipment deliveries estimated
142 – Truckloads removing building demolition
133 – Truckloads removing asphalt pavement demolition
275 – Total for demolition

TABLE 3.7-3
COA CPP PROJECT CONSTRUCTION PERSONNEL BY MONTH

Discipline	Months After Notice to Proceed												Man-month Total
	1	2	3	4	5	6	7	8	9	10	11	12	
Plant													
Ironworkers		4	4	10	20	26	26	20	20	10	4		144
Concrete workers	4	12	16	16	12	10	8	6	2	2	2		90
Carpenters	4	8	10	10	8	8	6	4	2	2	2		64
Electricians	8	16	20	30	40	40	40	40	30	20	10	2	296
Millwrights		2	4	10	14	18	18	18	14	12	6		116
Pipe fitters		8	12	16	16	16	16	16	12	8	4	2	126
Laborers	18	12	14	16	18	18	18	18	16	12	6	2	168
Equipment operators	13	10	10	10	10	10	10	10	8	6	4	2	103
Painters					2	2	4	4	6	6	2	1	27
Insulation Workers				2	6	6	12	12	12	12	8	2	72
Surveyors	2	2						2				2	8
Teamsters	4	4	4	4	4	4	4	4	4	2	1		39
Commissioning/Testing				2	4	6	8	10	12	12	12	8	74
Engineering site staff	4	6	6	8	8	8	8	8	7	7	6	5	81
Total Manual Staff	57	84	100	134	162	172	178	172	145	111	67	26	1,408
Total Contractor Staff	10	14	17	23	28	29	30	29	25	19	11	4	239
Subtotal Plant Labor	67	98	117	157	190	201	208	201	170	130	78	30	1,647
Underground 69 kV Transmission Line with Fiber Optic Cable													
Equipment Operators				4	4								8
Electricians				0	8								8
Carpenters				2	2								4
Laborers				5	5								10
Foremen				1	1								2
T-line Subtotal				12	20								32
Underground Pipeline Linears, Natural Gas, GWRS Water													
Equipment Operators					4	4	4	4					16
Pipe fitters					4	4	4	4					16
Carpenters					2	2	2	2					8
Laborers					4	5	5	4					18
Foremen					1	1	1	1					4
Water Line Subtotal					15	16	16	15					62
Total Labor Force	67	98	117	169	225	217	224	216	170	130	78	30	1,741

Note: Other short linears connecting directly into Miraloma (i.e., sewer, storm drain, potable water line) are part of plant construction workforce.

- Review of manufacturers' drawings, data, instructions, procedures, plans, and other documents to ensure coordination of plant systems and components, and conformance to procurement specifications
- Onsite construction quality control, including contractor qualification review and documentation, material inspection and test
- Management of multiple contractors, suppliers, and disciplines, manage and organize proper document control of all submittals for final turnover to the owner

3.7.2.1 Engineering and Pre-construction Mobilization

The EPC contractor will be selected in coordination with the California Energy Commission (CEC) final approval of the project. Staff from the engineering and construction groups will work together to prepare a safe, cost effective, and sequentially appropriate plan for the project. The initial focus will include the purchase and delivery of engineering equipment and specialty, long lead-time materials. Facility design will include early milestones to complete the civil, structural, and mechanical equipment elements of the project. It is anticipated that the EPC contractor will mobilize within two months of final CEC approval.

3.7.2.2 Construction Facilities

The construction site layout will include temporary facilities for the following:

- Perimeter security fence and guard house
- Gated delivery truck access from East Miraloma Avenue
- Controlled site access with security guard
- Construction trailers for engineering, for contractors, sub-contractors, and for the COA staff
- Sanitary facilities
- Electrical and communications hookup (e.g., telephone and T1 line)

3.7.2.3 Construction Parking

Construction parking will include a limited number of onsite spaces for staff. Two offsite construction worker and staff parking areas located at two adjacent parking lots (3150 and 3190 East Miraloma Avenue) at the southeast corner of Kraemer Boulevard and East Miraloma Avenue have been identified with sufficient capacity to accommodate construction worker parking. The two proposed parking lots are within walking distance to the project site.

3.7.2.4 Laydown and Storage

Construction laydown area of up to approximately 3.5 acres will be located on the CPP site, primarily on the western portion of the plant area. Construction access will be from East Miraloma Avenue.

