

**Final  
Determination of Compliance**

**Los Esteros Critical Energy Facility**  
Plant No. 13289

**Bay Area Air Quality Management District**  
Application 3213

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**FINAL DETERMINATION OF COMPLIANCE  
ENGINEERING EVALUATION APPLICATION NO. 3213  
LOS ESTEROS CRITICAL ENERGY FACILITY  
PLANT NO. 13289**

## **Background**

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This is the Final Determination of Compliance (FDOC) for the first phase of a natural gas-fueled energy generation facility that Calpine Corporation is proposing to develop. The facility is to be located on Alviso-Milpitas Road in San Jose. The proposed Los Esteros Critical Energy Facility (LECEF) project will consist of four natural gas-fired LM6000PC simple cycle turbines with auxiliary equipment. The Los Esteros Project is currently undergoing review by the California Energy Commission (CEC) for certification pursuant to the Warren-Alquist Act (PRC 25500 et seq.).

The proposed new LECEF facility will be capable of generating a nominal output of 180 megawatts (MW). In accordance with BAAQMD Rules and Regulations, Best Available Control Technology will be employed for all regulated pollutants. Offsets will be provided for emission increases of oxides of nitrogen and precursor organic compounds. Emissions of all criteria pollutants will be below 100 tons per year, so the facility will not be subject to Prevention of Significant Deterioration (PSD) review.

Pursuant to BAAQMD Regulation 2, Rule 3, Section 405, this document serves as the Final Determination of Compliance (FDOC) document for the Los Esteros Project. It will also serve as the evaluation report for the BAAQMD Authority to Construct application #3213. The Authority to Construct will not be issued until after the CEC issues its final certification for the Los Esteros Project in accordance with Regulation 2-3-405.

The FDOC describes how the proposed facility will comply with applicable federal, state and BAAQMD regulations, including the Best Available Control Technology and emission offsets requirements of the District New Source Review Regulation 2, Rule 2. Conditions necessary to insure compliance with applicable rules and regulations and air pollutant emission calculations are also included.

In accordance with BAAQMD Regulation 2, Rule 3, Section 405 & 406 the Preliminary Determination of Compliance (PDOC) has fulfilled the public notice, public inspection, and 30-day public comment period requirements of District Regulation 2, Rule 2, Sections 406 and 407.

### **Project Description:**

The Los Esteros Critical Energy Facility will consist of the following equipment proposed for installation/operation:

- S-1 Combustion Gas Turbine with Water Injection, General Electric LM6000PC Sprint, natural gas fired, 45 MW nominal, net simple-cycle, 472.6 MMBtu/hr maximum heat input rating; abated by A-1 Oxidation Catalyst, and A-2 Selective Catalytic Reduction System.**
- S-2 Combustion Gas Turbine with Water Injection, General Electric LM6000PC Sprint, natural gas fired, 45 MW nominal, net simple-cycle, 472.6 MMBtu/hr maximum heat input rating; abated by A-3 Oxidation Catalyst, and A-4 Selective Catalytic Reduction System.**
- S-3 Combustion Gas Turbine with Water Injection, General Electric LM6000PC Sprint, natural gas fired, 45 MW nominal, net simple-cycle, 472.6 MMBtu/hr maximum heat input rating; abated by A-5 Oxidation Catalyst, and A-6 Selective Catalytic Reduction System.**
- S-4 Combustion Gas Turbine with Water Injection, General Electric LM6000PC Sprint, natural gas fired, 45 MW nominal, net simple-cycle, 472.6 MMBtu/hr maximum heat input rating; abated by A-7 Oxidation Catalyst, and A-8 Selective Catalytic Reduction System.**
- S-5 Fire Pump Engine, Fairbanks Morse JDFP-06WR, diesel fired, 300 HP, 2.0 MMBtu/hr maximum heat input rating.**
- S-6 Emergency Generator Engine, Caterpillar G3512 90 LE or equivalent, natural gas-fired, 804 HP (600 kW), 6.44 MMBtu/hr maximum heat input rating.**

A small cooling tower for turbine inlet and oil cooling will be installed as part of this project. PM10 emissions from this tower are calculated to be 2.2 lbs./day. This source is thus exempt from District permit requirements, under regulation 2-1-103, because the emissions are less than 10 lbs./day.

The following projected operating scenarios for S-1, S-2, S-3 and S-4 were utilized to estimate maximum annual air pollutant emissions from the new gas turbines.

- 8760 hours of baseload (based on 100% load & 2.5 ppmvd @15% O<sub>2</sub>) operation per year @ 29°F or
- 4380 hours of baseload (based on 100% load & 5.0 ppmvd @15% O<sub>2</sub>) operation per year @ 29°F.

These scenarios were used for the analysis and are considered conservative because they assume 24-hour operation at a low temperature. Actual operation will include: reduced load, down time and a higher average ambient temperature, all of which will reduce the actual emissions. The conservative analysis will be partially offset by start/stop emissions, which are expected to be only slightly higher and, in some cases lower, than

steady state emissions. In any case, the plant emissions will be limited by permit conditions and monitored with a Continuous Emission Monitor (CEM).

### **Emissions Control Strategy:**

The proposed project triggers the Best Available Control Technology (BACT) requirement of New Source Review (District Regulation 2, Rule 2, NSR) for emissions of nitrogen oxides (NO<sub>x</sub>), carbon monoxide (CO), precursor organic compounds (POCs), sulfur dioxide (SO<sub>2</sub>), and particulate matter of less than 10 microns in diameter (PM<sub>10</sub>). The applicant has proposed the following controls:

### **Selective Catalytic Reduction with Ammonia Injection for the Control of NO<sub>x</sub>**

The S-1, S-2, S-3 and S-4 gas turbines will be equipped with water injection to minimize NO<sub>x</sub> emissions. NO<sub>x</sub> emissions will be further reduced through the use of a selective catalytic reduction (SCR) system with ammonia injection. Each gas turbine will achieve a BACT-level NO<sub>x</sub> emission limit of 5.0 ppmvd @ 15 % O<sub>2</sub> (three hour average) with an annual cap of 74.9 tons/yr. (equivalent to an annual average of 2.5 ppmvd @ 15 % O<sub>2</sub> and 8760 hours or 5.0 ppmvd @ 15 % O<sub>2</sub> for 4380 hours). Selective catalytic reduction can typically achieve NO<sub>x</sub> emission reductions in the range of about 80 to 95 percent without exceeding the ammonia limit. Ammonia is limited to 10 ppmvd @ 15 % O<sub>2</sub> and 110.7 tons/year.

The efficiency of catalytic NO<sub>x</sub> controls is limited by temperature. Catalytic control efficiencies may be reduced at hot or cold temperatures. Hot temperatures associated with uncooled exhaust may cause sintering of a catalyst. Conversely, low temperatures can result in higher NO<sub>x</sub> emissions and unreacted ammonia due to the fact that catalysts normally require a minimum temperature before they become chemically active.

Flue gas temperatures associated with simple-cycle gas turbines are generally higher than those of gas turbines used in combined-cycle. Simple-cycle gas turbine can have exhaust temperatures ranging up to 1100 °F, which vary only slightly from the gas to the stack. With combined-cycle gas turbines, exhaust heat is removed with a Heat Recovery Steam Generator (HRSG), resulting in a decrease in flue temperatures from the gas turbine to the stack. Catalysts used for selective catalytic reduction are not as efficient in controlling NO<sub>x</sub> at the higher temperatures associated with uncooled exhaust of simple cycle gas turbines. As a result, gas turbine emissions from combined-cycle operations can be controlled with more efficiency. Recognizing that catalysts must be restructured to deal with high temperatures, more operational problems may be encountered in consistently achieving the required emissions levels due to the deactivation of the catalyst.

### **Oxidation Catalyst to Minimize CO and POC Emissions**

The S-1, S-2, S-3 and S-4 gas turbines trigger BACT for CO and POC emissions. A CO catalyst designed to catalytically oxidize the CO and POC to achieve a BACT-level CO

emission limit of 4.0 ppmvd @ 15 % O<sub>2</sub> (three hour average) and an annual facility cap of 72.9 tons/yr. The POC level will be limited to 2.0 ppmvd @ 15 % O<sub>2</sub>.

### **Exclusive Use of Clean-burning Natural gas to Minimize SO<sub>2</sub> and PM<sub>10</sub> Emissions**

The S-1, S-2, S-3 and S-4 gas turbine will utilize, exclusively, natural gas as a fuel to minimize SO<sub>2</sub> and PM<sub>10</sub> emissions. Because the emission rate of SO<sub>2</sub> depends on the sulfur content of the fuel burned and is not dependent upon the burner type or other combustion characteristics; the use of natural gas will result in the lowest possible emission of SO<sub>2</sub>. PM<sub>10</sub> emissions are minimized through the use of best combustion practices and "clean burning" natural gas.

### **Emissions Calculations**

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#### **Hourly Emission Estimates:**

NO<sub>x</sub>, CO, POC, and ammonia are all limited by BACT and enforceable permit conditions to not exceed certain exhaust concentrations. BACT for SO<sub>2</sub> and PM<sub>10</sub> is the exclusive use of clean-burning natural gas. The exhaust concentration, in ppmv, is not specifically limited for SO<sub>2</sub> and PM<sub>10</sub>, so the hourly emission rate will be taken to be those values provided by natural gas composition and the turbine manufacturer (General Electric), respectively.