3.7.2.5 Emergency Facilities

Emergency facilities will be provided by the COA with police, fire, and emergency response nearby. Onsite emergency facilities will be provided by the general contractor according to their site-specific safety plan and will include a rest area, first aid station, and communication links to offsite emergency responders. Onsite safety personnel will have training in first aid.

3.7.2.6 Construction Utilities

Temporary construction utilities will be established during site mobilization, including temporary site communications with telephone and T1 line, electric power, water, and sanitary services. Portable sanitary services will be provided as necessary throughout the site for the duration of the project. Most of these services will eventually become connected and available from COA utilities located on East Miraloma Avenue.

3.7.2.7 Site Services

Site services provided by the general contractor include engineering, construction, and construction management. Site services will make personnel aware of environmental health, emergency medical services, and safety precautions to be used by project personnel. This includes additional information on area medical services and will comply with plans identified in Section 6.17, Worker Safety. Compliance with these requirements will minimize project effects on public and employee safety.

In the event of a major fire, the construction and/or plant personnel will be able to call upon the local fire department for assistance. The Hazardous Materials Risk Management Plan for the plant will include all information necessary to permit all firefighting and other emergency response agencies to plan and implement safe responses to fires, spills, and other emergencies.

QA/QC inspectors will be provided onsite for constant oversight, and will arrange testing, nondestructive examinations, and soil compaction.

The general contractor also provides trash collection and disposal (for both hazardous and non-hazardous material), service of sanitary facilities, and site security.

3.7.2.8 Construction Equipment and Materials Delivery

Construction materials and equipment are expected to be delivered by truck to the site utilizing East Miraloma Avenue and the local freeway system. All large or heavy load deliveries will have a contract shipment schedule, where the equipment supplier must provide notification and coordination with the general contractor onsite.

3.7.2.9 Power Plant Maturation

The anticipated maturation of CPP will range between three and four months. The plant's first year equivalent availability factor (EAF) is estimated to be 98 percent. Functional testing, performance testing, punchlist resolution, reliability runs, and warranty claims will accelerate the maturation process, as well as extensive quality assurance and control during the commission and startup of the facility.

3.8 FACILITY OPERATIONS AND MAINTENANCE

The facility will normally be staffed and available for operations between the hours of 6:00 a.m. through 12:00 p.m. Monday through Friday. The COA Integrated Resource Schedulers group will use surveillance cameras installed throughout the site to monitor the facility while unstaffed. The CPP will be staffed and available for operations on weekends and for 24-hour continuous operations as situations require.

Fiber-optic cable will connect the CPP to City Hall West 8th floor and the existing Anaheim Peaking plant located at Dowling via the COA SCADA system with the ability to monitor and with some remote control capability as needed and in the event of an emergency.

3.8.1 Introduction

The Applicant intends to operate the facility 16 hours per day, 5 days per week, for up to 4,006 hours per year total for the 4 CTGs. The air emissions associated with the operation of the CPP are presented in Table 3.4-2.

This section discusses the operation and maintenance procedures that will be followed by the CPP staff to ensure safe, reliable, and environmentally acceptable operation of the power plant, transmission system, and pipelines. Additional information will be provided in the attached appendices.

The CPP will require approximately nine fulltime employees, including six operating technicians, one clerical worker, one manager, and one supervisor. Four of the six operating technicians will operate on rotating shifts of two operators per shift, two shifts per day. The remaining two technicians will perform maintenance activities. Rotations will occur to ensure a 40-hour work week with six operators, as well as coverage for vacation and sick leave.

Currently, the COA has a staff of seven full-time employees operating its LM5000 STIG facility, in operation since 1991. The same staff will operate the new facility (with two additions), while the LM5000 STIG facility will go on standby reserve. Given the new units are LM6000s, it is anticipated that minimal training for the operating staff will be required to transition to the new facility.

Plant operations will be directed from a new control room. All system equipment will be controlled through a PLC-based system and the project equipment will be integrated into the proven control system.

3.8.2 Power Plant Facility

The CPP is designed as a simple-cycle, intermediately loaded peaking facility with four LM6000 CTGs. The project will be designed to emphasize efficiency and flexibility.

3.8.2.1 Peaker Plant Operation

The plant will be operated to provide its maximum available electrical output during the periods when the demand for electricity is greatest. As an intermediate load and peaking facility, the plant is estimated to operate no more than 4,006 hours per year. The plant will be dispatched by the COA in accordance with its economic dispatch procedures. At various times during the year, these units may be designated as Resource Adequacy units under the California Independent System Operators (CAISO) scheduling protocols. As such, they will be required to be bid into CAISO's ancillary service and energy markets. If dispatched by CAISO, it will also be in accordance with economic dispatch procedures.

The project equipment will be integrated with a COA plant performance monitoring program that allows plant staff to make critical decisions as to when the equipment performance has deteriorated to the extent that corrective action is required. This program also allows the plant staff to accurately determine the cost of electrical production. This ability in conjunction with an experienced and adaptable staff will allow the plant to be operated and maintained in the most efficient method possible.

Planned maintenance will be coordinated to coincide with periods of lower power demand on the CAISO system.

3.8.2.1.1 Annual Operating Practices. Generally, the plant will be operated to provide its maximum practical output when the demand for electricity is highest. There may be economic situations where designated units will operate at partial loads either to meet CPP customer demand requirements or to provide operating reserves to the CAISO. The plant design is configured to provide other ancillary services to CAISO to maximize the benefit of the CPP to the local grid.

3.8.2.1.2 Operation with Daily and Seasonal Variation in Temperature and Demand. Unit output is sensitive to the temperature and density of the ambient air taken into the CTG inlet and used in the combustion process. The temperature and humidity of the air ingested into the gas turbine inlets affect power output. The gas turbine will be equipped with a chiller water system that will be operated when needed to enhance the power output of the gas turbines.

3.8.2.1.3 Startup and Shutdown. The time required for startup is approximately 10 to 20 minutes. The air permit will allow for an appropriate number of startups and shutdowns for the facility in a one-year period.

3.8.2.2 Control Philosophy

The control philosophy incorporates specific checks and safety measures to ensure systems or equipment operate safely and efficiently. Control systems are programmed to be fully automated and some controls may be switched to manual operation in specific cases.

The control system will consist of a state-of-the-art, integrated, microprocessor-based DCIS and will provide for monitoring, startup, shutdown, and control of the plant within safe operating limits to protect the equipment.

An interlock and logic system will be provided via hard wired relays, and/or PLCs. Process switches (e.g., pressure, temperature, level, flow) used for protective functions will be connected directly to the DCIS and the protective system.

3.8.2.3 Degree of Automation

It is intended that the power station offer the highest degree of safety through automation. The plant will be designed with automation where practical in order to reduce the required actions performed by operating personnel. For example, the fast (10-minute) startup is fully automated after specific systems are in their ready-for-operation status. Through subsystem automation and use of the DCIS, the number of individual control switches and indicators that confront the operator will be greatly reduced. This will reduce the complexity and size of the main control room workstations and panels.

3.8.2.4 Centralized Control

The centralized control will be the CPP control room. The majority of the equipment required to support the operation of the plant will be located here and in the electrical equipment rooms. The control room contains the DCIS operator workstations, the auxiliary control panels, alarm, and utility and log printers. Certain monitoring and control functions will be available from the existing Anaheim Peaking power station located at Dowling and from the COA City Hall via fiber optic cable.

3.8.2.5 Distributive Control and Information System

The DCIS is a PLC-based control system providing analog and sequential logic control, advanced control computations, data acquisition, operator interface, and computer interface capability. The DCIS will provide overall control and operator interface to the generating facility. It will consist of a real-time functionally distributed computer control system equipped with adequate memory, I/O hardware, termination cabinets, redundant data highway, operator interface consoles, engineering workstation, and peripherals such as printers and mass storage.

The DCIS 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 balance-of-plant systems in response to plant demands
- Monitoring controlled plant equipment and process parameters and delivery of this information to plant operators
- Providing control displays (e.g., printed logs for signals generated within the system or received from I/O
- 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 on alarm screens and recording on an alarm log printer
- A sequential event recorder to be provided with a resolution of 1 millisecond for post-trip analysis
- Providing storage and retrieval of historical data

DCIS will be a redundant microprocessor-based system and will consist of the following major components:

- Operator consoles
- Engineer work station
- Distributed processing units
- I/O cabinets
- Historical data unit

- Printers
- Data links to the CTG control systems

The DCIS will have a functionally distributed architecture comprising a group of similar redundant processing units linked to a group of operator consoles and the engineer work station by redundant data highways. Each processor will interface with the control systems furnished by the CTG suppliers to provide remote control capabilities, as well as data acquisition, annunciation, and historical storage of turbine and generator operating information. The system will be designed with sufficient redundancy to preclude a single device failure from significantly affecting overall plant control and operation. This also will allow critical control and safety systems to have redundancy of controls, as well as an uninterruptible power source.