**NO<sub>x</sub> emissions.** The applicant has proposed a NO<sub>x</sub> emission limit of 5.0 ppmv (averaged over three hours), which complies with BACT requirements for this gas turbine. The NO<sub>x</sub> emissions from the turbine will be limited by permit condition to 5.0 ppmv, dry @ 15% O<sub>2</sub>. This concentration is converted to a mass emission factor as follows:

$$(5.0 \text{ ppmvd})(20.95-0)/(20.95 - 15) = 17.61 \text{ ppmv NO}_x, \text{ dry @ } 0\% \text{ O}_2$$

$$(17.61/1,000,000)(1 \text{ lbmol}/385.3 \text{ dscf})(46.01 \text{ LB NO}_x \text{ (as NO}_2\text{)})/\text{lbmol})(8600 \text{ dscf/MMBtu}) = 0.0181 \text{ LB NO}_2/\text{MMBtu}$$

The hourly NO<sub>2</sub> mass emission rate based on the maximum firing rate of the turbine is calculated as follows:

$$(0.0181 \text{ LB NO}_x/\text{MMBtu})(472.6 \text{ MMBtu/hr}) = \mathbf{8.55 \text{ LB NO}_2/\text{hr}}$$

**CO emissions.** The hourly CO emissions from each turbine will be limited by permit condition to 4.0 ppmv, dry @ 15% O<sub>2</sub>. The hourly CO mass emission rate based on the maximum firing rate of the turbine is calculated as follows based on 4.0 ppmvd @ 15% O<sub>2</sub>:

$$(0.0088 \text{ LB CO/MMBtu})(472.6 \text{ MMBtu/hr}) = \mathbf{4.16 \text{ LB CO/hr}}$$

**POC emissions.** The POC emission from the turbine will be limited by permit condition to 2.0 ppmv, dry @ 15% O<sub>2</sub>. The hourly POC mass emission rate based on the maximum firing rate of the turbine is calculated as follows based on 2.0 ppmvd @ 15% O<sub>2</sub>:

$$(0.0025 \text{ LB POC/MMBtu})(472.6 \text{ MMBtu/hr}) = \mathbf{1.18 \text{ LB POC/hr}}$$

**Ammonia emissions.** The ammonia (NH<sub>3</sub>) mass emission rate from the turbine will be limited by permit condition to 10.0 ppmv, dry @ 15% O<sub>2</sub>. The hourly NH<sub>3</sub> mass emission rate based on the maximum firing rate of the turbine is calculated as follows based on 10.0 ppmv @ 15% O<sub>2</sub>:

$$(0.0133 \text{ LB NH}_3\text{/MMBtu})(472.6 \text{ MMBtu/hr}) = \mathbf{6.32 \text{ LB NH}_3\text{/hr}}$$

**SO<sub>2</sub> emissions.** The SO<sub>2</sub> emission factor is based upon an expected average natural gas sulfur content that will not exceed 0.25 grains per 100 scf and a higher heating value of 1022 Btu/scf.

The sulfur emission factor is calculated as follows:

$$(0.25 \text{ gr./100scf})(10^6 \text{ Btu/MM Btu})(2 \text{ LB SO}_2\text{/LB S})/[(7000 \text{ gr./LB})(1022 \text{ Btu/scf})(100 \text{ scf})] = 0.000699 \text{ SO}_2 \text{ lb. /MM Btu}$$

The corresponding hourly mass SO<sub>2</sub> emission rate is:

$$(0.000699 \text{ LB SO}_2\text{/MM Btu})(472.6 \text{ MM Btu/hr}) = \mathbf{0.33 \text{ LB/hr}}$$

**PM<sub>10</sub> emissions.** The PM<sub>10</sub> emission factor is based upon the manufacturer's guarantees of 2.5 LB/hr for similar installations.

### **Baseload Hourly Emissions Estimates, LB/hour-turbine**

<b>NO<sub>2</sub></b>	<b>POC</b>	<b>PM<sub>10</sub></b>	<b>CO</b>	<b>SO<sub>2</sub></b>	<b>NH<sub>3</sub></b>
8.55	1.18	2.5	4.16	0.33	6.32

The start-up/shutdown (non-baseload) emissions data for NO<sub>x</sub>, POC and CO were provided by the turbine manufacturer, General Electric, for the United Golden Gate Project (Bay Area AQMD Permit Application #1889). Both the United Golden Gate Project and the Gilroy Energy Center (Bay Area AQMD Permit Application #2686), which use the same make and model gas turbine, used the factors below to estimate start-up and shutdown emissions. A start-up is anticipated to take an average of ten minutes for a simple cycle turbine whereas shutdowns are practically instantaneous. The SCR catalyst will require approximately 30 minutes to reach optimal operating temperature

and the oxidation catalyst, about 10 minutes. The emission rates for PM<sub>10</sub> and SO<sub>2</sub> have been taken to be equal to the full load, steady state figure and are lower than for the United Golden Gate Project because the steady state figures have been reduced.

**General Electric Start-up/Stop Emissions, LB-turbine/hour-start/stop**

<b>NO<sub>2</sub></b>	<b>POC</b>	<b>PM<sub>10</sub></b>	<b>CO</b>	<b>SO<sub>2</sub></b>
7.7	0.68	2.5	7.7	0.33

**Maximum Daily Emissions, LB/day:**

Maximum daily emissions are estimated based on 24 hours of worst-case emission rates. The worst-case daily emission rate is either: a day, which includes a startup/shutdown, with the balance of the daily operations based on 100% load (29°F ambient temperature) or 100% load for 24 hours. The baseload hourly emission estimates are based on allowable BACT concentration emission limits at 100% load. The start/stop hourly emission estimates are based on the emission estimates provided by the turbine vendor for the United Golden Gate Project which used the same make and model gas turbine. In those cases in which the start/stop emissions are less than the baseline, the baseline number was used for the entire 24 hours.

$$\text{NO}_2 = (7.7 \text{ LB/hr-start/stop})(1 \text{ start}) + (8.55 \text{ LB/hr-baseload})(23 \text{ hr}) = 204.4 \text{ LB/day NO}_2$$

$$\text{or } (8.55 \text{ LB/hr-baseload})(24 \text{ hr}) = 205.2 \text{ LB/day NO}_2$$

$$\text{CO} = (7.7 \text{ LB/hr-start/stop})(1 \text{ start}) + (4.16 \text{ LB/hr-baseload})(23 \text{ hr}) = 103.4 \text{ LB/day CO}$$

$$\text{POC} = (0.68 \text{ LB/hr-start/stop})(1 \text{ start}) + (1.18 \text{ LB/hr-baseload})(23 \text{ hr}) = 27.8 \text{ LB/day POC}$$

$$\text{or } (1.18 \text{ LB/hr-baseload})(24 \text{ hr}) = 28.3 \text{ LB/day POC}$$

$$\text{PM}_{10} = (2.5 \text{ LB/hr-start/stop})(1 \text{ start}) + (2.5 \text{ LB/hr-baseload})(23 \text{ hr}) = 60.0 \text{ LB/day PM}_{10}$$

$$\text{SO}_2 = (0.33 \text{ LB/hr-start/stop})(1 \text{ start}) + (0.33 \text{ LB/hr-baseload})(23 \text{ hr}) = 7.9 \text{ LB/day SO}_2$$

**Annual Emissions, tons/year:**

The applicant has requested emission limits based on nominal operation of 24 hours/day, 365 days/year and fuel use equivalent to 8760 hours/year of baseload operation per turbine. The NO<sub>2</sub> emissions from the turbines have been capped at 74.9 tons/yr. and the CO emissions are capped at 72.9 tons/year. This will necessitate actual concentrations being lower than the 3-hour average levels or reduction of the operating time to less than

the assumed 8760 hrs/yr. and/or average firing rates less than maximum. The accumulated mass emission totals for NO<sub>x</sub> and CO will be monitored by the Continuous Emission Monitor (CEM) system. The other pollutants will be monitored by source test and parametric correlation. If any part of the CEM, involved in the mass emission calculations, is inoperative for more than three hours of plant operation, the mass data shall be calculated using a District approved Alternate Calculation.

NO<sub>2</sub> emissions calculation at 2.5 ppmvd average (3-hour Ave. is 5.0 ppmvd):  
 $[(4.23 \text{ LB/hr})(8760 \text{ hours/yr.})(2.5 \text{ ppm}/5.0 \text{ ppm})(4 \text{ turbines})](1 \text{ ton}/2000 \text{ LB}) = 74.9 \text{ tons NO}_2 \text{ /yr.}$

POC emissions calculation:  
 $[(1.18 \text{ LB/hr})(8760 \text{ hours/yr.})(4 \text{ turbines})](1 \text{ ton}/2000 \text{ LB}) = 20.8 \text{ tons POC /yr.}$

PM<sub>10</sub> emissions calculation:  
 $[(2.5 \text{ LB/hr})(8760 \text{ hours/yr.})(4 \text{ turbines})](1 \text{ ton}/2000 \text{ LB}) = 43.8 \text{ tons PM}_{10}\text{/yr.}$

CO emissions calculation at 4.0 ppmvd average:  
 $[(4.16 \text{ LB/hr})(8760 \text{ hours/yr.})(4 \text{ turbines})](1 \text{ ton}/2000 \text{ LB}) = 72.9 \text{ tons CO /yr.}$

SO<sub>2</sub> emissions calculation:  
 $[(0.33 \text{ LB/hr})(8760 \text{ hours/yr.})(4 \text{ turbines})](1 \text{ ton}/2000 \text{ LB}) = 5.8 \text{ tons/yr. SO}_2$

**Emergency Generator & Diesel Fire Pump Emissions**

	NO <sub>2</sub>	POC	PM <sub>10</sub>	CO	SO <sub>2</sub>
Emergency Generator					
gm/bhp-hr	1.00	0.8	3.5E-4	1.7	N/A
LB/hr (as NO <sub>2</sub> )	1.77	1.4	0.28	3.0	4.5E-3
tpy (as NO <sub>2</sub> )	0.09	0.7	0.014	0.15	2.3E-4
Diesel Fire Pump					
gm/bhp-hr	5.2	0.15	0.09	0.27	0.15
LB/hr (as NO <sub>2</sub> )	3.44	0.10	0.06	0.18	0.10
tpy (as NO <sub>2</sub> )	0.17	0.01	0.003	0.01	0.01

Emergency Generator emissions are based on 100 hrs/yr. of operation on natural gas with 0.25 gr./100scf of sulfur content. Diesel Fire Pump emissions are based on 100 hrs/yr. of operation on fuel with 0.05 % sulfur content.

**Cooling Tower**

This facility has a small, two-cell cooling tower for cooling of the gas turbine inlet on hot days. Although the towers will only be used on hot days the emissions have been calculated assuming 24 hrs/day and 8760 hrs/yr. PM<sub>10</sub> emissions are estimated to be 0.09 lbs./hr and 0.4 tons/yr.