As part of the quality control program, daily operator logs will be available for review to determine the status of the operating equipment.

3.8.3 Pipelines

There will be two potable water connections from the COA to the CPP that will connect to an underground fire water loop around the major power plant equipment, buried in the site's paved loop access road. Recycled water for treated water system will be pumped from the GWRS line located on East Miraloma Avenue to a raw water storage tank located onsite. A new natural gas line will connect into SCGC transmission line at the intersection of Kraemer Boulevard and Orangethorpe Avenue, run 2,660 feet southward in Kraemer Boulevard, then run 580 feet east along East Miraloma Avenue to the site.

3.8.4 Water Supply System

Recycled water provided by the GWRS will be utilized to meet the CPP process and other water needs. In support of this option, the OCWD has provided CPP with a "Will-Serve" letter acknowledging that there is adequate recycled water supply is available to support the CPP operations and that the District will provide this supply (see Appendix O).

The typical water quality of the GWRS supply is presented in Table 6.5-5. As described in the OCWD Will-Serve letter, the OCWD has adequate and dependable recycled water supply to meet current and future demands through the thirty-year life of the CPP.

Municipal water supplies from the COA 14-inch water line in East Miraloma Avenue will provide potable water sanitary needs, fire water, and a backup supply to the GWRS.

3.9 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 due to 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.

3.9.1 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 there is no facility damage resulting in a hazardous substance release, the facility would be kept "as is," ready to resume operating when the unplanned closure event is rectified or ceases to restrict operations.

In the event that there is a possibility of a hazardous substances release, the project owner will notify the CEC compliance unit and follow emergency plans that are appropriate to 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 non-hazardous) will be disposed of according to LORS in effect at the time of the closure. Facility security will be retained so that the facility is secure from trespassers.

3.9.2 Permanent Closure

The anticipated life of the generation facility 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 much longer period of time. As power plant operators continuously upgrade their generation equipment, and maintain the equipment up to industry standards, there is every expectation that the generation facility will have value beyond its expected life.

3.9.3 Closure Mitigation

At the time of facility closure, decommissioning will be completed in a manner that both protects the health and safety of the public, and 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 proposed 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 tankage, 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, including the CEC.
- 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 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.

3.10 SAFETY, AVAILABILITY, AND RELIABILITY

3.10.1 Safety Precautions and Emergency Systems

Safety precautions and emergency systems will be implemented as part of the design and construction of the plant to ensure safe and reliable operation of project 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 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 backup 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.

3.10.1.1 Safety Precautions

3.10.1.1.1 Worker Safety. The CPP will implement programs to assure that compliance with federal and state occupational safety and health program requirements is maintained. In addition to compliance with these programs, the CPP will identify and implement plant-

specific programs that effectively assess potential hazards and mitigate them on a routine basis.

A more complete discussion of worker safety is provided in Section 6.17.

3.10.1.1.2 Hazardous Materials Handling. Hazardous materials will be stored and used at the CPP during both construction and operation. Design and construction of hazardous materials storage and dispensing systems will be in accordance with applicable codes, 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. Appropriate PPE will be provided during both construction and operation of the facility. A more detailed discussion of hazardous materials handling is presented in Section 6.15.

3.10.1.1.3 Security. A security fence will enclose the plant site. Access gates will be provided, as required. In addition to the perimeter security fence, the substation and transformer area will be fenced and provided with access gates. Security will be maintained on a 24-hour basis with surveillance devices.

3.10.1.1.4 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.

The CPP 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.

3.10.1.2 Emergency Systems

3.10.1.2.1 Fire Protection Systems. The CPP will have onsite fire protection systems and will be supported by local fire protection services. Section 3.4.11 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 located at strategic locations throughout the project site. Smoke detectors, sprinkler systems, and fire hydrants with hoses will be utilized. Based on detailed design, the fixed fire protection system may also include a carbon dioxide 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 the reporting of 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 COA Fire Department station, located approximately 0.5 mile from the plant site with an estimated response time of 5 to 10 minutes, will provide primary fire protection, fire fighting, and emergency response services to the CPP site. The COA Fire Department will perform a final fire safety inspection upon completion of construction and, thereafter, will conduct periodic fire safety inspections. Prior to startup the COA Fire Department will be requested to visit the project site to become familiar with the site and with project emergency response procedures.