**Permitted Maximum Annual Emissions, tons/yr.**

	<b>NO<sub>2</sub></b>	<b>POC</b>	<b>PM<sub>10</sub></b>	<b>CO</b>	<b>SO<sub>2</sub></b>	<b>NH<sub>3</sub></b>
Turbines	74.9	20.8	43.8	72.9	5.8	110.7
Emergency Generator	0.09	0.07	0.014	0.15	2.3E-4	0
Diesel Fire Pump	0.17	0.01	0.01	0.01	0.01	0
Cooling Tower	-	-	0.4	-	-	-
<b>Total</b>	<b>75.2</b>	<b>20.8</b>	<b>44.2</b>	<b>73.1</b>	<b>5.8</b>	<b>110.7</b>

In the above table turbine NO<sub>x</sub> (as NO<sub>2</sub>) has been capped at 74.9 tons/yr. and CO has been capped at 72.9 tons/yr. The CEM and process computer will monitor the NO<sub>x</sub> and CO limits.

The table below is a summary of the maximum facility toxic air contaminant (TAC) emissions from the new sources. These emissions are used as input data for air pollutant dispersion models used to assess the health risk to the public resulting from air emissions from the project. The ammonia emissions shown are based upon a worst-case ammonia emission concentration of 10 ppmvd @ 15% O<sub>2</sub> due to ammonia slip from the four SCR Systems. The detailed input calculations are presented in Appendix A.

## Maximum Facility Toxic Air Contaminant (TAC) Emissions

Toxic Air Contaminant	Pounds/year	Risk Screening Trigger Level <sup>a</sup> (lb./yr.-source)
S-1, S-2, S-3, S-4, S-5, S-6 and Cooling Tower Combined		
1,3-Butadiene <sup>b</sup>	7.61E+00	1.10E+00
Acetaldehyde <sup>b</sup>	2.92E+03	7.20E+01
Acrolein	5.99E+01	3.90E+00
Ammonia <sup>c</sup>	2.22E+05	1.93E+04
Arsenic	4.91E-04	2.50E-02
Benzene <sup>b</sup>	5.42E+01	6.70E+00
Cadmium	1.01E-03	4.60E-02
Copper	4.31E-03	4.60E+02
Diesel PM <sup>b</sup>	1.19E+01	6.40E-01
Ethylbenzene	5.31E+02	1.93E+05
Formaldehyde <sup>b</sup>	5.97E+03	3.30E+01
Hexane	4.20E+03	8.30E+04
Lead	1.12E-03	1.60E+01
Mercury	9.10E-05	5.80E+01
Naphthalene	2.69E+01	2.70E+02
Nickel <sup>b</sup>	7.90E-03	7.30E-01
PAHs <sup>b</sup>	1.71E+00	4.40E-02
Propylene	1.25E+04	N/A
Propylene Oxide <sup>b</sup>	4.72E+01	5.20E+01
Toluene	2.22E+03	3.86E+04
Xylene	1.05E+03	5.79E+04
Zinc	5.04E-02	6.80E+03

<sup>a</sup>pursuant to BAAQMD Toxic Risk Management Policy

<sup>b</sup>carcinogenic compound

<sup>c</sup>based upon the worst-case ammonia slip of 10 ppmvd @ 15% O<sub>2</sub> from the A-2, A-4, A-6 and A-8 SCR systems with ammonia injection

See the Toxic Risk Screen section of this report for the Risk Assessment of the TAC emissions.

## Compliance Determination

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This Section summarizes the applicable District Rules and Regulations and describes how the proposed project will comply with those requirements

### Regulation 2, Rule 2; New Source Review

The primary requirements of New Source Review that apply to the proposed Los Esteros Critical Energy Facility are Section 2-2-301; (Best Available Control Technology Requirement), Section 2-2-302; (Offset Requirements, Precursor Organic Compounds

and Nitrogen Oxides, NSR), and Section 2-2-303; (Offset Requirement, PM<sub>10</sub> and Sulfur Dioxide, NSR) and Section 2-2-304, (PSD Requirements).

### **Best Available Control Technology (BACT) Determinations**

Pursuant to Regulation 2-2-206, BACT is defined as the more stringent of:

- (a) "The most effective control device or technique which has been successfully utilized for the type of equipment comprising such a source; or
- (b) The most stringent emission limitation achieved by an emission control device or technique for the type of equipment comprising such a source; or
- (c) Any emission control device or technique determined to be technologically feasible and cost-effective by the APCO; or
- (d) The most effective emission control limitation for the type of equipment comprising such a source which the EPA states, prior to or during the public comment period, is contained in an approved implementation plan of any state, unless the applicant demonstrates to the satisfaction of the APCO that such limitations are not achievable. Under no circumstances shall the emission control required be less stringent than the emission control required by any applicable provision of federal, state or District laws, rules or regulations."

The type of BACT described in definitions (a) and (b) must have been demonstrated in practice and approved by a local Air Pollution Control District, CARB, or the EPA and is referred to as "BACT 2". This type of BACT is termed "achieved in practice". The BACT category described in definition (c) is referred to as "technologically feasible/cost-effective" and must have been demonstrated to be effective and reliable on a full-scale unit and shown to be cost-effective on the basis of dollars per ton of pollutant abated. This is referred to as "BACT 1". BACT specifications (for both the "achieved in practice" and "technologically feasible/cost-effective" categories) for various source categories have been compiled in the BAAQMD BACT Guideline.

The following section includes BACT determinations by pollutant for the permitted sources of the proposed project.

### **Air Pollution Control Strategies and Equipment**

The proposed facility includes sources that trigger the Best Available Control Technology (BACT) requirement of New Source Review (District Regulation 2, Rule 2, NSR) for emissions of nitrogen oxides (NO<sub>x</sub>), carbon monoxide (CO), precursor organic compounds (POC), sulfur dioxide (SO<sub>2</sub>), and particulate matter of less than 10 microns in diameter (PM<sub>10</sub>).

The NO<sub>x</sub>, CO and oxygen concentrations will be monitored continuously using a continuous emissions monitor (CEM). Therefore, emission concentrations of NO<sub>x</sub> and CO will be limited to parts per million (ppm) emissions concentrations in the permit conditions. Source testing will verify compliance for POC, SO<sub>2</sub> and PM<sub>10</sub>. POC has a concentration limit and SO<sub>2</sub> and PM<sub>10</sub> have mass limits.

### **BACT for S-1 through S-4, Turbines**

#### **Nitrogen Oxides (NO<sub>x</sub>)**

The most stringent NO<sub>x</sub> BACT for a simple-cycle gas turbine of which the Bay Area AQMD is aware was required in the preconstruction permit for Carson Energy Group in Sacramento County, California. That preconstruction permit set BACT at 5 ppmvd NO<sub>x</sub> @15% averaged over 3 hours. That determination was made for a nominally rated 42 MW power plant consisting of a 450 MMBtu/hr., General Electric LM-6000 simple-cycle gas turbine equipped with oxidation catalyst. The gas turbine has been in operation since 1995. Since startup, the gas turbine has demonstrated compliance with the NO<sub>x</sub> emission limit in three consecutive years of source testing. NO<sub>x</sub> emissions varied from 3.96 to 4.70 ppmvd NO<sub>x</sub> @ 15%O<sub>2</sub>. Considering that Carson Energy Group represents the most stringent NO<sub>x</sub> BACT which has been achieved in practice, staff recommends a BACT level for NO<sub>x</sub> emission from simple-cycle gas turbines of 5 ppmvd @15% O<sub>2</sub> averaged over 3 hours.

District BACT Guideline 89.1.2, dated 8/28/00, specifies BACT1 (technologically feasible/cost-effective) for NO<sub>x</sub> for a simple-cycle gas turbine with a power rating ≤ 50 MW as NO<sub>x</sub> emissions < 5.0 ppmvd @ 15% O<sub>2</sub>, achieved through the use of Selective Catalytic Reduction (SCR) with ammonia injection in conjunction with combustion modifications and water injection. BACT2 (achieved in practice) is ≤ 5.0 ppmvd @15% O<sub>2</sub>. Calpine has elected to design the SCR NO<sub>x</sub> abatement system for an annual average NO<sub>x</sub> concentration of 2.5 ppmvd and a properly designed system should be capable of this level of performance. SCR has been widely and successfully used in combustion turbine applications nationwide since the 1980's. All of the recent gas turbine power projects issued permits by the BAAQMD, use SCR technology.

Two relatively new technologies are capable of controlling NO<sub>x</sub> emissions from a gas turbine to 2 ppmv or below. These are SCNONox, manufactured by Goal Line Environmental Technologies, and XONON, manufactured by Catalytica, Inc. The District has reviewed these technologies to determine if they are appropriate for this application. SCNONox is the more established of the two technologies. This system uses a potassium carbonate coated catalyst to remove both NO<sub>x</sub> and CO, without the use of a reagent such as ammonia. There is one system in commercial operation on a gas turbine of comparable size to this project. Although these technologies have been demonstrated for this source

category, only SCONOx is sufficiently developed to allow the District to approve an application using it.

However, SCONOx is installed on a combined-cycle electrical generation system, which typically has outlet temperatures below 400 degrees F. This project will be a simple-cycle system, with outlet temperatures exceeding 850 degrees F. We are not aware of any SCONOx applications on turbines with outlet temperatures that high, and Goal Line's Technical Paper describing the system lists acceptable temperature range as 300 to 700 degrees F. This problem may be solved by the use of dilution air to lower the temperature. Based on this information, we believe that SCONOx may represent a technologically feasible control option for this project. The District will not require an applicant to use an undemonstrated technology. SCONOx is sufficiently developed to allow the District to approve an application proposing its use. At this time, however, SCONOx is not sufficiently developed that the District can impose it as BACT in the absence of an application proposing its use.

XONON, developed by Catalytica, Inc., is another promising new technology for NOx emissions control. This technology uses a flameless catalyst located inside the combustion chamber itself, which allows for the combustion reaction to proceed at a lower temperature than in conventional turbines, thus preventing the formation of NOx.

At the present time, the commercial availability of this technology is extremely limited. To date, we are aware of only one application, a 1.5 MW turbine in Santa Clara, California. There is no information available regarding the operation of such a system on a turbine the size of the one to be installed at this project, which is over 30 times larger. Based on this information, we do not believe that XONON represents a technologically feasible control option for this project.

Water will be injected into the turbine combustor to reduce NOx emissions in the combustor exhaust. Aqueous ammonia is injected into the SCR catalyst to control exiting stack emissions to less than 5.0 ppmvd NOx @ 15% O2. The ammonia slip will be limited by permit condition to 10.0 ppmv. The applicant is proposing to reduce average NOx emissions below those levels required by current District BACT. Thus, some allowance for ammonia slip is appropriate. Since SCR, controlling NOx emissions to 5.0 ppmv corrected to 15% oxygen, represents a control technology that is technologically feasible, cost-effective, and achieved in practice in a wide variety of applications, it represents BACT for the project.