3.10.1.2.2 Medical Services and Emergency Response. The CPP will have an ERP. The ERP 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 onsite.

3.10.2 Aviation Safety – Power Generation Stacks

The Federal Aviation Administration (FAA) Regulations Part 77 establishes standards for determining obstructions in navigation space and sets forth requirements for notification of proposed construction. These regulations require notification of any construction over 200 feet in height above ground level. The closest airfield with regularly scheduled commercial flights is approximately 12.4 miles due south. The stack will be 86 feet above ground. A Notice of Construction or Alteration will not be required to be filed with the FAA. Local air uses will be reviewed to determine the need for other aviation safety markings.

3.10.3 Facility Availability

The facility consists of four simple-cycle aero-derivative CTGs which are optimally suited for peaking service. To support dispatch service, each CTG is normally operated between approximately 40 and 100 percent of base load. The facility will be operated to support dispatch service and automatic generation control (AGC) in response to the load demand.

3.10.3.1 Degradation in Output from Fouling and Wear

Power plant mechanical equipment will foul and wear from normal use. This will result in degradation of output and performance for the equipment and the plant. If excessive fouling and wear are allowed to continue to occur, this may affect the starting capability, which may impact the facility availability.

A proactive maintenance program will minimize degradation from fouling and wear. This is necessary to ensure optimal efficiency, avoid excessive wear, and prevent costly failures.

3.10.3.2 Summary of Availability

The Applicant intends that this facility is normally staffed and able to operate 16 hours per day, 5 days per week, for up to approximately 4,006 engine hours per year total for the four CTGs. The GE LM6000 aero-derivative technology is the most efficient simple-cycle CTG on the market and has a documented availability record of 97.8 percent.

3.10.4 Equipment Redundancy

The following subsections identify equipment redundancy as it applies to project availability. Specifically, redundancy in the power block is described. The power block will be served by the following balance-of-plant systems: DCIS, DI water system, raw water system, and gas compressors. Redundancy following final design may differ. Redundancy of major equipment is shown in Table 3.10-1.

3.10.4.1 Combustion Turbine

Four separate combustion turbine power generation trains, consisting of a General Electric LM6000 PC SPRINT CTG and its appurtenances, will operate in parallel within the power block. Each CTG will provide approximately 25 percent of the total power block output. The turbine packages have redundant ventilation fans. Other systems have no redundancy. The SCR systems have redundant tempering air fans and the ammonia injection system has redundant ammonia pumps and blowers.

TABLE 3.10-1
MAJOR EQUIPMENT REDUNDANCY

Description	Number	Note
Simple-cycle CTGs and SCRs	Four trains	Individual auxiliary systems allows all four CTG/SCR trains to operate at any load individually.
Chiller system	Two – 50 percent capacity	Two chiller systems serve four CTGs on peak summer days
Cooling towers	Four cells, two per chiller system	Cooling towers are elevated, factory built package mechanical draft design with built in collection basin.
Chilled water pumps	Two – 100 percent capacity	--
Cooling water pumps	Two – 100 percent capacity	--
Fuel gas compressors	Five – 25 percent capacity	Each compressor sized for one CTG, with one spare compressor.
Demineralizer—RO Systems	Two – 50 percent capacity trains	Redundant pumps will be provided.
GWRS water supply	Two – 100 percent capacity	
Station transformer	Two	Each transformer can handle the plant load
Auxiliary transformer	Two	Each transformer can handle the plant load
5 kV circuit breakers	N + 1	Spare circuit breaker available for any position as needed.

3.10.4.2 Distributed Control and Information System

This DCIS will have a functionally distributed architecture comprising a group of similar redundant processing units; these units will be linked to a group of operator consoles and an engineer work station by redundant data highways. Each processor will be programmed to perform specific dedicated tasks for control information, data acquisition, annunciation, and historical purposes. Since they will be redundant, no single processor failure can cause or prevent a unit trip.

3.10.5 Power Plant Performance and Efficiency

CTG output and efficiency are most affected by inlet air conditions. The CPP will use an inlet air-chilled water system to improve output and efficiency at high ambient temperatures.