### **Carbon Monoxide (CO)**

District BACT Guideline 89.1.2, dated 8/28/00, specifies BACT (achieved in practice) for CO for a gas turbine with a power rating  $\leq 50$  MW as CO emissions  $\leq 10.0$  ppmvd @ 15% O<sub>2</sub>, achieved through the use of a catalytic combustor.

The CO emissions from the combustion turbine will be reduced through the use of an oxidation catalyst to less than 4.0 ppmvd CO @ 15% O<sub>2</sub>. CO emissions are also minimized through the use of best combustion practices and "clean burning" natural gas. This will comply with BACT.

The Crockett Cogeneration facility was permitted by the District in 1993 at a CO emission concentration limit of 5.9 ppmvd @ 15% O<sub>2</sub>. This established the technologically feasible/cost-effective BACT specification cited above. However, subsequent operation of the facility has shown that this emission concentration cannot be achieved under all operating modes and ambient conditions. Specifically, CO emissions exceed 5.9 ppmvd during minimum load operation under ambient conditions of low temperature and high relative humidity and during peak load operation under ambient conditions of high temperature and moderate to high relative humidity. However, Crockett Cogeneration has indicated that the gas turbine will not exceed a CO emission concentration of 10 ppmvd @ 15% O<sub>2</sub> under all loads and ambient conditions with and without duct burner firing.

EPA advised that Sacramento Power Authority (SPA) is permitted at 4.0 ppmvd CO @ 15% O<sub>2</sub>, averaged over 1 hour. The Sacramento Municipal Utility District (SMUD) CEM data for the SPA installation over the past six months shows compliance with their CO mass limit, which is equivalent to 3.0 ppm. In fact, the data shows very low CO concentrations (<1 ppm averaged over 24 hours). The District staff believes there is sufficient justification at this time to lower the BACT level for CO to 4.0 ppmvd @ 15% O<sub>2</sub> three-hour average.

The LECEF has agreed to a CO emission limit of 4 ppmvd @ 15% O<sub>2</sub> that will apply to all gas turbine operating modes except for gas turbine start-up and shutdown. The LECEF intends to comply with this BACT specification through the use of an oxidation catalyst and combustor design. The proposed CO level of 4 ppm therefore complies with BACT.

### **Precursor Organic Compounds (POCs)**

District BACT Guideline 89.1.2, dated 8/28/00, specifies BACT (achieved in practice) for POC for a gas turbine with a power rating  $\leq 50$  MW as POC emissions  $\leq 2.0$  ppmvd @ 15% O<sub>2</sub>, achieved through the use of an Oxidation Catalyst in conjunction with combustion modifications.

Because CEMs for organic compounds only measure carbon (as C<sub>1</sub>), it is not possible to determine non-methane/ethane hydrocarbon concentrations on a real-time basis. As a result, a continuous emission concentration limitation as BACT for POC is not feasible. Therefore, BACT for POC is deemed to be a concentration limitation to be verified by annual source testing. The POC emissions from the combustion turbine will be reduced to less than 2.0 ppmvd through the use of an oxidation catalyst. POC emissions are also minimized through the use of best combustion practices and "clean burning" natural gas.

## **Sulfur Dioxide (SO<sub>2</sub>)**

District BACT Guideline 89.1.2, dated 8/28/00, specifies BACT (achieved in practice) for SO<sub>2</sub> for a gas turbine with a rated heat input  $\geq 2.0$  MW and  $< 50$  MW as the exclusive use of clean-burning natural gas. The gas turbines will utilize natural gas exclusively to minimize SO<sub>2</sub> emissions. Because the emission rate of SO<sub>2</sub> depends on the sulfur content of the fuel burned and is not dependent upon the burner type or other combustion characteristics, the use of natural gas will result in the lowest possible emission of SO<sub>2</sub>.

## **Particulate Matter (PM<sub>10</sub>)**

District BACT Guideline 89.1.2, dated 8/28/00, specifies BACT (achieved in practice) for POC for a gas turbine with a rated heat input  $\geq 2.0$  MW and  $< 50$  MW as the exclusive use of clean-burning natural gas. The proposed turbines will utilize natural gas exclusively, which will result in minimal nitrate and sulfate particulate formation. PM<sub>10</sub> emissions are minimized through the use of best combustion practices and "clean burning" natural gas.

## **BACT for S-5, Fire Pump Engine & S-6, Emergency Generator Engine**

The Fire Pump Engine, S-5, is a diesel, which, during an emergency, can operate up to 24 hours per day. Therefore it will be subject to BACT since it can emit more than 10 lbs./day of any one pollutant when operated for as little as 3 hours (a possibility in an emergency). Maximum emission is 82 lbs./day as NO<sub>2</sub>. BACT 2 for a diesel engine is summarized in the table below:

<b>Pollutant</b>	<b>BACT 2 Requirement</b>	<b>Proposed Engine Fairbanks Morse JDFP-06WR</b>
	(gm/bhp-hr)	(gm/bhp-hr)
NO <sub>x</sub> as NO <sub>2</sub>	6.9	5.2
CO	2.75	0.27
PM <sub>10</sub>	0.15	0.09

Previously the applicant had proposed a Fire Pump Engine that did not meet BACT for NO<sub>x</sub>. The presently proposed engine does meet the required BACT criteria and is acceptable to the District.

The Emergency Generator, S-6, is natural gas fired and can operate up to 24 hours per day during an emergency. The proposed engine also triggers BACT since it can emit up to 72 lbs./day of CO. However, the proposed engine meets the required BACT 2 criteria and is acceptable.

## Emission Offsets

### Permitted Maximum Annual Emissions, tons/yr.

<b>Pollutant</b>	<b>NO<sub>2</sub></b>	<b>SO<sub>2</sub></b>	<b>CO</b>	<b>POC</b>	<b>PM<sub>10</sub></b>
Facility Emissions (tpy)	75.4	5.8	72.9	21.0	44.2
Facility Threshold (tpy)	15	100	none	15	100
Offsets Required (tpy)	86.7	0	0	21.0	0

Pursuant to Regulation 2-2-303, emission reduction credits are not required for the proposed SO<sub>2</sub> emission increase associated with this project because the facility SO<sub>2</sub> emissions will not exceed 100 tons per year. Regulation 2-2-303 allows for the voluntary offsetting of SO<sub>2</sub> emission increases of less than 100 tons per year. The applicant has not opted to provide such emission offsets.

Pursuant to Regulation 2-2-302, federally enforceable emission reduction credits are required for NO<sub>x</sub> and POC increases at a ratio of 1.15 and 1.00, respectively. The applicant has demonstrated that it possesses sufficient valid POC offsets for this project, and will submit certificates before the Authority to Construct is issued. The applicant has proposed to meet the NO<sub>x</sub> offset requirement by providing POC ERC credits per 3-2-302.2. The total POC credits required would then be 107.7 tons. The applicant has provided a list of POC ERC credits, under its control, that is sufficient to satisfy the offset requirement.

As indicated, Calpine has secured sufficient valid emission reduction credits to offset the emission increases from the permitted sources proposed for the Los Esteros Critical Energy Project. These ERC credits are summarized in the table below.

**Emission Reduction Credits Identified by Calpine as of December 21, 2001 (tons/yr.)**

<b>Current Owner</b>	<b>Certificate Number</b>	<b>Amount of POC (tpy)</b>	<b>Origin Location</b>	<b>Date Banked</b>	<b>Source Type</b>
Calpine	751	53.3	Quebecor San Jose	6/99	Printing
Calpine	752	25.1	Quebecor San Jose	6/99	Printing
LSI Logic	573	15.9	LSI Milpitas	9/98	Semiconductor Fab
Owens Brockway	628	10.8	Owens Brockway Antioch	6/99	Glass Furnace
Owens Brockway	605	0.4	Owens Brockway Oakland	1/95	Glass Plant
Philips Semiconductor	287	2.6	Philips Sunnyvale	8/93	Semiconductor Fab
Philips Semiconductor	288	9.0	Philips Sunnyvale	7/93	Semiconductor Fab
Anacomp Inc.	393	7.1	Disk Systems Sunnyvale	7/94	Solvents
Total		124			

The applicant plans, however, to substitute the emission reduction credits generated by the Gilroy retrofit of the existing GE Frame 7 turbine when the modification is made and its performance verified. The District considers this approach acceptable.

Pursuant to District Regulation 2-2-311, the applicant must provide the required valid emission reduction credits to mitigate the emission increases for the facility prior to the issuance of the Authority to Construct. Pursuant to District Regulation 2, Rule 3, *Power Plants*, the Authority to Construct will be issued after the California Energy Commission issues the Certificate for the power plant.

**Prevention of Significant Deterioration, PSD**

Pursuant to Regulation 2-2-304, a PSD air quality analysis is not required because this new facility emits less than the trigger levels listed below for NO<sub>2</sub>, POC, PM<sub>10</sub>, CO and SO<sub>2</sub>. As such, the project will not be subject to PSD review for those pollutants.

<b>Pollutant</b>	<b>PSD Trigger Level (tpy)</b>	<b>Project Emissions (tpy)</b>
NO <sub>2</sub>	100	75.2
POC	n/a	20.8
PM <sub>10</sub>	100	44.2
CO	100	73.1
SO <sub>2</sub>	100	5.8

The sulfuric acid mist (SAM) emissions will be conditioned to be less than the PSD threshold of 7 tons per year. An enforceable permit condition has been included (Number 23) limiting sulfuric acid mist from the new combustion units to a level below the PSD trigger level. Compliance will be determined by use of emission factors (using fuel gas rate and sulfur content as input parameters) derived from quarterly compliance source tests. The quarterly source test will be conducted, as indicated in Condition number 27, to measure SO<sub>2</sub>, SO<sub>3</sub> and SAM. This approach is necessary because the extent of conversion in turbines of fuel sulfur to SO<sub>3</sub>, and then to SAM is not well established.

### **Public Notice, Comment and Inspection**

Because the California Energy Commission has accepted an Application for Certification for this plant, the plant is subject to the District Power Plant Regulation 2-3. Per Regulation 2-3-404, this project is subject to the Public Notice, Public Comment and Public Inspection requirements contained in Sections 2-2-406 and 407 of Rule 2. Pursuant to these sections, the APCO shall, within 10 days of the notification of the applicant, cause to have published in at least one newspaper of general circulation within the District, a prominent notice stating the preliminary decision of the APCO, the location of the information available, and inviting written public comment for a 30 day period. The Public Notice was published in the San Jose Mercury/News on November 20, 2001. Three comment letters were received and considered in the preparation of this FDOC.

### **California Environmental Quality Act (CEQA) Analysis**

The CEQA requirements of District Regulation 2-1-426 are met because the California Energy Commission (CEC) is the lead agency on this project and is thus responsible for complying with CEQA. CEC's final certification and licensure will serve as the EIR equivalent pursuant to the CEC's certified regulatory program (CEQA Guidelines Section 15253(b) and Public Resource Code Sections 21080.5 and 25523).

### **Toxic Risk Screen**

Pursuant to the BAAQMD Risk Management Policy, a health risk screening analysis must be performed to determine the potential impact on public health resulting from the worst-case emissions of toxic air contaminants (TACs) from the project. In accordance

with the requirements of the BAAQMD Risk Management Policy and California Air Pollution Control Officers Association (CAPCOA) guidelines, the impact on public health due to the emission of these compounds was assessed utilizing air pollutant dispersion models.

The District's Toxics Evaluation Section performed a review of the health risk assessment submitted by the applicant for operation of this gas turbine peaking facility. The emission rates used in that analysis are calculated based on an annual fuel use of 16,560,000 MMBtu (16,200 MMscf/yr.). The ammonia emissions shown are based upon a worst-case ammonia emission concentration of 10 ppmvd @ 15% O<sub>2</sub> due to ammonia slip from the SCR systems. The rest of the pollutant emissions, except for PAHs, hexane and propylene, were calculated using the emission factors from the AP42 Background Document published, by US-EPA, in April 2000. California Air Toxics Emission Factor (CATEF II) database mean emission factors, available from the California Air Resources Board (CARB) for gas turbines with COC/SCR controls, were used for PAHs, hexane and propylene. Emissions from four gas turbines, the cooling tower, natural gas emergency generator and diesel fire pump have been included in this risk screen. The detailed input calculations are presented in Appendix A.

The results of the District's risk screen are as follows:

Cancer Risk	Chronic Hazard Index	Acute Hazard Index
0.8 in a million	0.003	0.5

Pursuant to the BAAQMD Risk Management Policy, the increased carcinogenic risk attributed to this project is considered to be not significant since it is less than 1.0 in one million. Thus, in accordance with the BAAQMD Risk Management Policy, the screen passes. Therefore, the facility is deemed to be in compliance with the BAAQMD Risk Management Policy.

**Other Applicable District Rules and Regulations**

**Regulation 1, Section 301: Public Nuisance**

None of the project's proposed sources of air contaminants are expected to cause injury, detriment, nuisance, or annoyance to any considerable number of persons or the public with respect to any impacts resulting from the emission of air contaminants regulated by the District. In part, the air quality impact analysis is designed to insure that the proposed facility will comply with this Regulation.

**Regulation 2, Rule 1, Sections 301 and 302:  
Authority to Construct and Permit to Operate**

Pursuant to Regulation 2-1-301 and 2-1-302, the applicant has submitted an application to the District to obtain an Authority to Construct and Permit to Operate for the proposed S-1, 2, 3 and 4 Gas Turbines.

**Regulation 2, Rule 2, Section 307: Certification of Compliance**

Pursuant to Regulation 2-2-307, Calpine Corporation has submitted Certification of Compliance that all major stationary sources owned or operated by the company in the State of California are either in compliance or on a schedule of compliance with all applicable state and federal emission limitations and standards. The Certificate is presented in Appendix B.

**Regulation 2, Rule 3: Power Plants**

Pursuant to Regulation 2-3-403, this Final Determination of Compliance (FDOC) serves as the APCO's decision that the proposed power plant will meet the requirements of all applicable BAAQMD, state and federal regulations. The FDOC contains proposed permit conditions to ensure compliance with those regulations. Pursuant to Regulation 2-3-403, the PDOC was subject to the public notice, public comment, and public inspection requirements contained in Regulation 2-2-406 and 407. The issuance of the FDOC is not considered a final determination of whether the facility can be constructed or operated.

**Regulation 2, Rule 6: Major Facility Review**

Title V of the 1990 Clean Air Act Amendments (CAAA) required states to implement and administer a source-wide operating permit program consistent with the provisions of Title 40, Code of Federal Regulations (CFR), Part 70. The BAAQMD administers the Title V program through Rule 2-6.

Pursuant to Regulation 2, Rule 6, section 404.3 the owner or operator of the Los Esteros Critical Energy Project shall submit an application to the BAAQMD for a Title IV permit (Acid Rain) prior to operation.

**Regulation 2, Rule 7: Acid Rain**

Per the definition of Phase II Acid Rain Facility in Regulation 2-6-217.1, this facility is a Phase II Acid Rain Facility. This project will be subject to the requirements of Title IV of the federal Clean Air Act. The requirements of the Acid Rain Program are set forth in 40 CFR Part 72, 73, and 75. The specifications for the type and operation of continuous emission monitors (CEMs) for pollutants that contribute to the formation of acid rain are given in 40 CFR Part 75.

District Regulation 2, Rule 7 incorporates by reference the provisions of 40 CFR Part 72.

*The facility must obtain an Acid Rain Permit from the BAAQMD prior to the date on which the unit commences operation*

The project will be subject to the following general requirements under the acid rain program:

- Duty to apply for a modification to the Acid Rain Permit.
- Compliance with SO<sub>2</sub> and NO<sub>x</sub> emission limits.
- Duty to obtain required SO<sub>2</sub> allowances.
- Duty to install, operate and certify Continuous Emission Monitoring Systems (CEMs) to demonstrate compliance with the acid rain requirements.

The applicant will secure the required SO<sub>2</sub> allowances and will perform the required emission monitoring. Monitoring plans will be submitted as required by EPA rules.

#### **Regulation 6: Particulate Matter and Visible Emissions**

The combustion of natural gas at the proposed gas turbine is not expected to result in visible emissions. Specifically, the facility's combustion sources are expected to comply with Regulation 6, including sections 301 (Ringelmann No. 1 Limitation), 302 (Opacity Limitation) with visible emissions not to exceed 20% opacity, and 310 (Particulate Weight Limitation) with particulate matter emissions of less than 0.15 grains per dry standard cubic foot of exhaust gas volume.

#### **Regulation 7: Odorous Substances**

Regulation 7-302 prohibits the discharge of odorous substances, which remain odorous beyond the facility property line after dilution with four parts odor-free air. Regulation 7-302 limits ammonia emissions to 5000 ppm. Because the ammonia emissions from the proposed SCR system will each be limited by permit condition to 10 ppmvd @ 15% O<sub>2</sub>, the facility is expected to comply with the requirements of Regulation 7.

#### **Regulation 8: Organic Compounds**

This facility is exempt from Regulation 8, Rule 2, "Miscellaneous Operations" per 8-2-110 since natural gas will be fired exclusively at the project.

#### **Regulation 9: Inorganic Gaseous Pollutants**

##### Regulation 9, Rule 1, Sulfur Dioxide

This regulation establishes emission limits for sulfur dioxide from all sources and applies to the combustion sources at this facility. Section 301 (Limitations on Ground Level

Concentrations) prohibits emissions which would result in ground level SO<sub>2</sub> concentrations in excess of 0.5 ppm continuously for 3 consecutive minutes, 0.25 ppm averaged over 60 consecutive minutes, or 0.05 ppm averaged over 24 hours. Section 302 (General Emission Limitation) prohibits SO<sub>2</sub> emissions in excess of 300 ppm (dry). The gas turbine is not expected to contribute to noncompliance with ground level SO<sub>2</sub> concentrations and should easily comply with section 302.

#### Regulation 9, Rule 3, Nitrogen Oxides from Heat Transfer Operations

The proposed combustion gas turbine shall comply with the Regulation 9-3-303 NO<sub>x</sub> limit of 125 ppm with nitrogen oxide emissions of 5.0 ppmvd @ 15% O<sub>2</sub>.

#### Regulation 9, Rule 8, Nitrogen Oxides and Carbon Monoxide from Stationary Internal Combustion Engines

The proposed S-5 diesel-fired fire-pump engine and the S-6 natural gas-fired generator engine are expected to comply with Regulation 9-8-330 which allows emergency use for unlimited hours, and limits non-emergency use to 200 hours per year.

#### Regulation 9, Rule 9, Nitrogen Oxides from Stationary Gas Turbines

Because the proposed combustion gas turbine will be limited by permit condition to NO<sub>x</sub> emissions of 4.0 ppmvd @ 15% O<sub>2</sub>, it will comply with the Regulation 9-9-301.3 NO<sub>x</sub> limitation of 9 ppmvd @ 15% O<sub>2</sub>.

#### Regulation 9, Rule 11, Nitrogen Oxides and Carbon Monoxide from Electric Power Generating Steam Boilers

This rule does not apply because this project does not utilize a boiler.

#### **Regulation 10: New Source Performance Standards (NSPS)**

This regulation incorporates the federal NSPS.

Subpart A General Provisions provides the general framework for NSPS. Subpart Db Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units does not apply because this project does not utilize duct burners.

Subpart GG Standards of Performance for Stationary Gas Turbines – contains NO<sub>x</sub> and SO<sub>x</sub> emission limits, as well as monitoring and testing requirements for combustion turbines. The project emissions will be well below the applicable NO<sub>x</sub> and SO<sub>2</sub> emissions limits. The Applicant will comply with emission and fuel monitoring requirements, and monitoring plans will be submitted, as required. The applicable requirements will be incorporated into the Title V permit.

## **Section 112 of the Clean Air Act, National Emission Standards for Hazardous Air Pollutants (NESHAP)**

These standards are contained in 40 CFR Parts 61 and 63 and are not applicable to the proposed project.

### **CEQA**

The CEQA requirements of Districts Regulation 2-1-426 are met because the California Energy (CEC) is the lead agency on this project. CEC is thus responsible for conducting the CEQA review and preparing the CEQA document for this project. CEC's final certification and licensure will serve as the EIR equivalent pursuant to the CEC's certified regulatory program (CEQA Guidelines Section 15253(b) and Public Resources Code Section 21080.5 and 25523).