3.10.5.1 Performance and Efficiency Overview

The plant performance and efficiency are maximized to the most economical extent. Auxiliary loads are minimized without excessive equipment cost. Approximate power plant performance and fuel efficiency are summarized in the heat and mass balance diagrams shown on:

- Figure 3-3, Heat and Mass Balance, Hot Ambient
- Figure 3-4, Heat and Mass Balance, ISO Ambient
- Figure 3-5, Heat and Mass Balance, Cold Ambient

3.10.6 Fuel/Water Availability

Natural gas fuel will be made available to the project by SCGC in sufficient quantity.

Potable water is available to the project from the COA potable water system for drinking water and showers.

Process makeup water will be made available to the project from the GWRS in sufficient quantity. Backup to the GWRS system will be the city potable water system. The GWRS system pressure is insufficient, so a booster pumping station will be part of the project. This GWRS booster pumping station will be located 1,850 feet east of the site. The availability of water to meet the needs of the project is discussed in more detail in Section 3.4.7, Water Supply, and Section 6.5, Water Resources.

3.10.6.1 Gas Supply

As part of the project, natural gas fuel will be delivered by SCGC from a main line supplying the area. The new line will be 12 inches in diameter and will travel 3,240 feet to the site. Maximum natural gas requirements during operation are approximately 30,750 million Btu per 16-hour day (MMBtu/day) (HHV) basis. The natural gas fuel pressure available from SCGC will not be sufficient for the project. New fuel gas compressors will be installed in order to boost the pressure to the required levels for the project.

Table 3.4-3 shows the typical analysis of the fuel gas that will be supplied to the CPP.

3.10.6.2 Water Availability

The nearest source of recycled water is from the GWRS facility located approximately 2,480 feet east south of the CPP site.

The GWRS was developed as a cooperative project between the OCSD and the OCWD to improve water supply reliability, protect the groundwater basin from seawater intrusion and to provide for industrial uses. The GWRS reduces the amount of treated wastewater released into the ocean and delays the need for construction of another ocean outfall. The first phase of the GWRS includes the production of approximately 72,000 AF of water per year. The project can be expanded in the future.

3.10.7 Project Quality and Control

The objective of the Quality Control Program will be to ensure that all systems and components have the appropriate quality measures applied during design, procurement, fabrication, construction, and operation. The goal of the Quality Control Program is to achieve the desired levels of safety, reliability, availability, operability, constructability, and maintainability for the generation of electricity.

Assurance of the quality required for a system is obtained by applying appropriate controls to various activities. For example, the appropriate controls for design work are checking and review, and the appropriate controls for manufacturing and construction are inspection and testing. Appropriate controls will be applied to each of the various project activities.

3.10.7.1 Quality Assurance

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

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

1. Activities such as definition of requirements and engineering analyses.
2. Activities such as the preparation of calculations, drawings, and lists needed to describe, illustrate, or define systems, structures, or components.
3. Activities necessary to compile and document the contractual, technical, and quality provisions for procurement specifications for plant systems, components, or services.
4. Activities necessary to ensure that the manufacturers conform to the provisions of the procurement specifications.
5. Activities required to review manufacturers' drawings, data, instructions, procedures, plans, and other documents to ensure coordination of plant systems and components, and conformance to procurement specifications.
6. Inspection and review of product at the time of delivery to the construction site.
7. Inspection and review of storage, installation, cleaning, and initial testing of systems or components at the facility.
8. Actual operation of generating facility components in a system in a controlled manner to ensure that the performance of systems and components conform to specified requirements. As part of the quality control program, daily operator logs will be available for review to determine the status of the operating equipment.

As the project progresses, the design, procurement, fabrication, erection, and checkout of each generating facility system will progress through the eight stages defined above.

3.10.7.2 Quality Control Records

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

- Project instructions manual
- Design calculations
- Project design manual
- Quality assurance audit reports
- Conformance to construction records drawings
- Procurement specifications (contract issue and change orders)
- Purchase orders and change orders
- Project correspondence

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

During construction, field activities will be accomplished during the last four stages of the project: receipt inspection, construction/installation, system/component testing, and plant operation. The construction contractor will be contractually responsible for performing the work in accordance with the quality requirements specified by contract.

The contractor's quality compliance along with that of any subcontractors will be surveyed through inspections, audits, and the administration of independent testing contracts.

An Operation and Maintenance (O&M) program, typical for a project of this size, will be implemented by the COA or its maintenance contractor to control the quality of plant O&M. A specific program for this project will be defined and implemented during initial plant startup.

3.11 LORS

The applicable LORS for each engineering element are included in Appendices A1 through A7.