### **Sunset Provision**

Simple Cycle Powerplants (gas turbines without heat recovery steam cycles) are less efficient than combined cycle plants (those with heat recovery steam cycles) but require less time to design and build. In order to expedite the permitting of Simple Cycle Powerplants, the California legislature enacted Section 25552 of the California Public Resources Code. This legislation provided rapid permitting for plants that could be put into service on or before December 31, 2002. Section 25552(e)(5) of this law provides that the plant must have:

"A binding and enforceable agreement with the commission, that demonstrates either of the following:

- (A) That the thermal powerplant will cease to operate and the permit will terminate within three years.
- (B) That the thermal powerplant will be recertified, modified, replaced, or removed within a period of three years with a cogeneration or combined-cycle thermal powerplant that uses best available control technology and obtains necessary offsets, as determined at the time that the combined-cycle thermal powerplant is constructed, and that complies with all other applicable laws, ordinances, and standards."

Condition 38 has been included in the proposed permit conditions to require conversion or shutdown of this plant at the end of three years.

## **Permit Conditions**

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### **Definitions:**

Clock Hour: Any continuous 60-minute period beginning on the hour.

Calendar Day:	Any continuous 24-hour period beginning at 12:00 AM or 0000 hours.
Year:	Any consecutive twelve-month period of time
Heat Input:	All heat inputs refer to the heat input at the higher heating value (HHV) of the fuel, in Btu/scf.
Firing Hours:	Period of time, during which fuel is flowing to a unit, measured in fifteen-minute increments.
MM Btu:	million British thermal units
Gas Turbine Start-up Mode:	The time beginning with the introduction of continuous fuel flow to the Gas Turbine until the requirements listed in Condition 19 are met, but not to exceed 60 minutes.
Gas Turbine Shutdown Mode:	The time from non-compliance with any requirement listed in Condition 19 until termination of fuel flow to the Gas Turbine, but not to exceed 30 minutes.
Corrected Concentration:	The concentration of any pollutant (generally NO <sub>x</sub> , CO or NH <sub>3</sub> ) corrected to a standard stack gas oxygen concentration. For an emission point (exhaust of a Gas Turbine) the standard stack gas oxygen concentration is 15% O <sub>2</sub> by volume on a dry basis
Commissioning Activities:	All testing, adjustment, tuning, and calibration activities recommended by the equipment manufacturers and the construction contractor to insure safe and reliable steady state operation of the gas turbines, heat recovery steam generators, steam turbine, and associated electrical delivery systems.
Commissioning Period:	The Period shall commence when all mechanical, electrical, and control systems are installed and individual system start-up has been completed, or when a gas turbine is first fired, whichever occurs first. The period shall terminate when the plant has completed performance testing, is available for commercial operation, and has initiated sales to the power exchange. In no event shall the Commissioning Period exceed 120 days unless the applicant has made a written request for an extension and the District has granted such an extension. In no case may the Commissioning Period exceed 180 days.
Alternate Calculation:	A District approved calculation used to calculate mass emission data during a period when the CEM or other monitoring system is not capable of calculating mass emissions.
Precursor Organic Compounds (POCs):	Any compound of carbon, excluding methane, ethane, carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate

EQUIPMENT DESCRIPTION:

This Authority To Construct Is Issued And Is Valid For This Equipment Only While It Is In The Configuration Set Forth In The Following Description:

Installation of four Simple-Cycle Gas Turbine Generators Consisting Of:

1. Simple Cycle Gas Turbine, General Electric LM6000PC, Maximum Heat Input 472.6 MMBtu/hr, Nominal Electrical Output 45 MW, Natural Gas-Fired.
2. Selective Catalytic Reduction (SCR) NOx Control System.
3. Ammonia Injection System.  
(including the ammonia storage tank and control system)
4. Oxidation Catalyst (OC) System.
5. Continuous emission monitoring system (CEMS) designed to continuously record the measured gaseous concentrations, and calculate and continuously monitor and record the NOx and CO concentrations in ppmvd corrected to 15% oxygen on a dry basis. The CEM shall also calculate, using District approved methods, and log any mass limits required by these conditions.

PERMIT CONDITIONS:

**Conditions for the Commissioning Period**

1. The owner/operator of the Los Esteros Critical Energy Facility shall minimize emissions of carbon monoxide and nitrogen oxides from S-1, S-2, S-3 and S-4 Gas Turbine to the maximum extent possible during the commissioning period. Conditions 1 through 11 shall only apply during the commissioning period as defined above.
2. At the earliest feasible opportunity in accordance with the recommendations of the equipment manufacturers and the construction contractor, the owner/operator shall tune the S-1, S-2, S-3 and S-4 Gas Turbine combustors to minimize the emissions of carbon monoxide and nitrogen oxides.
3. At the earliest feasible opportunity in accordance with the recommendations of the equipment manufacturers and the construction contractor, the owner/operator shall install, adjust and operate the SCR Systems (A-2, A-4, A-6 & A-8) and OC Systems (A-1, A-3, A-5 & A-7) to minimize the emissions of nitrogen oxides and carbon monoxide from S-1, S-2, S-3 and S-4 Gas Turbine.

4. Coincident with the steady-state operation of SCR Systems (A-2, A-4, A-6 & A-8) and OC Systems (A-1, A-3, A-5 & A-7) pursuant to condition 3 the owner/operator shall operate the facility in a manner such that the Gas Turbine (S-1, S-2, S-3 and S-4) comply with the NO<sub>x</sub> and CO emission limitations specified in conditions 19a and 19c.
5. The owner/operator of the Los Esteros Critical Energy Facility shall submit a plan to the District Permit Services Division at least two weeks prior to first firing of S-1, S-2, S-3 and S-4 Gas Turbines describing the procedures to be followed during the commissioning of the turbines. The plan shall include a description of each commissioning activity, the anticipated duration of each activity in hours, and the purpose of the activity. The activities described shall include, but not be limited to, the tuning of the water injection, the installation and operation of the required emission control systems, the installation, calibration, and testing of the CO and NO<sub>x</sub> continuous emission monitors, and any activities requiring the firing of the Gas Turbines (S-1, S-2, S-3 and S-4) without abatement by their respective SCR Systems. The Gas Turbines (S-1, S-2, S-3 and S-4) shall be fired no sooner than fourteen days after the District receives the commissioning plan.
6. During the commissioning period, the owner/operator of the Los Esteros Critical Energy Facility shall demonstrate compliance with conditions 8 through 10 through the use of properly operated and maintained continuous emission monitors and data recorders for the following parameters:
  - a. firing hours
  - b. fuel flow rates
  - c. stack gas nitrogen oxide emission concentrations,
  - d. stack gas carbon monoxide emission concentrations
  - e. stack gas oxygen concentrations.

The monitored parameters shall be recorded at least once every 15 minutes (excluding normal calibration periods or when the monitored source is not in operation) for the S-1, S-2, S-3 and S-4 Gas Turbines. The owner/operator shall use District-approved methods to calculate heat input rates, nitrogen dioxide mass emission rates, carbon monoxide mass emission rates, and NO<sub>x</sub> and CO emission concentrations, summarized for each clock hour and each calendar day. All records shall be retained on site for at least 5 years from the date of entry and made available to District personnel upon request.

7. The owner/operator shall install, calibrate and make operational the District-approved continuous monitors specified in condition 6 prior to first firing of each turbine (S-1, S-2, S-3 and S-4 Gas Turbines). After first firing of the turbine, the owner/operator shall adjust the detection range of these continuous emission monitors as necessary to accurately measure the resulting range of CO and NO<sub>x</sub> emission concentrations. The

type, specifications, and location of these monitors shall be subject to District review and approval.

8. The owner/operator shall not operate the facility such that the number of firing hours of S-1, S-2, S-3 and S-4 Gas Turbines without abatement by SCR or CO Systems exceed 100 hours during the commissioning period. Such operation of the S-1, S-2, S-3 and S-4 Gas Turbines without abatement shall be limited to discrete commissioning activities that can only be properly executed without the SCR or CO system in place. Upon completion of these activities, the owner/operator shall provide written notice to the District Permit Services and Enforcement Divisions and the unused balance of the 100 firing hours without abatement shall expire.
9. The total mass emissions of nitrogen oxides, carbon monoxide, precursor organic compounds, PM<sub>10</sub>, and sulfur dioxide that are emitted by the S-1, S-2, S-3 and S-4 Gas Turbines during the commissioning period shall accrue towards the consecutive twelve-month emission limitations specified in condition 22.
10. The owner/operator shall not operate the facility such that the pollutant mass emissions from each turbine (S-1, S-2, S-3 and S-4 Gas Turbines) exceed the following limits during the commissioning period. These emission limits shall include emissions resulting from the start-up and shutdown of the S-1, S-2, S-3 and S-4 Gas Turbines.

	<u>Without Catalyst</u>	<u>With Catalyst</u>
a. NO <sub>x</sub> (as NO <sub>2</sub> )	1224 lbs./day 102 lbs./hr	410 lbs./day 34.2 lbs./hr
b. CO	1056 lbs./day 88 lbs./hr	300 lbs./day 25 lbs./hr
c. POC (as CH <sub>4</sub> )	114 lbs./day	114 lbs./day
d. PM <sub>10</sub>	240 lbs./day	240 lbs./day
e. SO <sub>2</sub>	32 lbs./day	32 lbs./day

11. Within sixty (60) days of startup, the Owner/Operator shall conduct a District approved source test using external continuous emission monitors to determine compliance with condition 10. The source test shall determine NO<sub>x</sub>, CO, and POC emissions during start-up and shutdown of the gas turbines. The POC emissions shall be analyzed for methane and ethane to account for the presence of unburned natural gas. The source test shall include a minimum of three start-up and three shutdown periods. Thirty (30) days before the execution of the source tests, the Owner/Operator shall submit to the District a detailed source test plan designed to satisfy the requirements of this condition. The Owner/Operator shall be notified of any necessary modifications to the plan within 20 working days of receipt of the plan; otherwise, the plan shall be deemed approved. The Owner/Operator shall incorporate the District comments into the test plan. The Owner/Operator shall notify the District within ten (10) days prior to the planned source testing date. Source test results shall be submitted to the District within 30 days of the source testing date. These results can be used to satisfy applicable source testing requirements in Condition No. 26 below.

### **Conditions for Operation:**

12. Consistency with Analyses: Operation of this equipment shall be conducted in accordance with all information submitted with the application (and supplements thereof) and the analyses under which this permit is issued unless otherwise noted below.
13. Conflicts Between Conditions: In the event that any condition herein is determined to be in conflict with any other condition contained herein, then, if principles of law do not provide to the contrary, the condition most protective of air quality and public health and safety shall prevail to the extent feasible.
14. Reimbursement of Costs: All reasonable expenses, as set forth in the District's rules or regulations, incurred by the District for all activities that follow the issuance of this permit, including but not limited to permit condition implementation, compliance verification and emergency response, directly and necessarily related to enforcement of the permit shall be reimbursed by the owner/operator as required by the District's rules or regulations.
15. Access to Records and Facilities: As to any condition that requires for its effective enforcement the inspection of records or facilities by representatives of the District, the Air Resources Board (ARB), the U.S. Environmental Protection Agency (U.S. EPA), or the California Energy Commission (CEC), the owner/operator shall make such records available or provide access to such facilities upon notice from representatives of the District, ARB, U.S. EPA, or CEC. Access shall mean access consistent with California Health and Safety Code Section 41510 and Clean Air Act Section 114A.
16. Notification of Commencement of Operation: The owner/operator shall notify the District of the date of anticipated commencement of turbine operation not less than 10 days prior to such date. Temporary operations under this permit are granted consistent with the District's rules and regulations.
17. Operations: The gas turbine, emissions controls, CEMS and associated equipment shall be properly maintained and kept in good operating condition at all times when the equipment is in operation.
18. Visible Emissions: No air contaminant shall be discharged into the atmosphere for a period or periods aggregating more than three minutes in any one hour, which is as dark or darker than Ringelmann 1 or equivalent 20% opacity.
19. Emissions Limits:

The owner/operator shall operate the facility such that none of the following limits are exceeded:

- a. The Oxides of nitrogen (NO<sub>x</sub>) emissions from the gas turbine shall not exceed 5.0 ppmvd @ 15% O<sub>2</sub> (3-hour rolling average), except during periods of startup and shutdown as defined in this permit. The NO<sub>x</sub> emission concentration shall be verified by a District-approved continuous emission monitoring system (CEMS) and during any required source test. (basis: BACT)
  - b. Ammonia emissions from the gas turbine shall not exceed 10 ppmvd @ 15% O<sub>2</sub> (3-hour rolling average), except during periods of startup and shutdown as defined in this permit. The ammonia emission concentration shall be verified by the continuous recording of the ratio of the ammonia injection rate to the NO<sub>x</sub> inlet rate into the SCR control system (molar ratio). The maximum allowable NH<sub>3</sub>/NO<sub>x</sub> molar ratio shall be determined during any required source test, and shall not be exceeded until reestablished through another valid source test. (basis: BACT)
  - c. Carbon monoxide (CO) emissions from the gas turbine shall not exceed 4 ppmvd @ 15 % O<sub>2</sub> (3-hour rolling average), except during periods of startup and shutdown as defined in this permit. The CO emission concentration shall be verified by a District-approved CEMS and during any required source test. (basis: BACT)
  - d. Precursor organic compound (POC) emissions from the gas turbine shall not exceed 2 ppmvd @ 15% O<sub>2</sub> (3-hour rolling average), except during periods of startup and shutdown as defined in this permit. The POC emission concentration shall be verified during any required source test. (basis: BACT)
  - e. Particulate matter emissions less than ten microns in diameter (PM<sub>10</sub>) from each gas turbine shall not exceed 2.5 pounds per hour, except during periods of startup and shutdown as defined in this permit. The PM<sub>10</sub> mass emission rate shall be verified during any required source test. (basis: BACT & cumulative increase)
  - f. Oxides of sulfur emissions (SO<sub>x</sub>) from each gas turbine shall not exceed 0.33 pounds per hour, except during periods of startup and shutdown as defined in this permit. The SO<sub>x</sub> emission rate shall be verified during any required source test. (basis: BACT & cumulative increase)
20. Turbine Startup: The owner/operator shall not operate the facility such that startup of the gas turbine exceeds a time period of 60 minutes each per occurrence, or another time period based on good engineering practice and approved in advance by the District. The startup applicable period begins with the turbine's initial firing and continues until the unit meets the emission concentration limits. (Basis: Cumulative increase)

21. Turbine Shutdown: The owner/operator shall not operate the facility such that shutdown of the gas turbine exceeds a time period of 30 minutes each per occurrence, or another time period based on good engineering practice and approved in advance by the District. Shutdown begins with initiation of the turbine shutdown sequence and ends with the cessation of turbine firing. (Basis: Cumulative increase)
22. Mass Emission Limits: The owner/operator shall not operate the facility such that the mass emissions from the S-1, S-2, S-3 and S-4 Gas Turbines exceeds the daily, and annual mass emission limits listed in Table 1 below. The owner/operator shall implement process computer data logging including running totals to demonstrate compliance with Table 1 limits without further calculations

Table 1 – Mass Emission Limits (Including Startups and Shutdowns)

Pollutant	Each turbine lb./day	Daily (4 units) (lb.)	Annual (tons)
NO <sub>x</sub> (as NO <sub>2</sub> )	205.2	821	74.9
POC	28.3	113	20.8
CO	99.8	399	72.9
SO <sub>x</sub> (as SO <sub>2</sub> )	7.9	32	5.8
PM <sub>10</sub>	60.0	240	43.8
NH <sub>3</sub>	151.7	607	110.7

The daily mass limits are on a Calendar Day basis as defined under Permit Conditions. The Annual Mass Limit is based on a rolling 8760-hour period ending on the last hour. Compliance shall be based on calendar average one-hour readings through the use of process monitors (e.g., fuel use meters), CEMS, and source test results; and the monitoring, recordkeeping and reporting conditions of this permit. If any part of the CEM, involved in the mass emission calculations, is inoperative for more than three hours of plant operation, the mass data for the inoperative period shall be calculated using a District approved Alternate Calculation.  
(Basis: Cumulative increase & record keeping)

23. Acid Limit: The owner/operator shall not operate the facility such that sulfuric acid emissions (SAM) from S-1 through S-4 combined exceed 7 tons in any consecutive four quarters. (Basis: PSD)
24. Operational Limits: In order to comply with the emission limits of this rule, the owner/operator shall comply with the following operational limits:
- a. The heat input to any gas turbine shall not exceed:
    - Hourly: 472.6 MMBtu/hr
    - Daily: 11,342 MMBtu/day
    - Four Turbines

Annual: 16,560,000 MMBtu/year

- b. Only PUC Quality natural gas (General Order 58-a) shall be used to fire the gas turbine. The natural gas shall not contain total sulfur in concentrations exceeding 0.25 gr./100 scf.
- c. The owner/operator of the gas turbine shall comply with the daily and annual emission limits listed in Table 1 by keeping running totals based on CEM data. (Basis: Cumulative increase)

25. Monitoring Requirements: The owner/operator shall comply with the following monitoring requirements for each gas turbine:

- a. The gas turbine exhaust stack shall be equipped with permanent provisions to allow collection of stack gas samples consistent with EPA test methods.
- b. The ammonia injection system shall be equipped with an operational ammonia flowmeter and injection pressure indicator accurate to plus or minus five percent at full scale and calibrated once every twelve months.
- c. The gas turbine exhaust shall be equipped with continuously recording emissions monitor(s) for NO<sub>x</sub>, CO and O<sub>2</sub>. Continuous emissions monitors shall comply with the requirements of 40 CFR Part 60, Appendices B and F, and 40 CFR Part 75, and shall be capable of monitoring concentrations and mass emissions during normal operating conditions and during startups and shutdowns.
- d. The fuel heat input rate shall be continuously recorded using District-approved fuel flow meters along with quarterly fuel compositional analyses for the fuel's higher heating value (wet basis).
- e. The total sulfur content of the fuel gas shall be analyzed on a quarterly basis. (Basis: Monitoring & record keeping)

26. Source Testing/RATA: Within sixty days after startup of the gas turbines, and at a minimum on an annual basis thereafter, the owner/operator shall perform a relative accuracy test audit (RATA) on the CEMS in accordance with 40 CFR Part 60 Appendix B Performance Specifications and a source test shall be performed. Additional source testing may be required at the discretion of the District to address or ascertain compliance with the requirements of this permit. The written test results of the source tests shall be provided to the District within thirty days after testing. A complete test protocol shall be submitted to the District no later than 30 days prior to testing, and notification to the District at least ten days prior to the actual date of testing shall be provided so that a District observer may be present. The source test protocol shall comply with the following: measurements of NO<sub>x</sub>, CO, POC, and stack gas oxygen content shall be conducted in accordance with ARB Test Method 100;

measurements of PM<sub>10</sub> shall be conducted in accordance with ARB Test Method 5; and measurements of ammonia shall be conducted in accordance with Bay Area Air Quality Management District test method ST-1B. Alternative test methods, and source testing scope, may also be used to address the source testing requirements of the permit if approved in advance by the District. The initial and annual source tests shall include those parameters specified in the approved test protocol, and shall at a minimum include the following:

- a. NO<sub>x</sub> – ppmvd at 15% O<sub>2</sub> and LB/MMBtu (as NO<sub>2</sub>);
  - b. Ammonia – ppmvd at 15% O<sub>2</sub> (Exhaust);
  - c. CO – ppmvd at 15% O<sub>2</sub> and LB/MMBtu (Exhaust);
  - d. POC – ppmvd at 15% O<sub>2</sub> and LB/MMBtu (Exhaust);
  - e. PM<sub>10</sub> – LB/hr (Exhaust);
  - f. SO<sub>x</sub> – LB/hr (Exhaust);
  - g. Natural gas consumption, fuel High Heating Value (HHV), and total fuel sulfur content;
  - h. Turbine load in megawatts;
  - i. Stack gas flow rate (SDCFM) calculated according to procedures in U.S. EPA Method 19.
  - j. Exhaust gas temperature (°F)
  - k. Ammonia injection rate (LB/hr or moles/hr)
  - l. Water injection rate for each turbine at S-1, S-2, S-3, & S-4  
(Basis: source test requirements & monitoring)
27. Within 60 days of start-up of the LECEF and on a semi-annual basis thereafter, the owner/operator shall conduct a District approved source test on exhaust points for S-1 through S-4 while each Gas Turbine is operating at maximum load to demonstrate compliance with the SAM levels in Condition number 23. The owner/operator shall test for (as a minimum) SO<sub>2</sub>, SO<sub>3</sub> and SAM. After acquiring one year of source test data on these units, the owner/operator may petition the District to switch to annual source testing if test variability is low. (Basis: PSD Avoidance, SAM Periodic Monitoring)
28. The owner/operator shall prepare a written quality assurance program must be established in accordance with 40 CFR Part 75, Appendix B and 40 CFR Part 60 Appendix F. (Basis: continuous emission monitoring)
29. The owner/operator shall comply with the applicable requirements of 40 CFR Part 60 Subpart GG. (Basis: NSPS)
30. The owner/operator shall notify the District of any breakdown condition consistent with the District's breakdown regulations. (Basis: Regulation 1-208)
31. The owner/operator shall notify the District in writing in a timeframe consistent with the District's breakdown regulations following the correction of any breakdown

condition. The breakdown condition shall include a description of the equipment malfunction or failure, the date and cause of the initial failure, the estimated emissions in excess of those allowed, and the actions taken to restore normal operations. (Basis: Regulation 1-208)

32. Recordkeeping: The owner/operator shall maintain the following records:

- a. hourly, daily, quarterly and annual quantity of fuel used and corresponding heat input rates;
- b. the date and time of each occurrence, duration, and type of any startup, shutdown, or malfunction along with the resulting mass emissions during such time period;
- c. emission measurements from all source testing, RATAs and fuel analyses;
- d. daily, quarterly and annual hours of operation;
- e. hourly records of NO<sub>x</sub> and CO, emission concentrations and hourly ammonia injection rates and ammonia/NO<sub>x</sub> ratio.
- f. for the continuous emissions monitoring system; performance testing, evaluations, calibrations, checks, maintenance, adjustments, and any period of non-operation of any continuous emissions monitor.

(Basis: record keeping)

33. The owner/operator shall maintain all records required to be maintained by this permit for a period of five years and shall make such records readily available for District inspection upon request. (Basis: record keeping)

34. Reporting: The owner/operator shall submit to the District a written report for each calendar quarter, within 30 days of the end of the quarter, which shall include:

- a. Daily and quarterly fuel use and corresponding heat input rates;
- b. Daily and quarterly mass emission rates for all criteria pollutants during normal operations and during other periods (startup/shutdown, breakdowns);
- c. Time intervals, date, and magnitude of excess emissions;
- d. Nature and cause of the excess emission, and corrective actions taken;
- e. Time and date of each period during which the CEM was inoperative, except for zero and span checks, and the nature of system repairs and adjustments;
- f. A negative declaration when no excess emissions occurred;
- g. Results of quarterly fuel analyses for HHV and total sulfur content.

(Basis: record keeping & reporting)

35. Emission Offsets: The owner/operator shall offset the project emissions in the amount and at the ratios outlined in Table 2 below.

Table 2 – Emission Offsets

Pollutant	Emissions Requiring Offsets (tons/yr.)	Offset Ratio	Total ERCs Required (tons/yr.)
NO <sub>x</sub> (as NO <sub>2</sub> )	75.4	1.15	86.7
POC	21.0	1.00	21.0

The ERC certificates must be delivered to the District ten days prior to the issuance of the ATC. (Basis: Emission Offsets)

36. District Operating Permit: The owner/operator shall apply for and obtain all required operating permits from the District according to the requirements of the District's rules and regulations. (Basis: Regulations 2-2 & 2-6)
37. Title IV and Title V Permits: The owner/operator must deliver applications for the Title IV and Title V permits to the District prior to first-fire of the turbines. The owner/operator must cause the acid rain monitors (Title IV) to be certified within 90 days of first-fire. (Basis: Regulation 2-6)
38. Sunset Provision: Within three years of CEC Approval, The owner/operator must convert to either a combined cycle or cogeneration plant using BACT in effect at the time of conversion. If conversion does not occur the plant must cease operation. (Basis: California State Resources Code, Section 25552)
39. The owner/operator shall fire S-5 Fire Pump Engine exclusively on diesel fuel having a sulfur content no greater than 0.05% by weight. (Toxics, Cumulative Increase)
40. The owner/operator shall operate the S-5 Fire Pump Engine for no more than 100 hours per year for the purpose of reliability testing and non-emergency operation. (Cumulative Increase, Regulation 9-8-231 & 330)
41. The owner/operator shall equip the S-5 Fire Pump Engine with a non-resettable totalizing counter that records hours of operation. (BACT)
42. The owner/operator shall maintain the following monthly records in a District-approved log for at least 5 years and shall make such records and logs available to the District upon request: (BACT)

- a. Total number of hours of operation for S-5.
  - b. Fuel usage at S-5
43. The owner/operator shall fire the S-6 Emergency Generator exclusively on natural gas. (Toxics, Cumulative Increase).
44. The owner/operator shall not operate S-6 Emergency Generator for more than 100 hours per year for the purpose of reliability testing or in anticipation of imminent emergency conditions. Emergency conditions are any of the following: loss of regular natural gas supply, failure of regular electric power supply, flood mitigation, sewage overflow mitigation, fire, failure of a primary motor, but only for such time as needed to repair or replace the primary motor. (Regulation 9-8-231 & 330, Cumulative Increase)
45. The owner/operator shall equip the S-6 Emergency Generator with a non-resettable totalizing counter that records hours of operation. (BACT)
46. The owner/operator shall maintain the following monthly records in a District-approved log for at least 5 years and shall make such records and logs available to the District upon request: (BACT)
- a. Total number of hours of operation for S-6
  - b. Fuel usage at S-6
47. The owner/operator shall operate the facility such that maximum projected annual toxic air contaminant emissions (per condition 48) from the gas turbines combined (S-1, S-2, S-3 and S-4) shall not exceed the following limits:
- 6000 pounds of formaldehyde per year
  - 3000 pounds of acetaldehyde per year
  - 1.7 pounds of Specified polycyclic aromatic hydrocarbons (PAHs) per year
  - 60 pounds of acrolein per year

unless the following requirement is requirement satisfied:

The owner/operator shall perform a health risk assessment using the emission rates determined by source test and the most current Bay Area Air Quality Management District approved procedures and unit risk factors in effect at the time of the analysis. This analysis shall be submitted to the District and the CEC CPM within 60 days of the source test date. The owner/operator may request that the District and CEC CPM revise the carcinogenic compound emission limits specified above. If the owner/operator demonstrates to the satisfaction of the APCO that these revised emission limits will result in a cancer risk of not more than 1.0 in one million, the District and CEC CPM may, at their discretion, adjust the carcinogenic compound emission limits listed above. (TRMP)

48. To demonstrate compliance with Condition 47, the owner/operator shall calculate and record on an annual basis the maximum projected annual emissions shall be calculated using the maximum Heat Input of 16,560,000 MM Btu/year and the highest emission factor (pound of pollutant per MM Btu of Heat Input) determined by any source test of the S-1, S-2, S-3 & S-4 Gas Turbines. If this calculation method results in an unrealistic mass emission rate (the highest emission factor occurs at a low firing rate) the applicant may use an alternate calculation, subject to District approval. (TRMP)
49. Within 60 days of start-up of the Los Esteros Critical Facility and on a biennial (once every two years) thereafter, the owner/operator shall conduct a District-approved source test at exhaust point P-1, P-2, P-3, or P-4 while the Gas Turbines are at maximum allowable operating rates to demonstrate compliance with Condition 47. If three consecutive biennial source tests demonstrate that the annual emission rates calculated pursuant to condition 47 For any of the compounds listed above are less than the BAAQMD Toxic Risk Management Policy trigger levels shown, and then the owner/operator may discontinue future testing for that pollutant:

Formaldehyde	<	132 lbs./yr.
Acetaldehyde	<	288 lbs./yr.
Specified PAHs	<	0.18 lbs./yr.
Acrolein	<	15.6 lbs./yr.

(TRMP)

## Conclusion

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The proposed Los Esteros Critical Energy Project, which is composed of the permitted sources listed below, complies with all applicable federal, state and District rules and regulations. We recommend that the District issue a Final Determination of Compliance document for the following equipment:

- S-1 Combustion Gas Turbine with Water Injection, General Electric LM6000PC Sprint, natural gas fired, 45 MW nominal, net simple-cycle, 472.6 MMBtu/hr maximum heat input rating; abated by A-1 Oxidation Catalyst, and A-2 Selective Catalytic Reduction System.**
- S-2 Combustion Gas Turbine with Water Injection, General Electric LM6000PC Sprint, natural gas fired, 45 MW nominal, net simple-cycle, 472.6 MMBtu/hr maximum heat input rating; abated by A-3 Oxidation Catalyst, and A-4 Selective Catalytic Reduction System.**
- S-3 Combustion Gas Turbine with Water Injection, General Electric LM6000PC Sprint, natural gas fired, 45 MW nominal, net simple-cycle, 472.6 MMBtu/hr**

- maximum heat input rating; abated by A-5 Oxidation Catalyst, and A-6 Selective Catalytic Reduction System.**
- S-4 Combustion Gas Turbine with Water Injection, General Electric LM6000PC Sprint, natural gas fired, 45 MW nominal, net simple-cycle, 472.6 MMBtu/hr maximum heat input rating; abated by A-7 Oxidation Catalyst, and A-8 Selective Catalytic Reduction System.**
- S-5 Fire Pump Engine, Fairbanks Morse JDFP-06WR, diesel fired, 300 HP, 2.0 MMBtu/hr maximum heat input rating.**
- S-6 Emergency Generator Engine, Caterpillar G3512 90 LE or equivalent, natural gas-fired, 804 HP (600 kW), 6.44 MMBtu/hr maximum heat input rating.**

Pursuant to District Regulation 2-3-404, the Preliminary Determination of Compliance (PDOC) fulfilled the public notice, public comment, and public inspection requirements of Regulation 2-2-406 and 2-2-407. A notice inviting written comment was published in the San Jose Mercury News on November 20, 2001. The public comment period ended on December 20, 2001. Comments received on the PDOC have been considered and, where appropriate this FDOC reflects changes in response to those comments.

Ellen Garvey  
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## **Appendix A**

### **Toxic Risk Analysis Input Data**

## **Appendix B**

### **Certificate of Compliance**

**(To be furnished by Calpine)**