



**MAY 03 2011**

Mary Dyas  
Compliance Project Manager  
California Energy Commission  
1516 Ninth Street, MS-2000  
Sacramento, CA 95814

**Re: Notice of Preliminary Determination of Compliance (PDOC)**  
**Facility: Pastoria Energy Facility, LLC**  
**Project Number: S-1103990**

Dear Ms. Dyas:

Enclosed for your review and comment is the District's preliminary revised determination of compliance for the expansion of Pastoria Energy, LLC. The project which received a final determination of compliance from the District in 2005 and approval from the California Energy Commission in November 2006, will install a 164 MW GE natural gas fired turbine engine- generator operating in simple cycle mode. The project is located in Tejon Ranch in Section 7, Township 10N, Range 18W in Kern County.

The notice of preliminary decision for this project will be published approximately three days from the date of this letter. Please submit your written comments on this project within the 30-day comment period that begins on the date you receive this letter.

If you have any questions, please contact Mr. Leonard Scandura, Permit Services Manager, at (661) 392-5500.

Sincerely,

David Warner  
Director of Permit Services

DW:DG/dg

Enclosures

**Seyed Sadredin**

Executive Director/Air Pollution Control Officer

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**Northern Region**

4800 Enterprise Way  
Modesto, CA 95356-8718  
Tel: (209) 557-6400 FAX: (209) 557-6475

**Central Region (Main Office)**

1990 E. Gettysburg Avenue  
Fresno, CA 93726-0244  
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**Southern Region**

34946 Flyover Court  
Bakersfield, CA 93308-9725  
Tel: 661-392-5500 FAX: 661-392-5585



MAY 03 2011

Ms. Barbara McBride  
Pastoria Energy Facility, LLC  
4160 Dublin Boulevard  
Dublin, CA 94568

**Re: Notice of Preliminary Decision - DOC / Certificate of Conformity**  
**Facility # S-3636**  
**Project # S-1103990**

Dear Ms. McBride:

Enclosed for your review and comment is the District's analysis of an application for Preliminary Determination of Compliance (DOC) for Pastoria Energy Facility, LLC, Tejon Ranch, 30 miles south of Bakersfield, CA. The project is to install a 164 MW GE natural gas fired turbine engine/electrical generator with dry low NOx combustors and selective catalytic reduction.

After addressing all comments made during the 30-day public notice and the 45-day EPA comment periods, the Preliminary Determination of Compliance will be issued to the facility with a Certificate of Conformity. Prior to operating with modifications authorized by the DOC, the facility must submit an application to modify the Title V permit as an administrative amendment, in accordance with District Rule 2520, Section 11.5.

The public notice will be published approximately three days from the date of this letter. Please submit your written comments within the 30-day public comment period which begins on the date of publication of the public notice.

Thank you for your cooperation in this matter. If you have any questions, please contact Mr. Leonard Scandura, Permit Services Manager, at (661) 392-5500.

Sincerely,

David Warner  
Director of Permit Services

DW:DG/dg

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**MAY 03 2011**

Gerardo C. Rios, Chief  
Permits Office  
Air Division  
U.S. EPA - Region IX  
75 Hawthorne St.  
San Francisco, CA 94105

**Re: Notice of Preliminary Decision - DOC/ Certificate of Conformity  
Facility # S-3636  
Project # S-1103990**

Dear Mr. Rios:

Enclosed for your review is the District's engineering evaluation of an application for Preliminary Determination of Compliance (DOC) for Pastoria Energy Facility, LLC, Tejon Ranch, 30 miles south of Bakersfield, CA, which has been issued a Title V permit. Pastoria Energy Facility, LLC is requesting that a Certificate of Conformity, with the procedural requirements of 40 CFR Part 70, be issued with this project. The project is to install a 164 MW GE natural gas fired turbine engine/electrical generator with dry low NOx combustors and selective catalytic reduction.

Enclosed is the engineering evaluation of this application and proposed Preliminary Determination of Compliance with Certificate of Conformity. After demonstrating compliance with the DOC, the conditions will be incorporated into the facility's Title V permit through an administrative amendment.

Please submit your written comments on this project within the 45-day comment period that begins on the date you receive this letter.

Thank you for your cooperation in this matter. If you have any questions, please contact Mr. Leonard Scandura, Permit Services Manager, at (661) 392-5500.

Sincerely,



David Warner  
Director of Permit Services

DW:DG/dg

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MAY 03 2011

Mike Tollstrup, Chief  
Project Assessment Branch  
Air Resources Board  
P O Box 2815  
Sacramento, CA 95812-2815

Re: **Notice of Preliminary Decision - DOC / Certificate of Conformity**  
**Facility # S-3636**  
**Project # S-1103990**

Dear Mr. Tollstrup:

Enclosed for your review and comment is the District's analysis of an application for Preliminary Determination of Compliance (DOC) for Pastoria Energy Facility, LLC, Tejon Ranch, 30 miles south of Bakersfield, CA. The project is to install a 164 MW GE natural gas fired turbine engine/electrical generator with dry low NOx combustors and selective catalytic reduction.

The public notice will be published approximately three days from the date of this letter. Please submit your written comments within the 30-day public comment period which begins on the date of publication of the public notice.

Thank you for your cooperation in this matter. If you have any questions, please contact Mr. Leonard Scandura, Permit Services Manager, at (661) 392-5500.

Sincerely,

David Warner  
Director of Permit Services

DW:DG/dg

Enclosures

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Executive Director/Air Pollution Control Officer

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**NOTICE OF PRELIMINARY DECISION  
FOR THE ISSUANCE OF DETERMINATION OF COMPLIANCE**

NOTICE IS HEREBY GIVEN that the San Joaquin Valley Air Pollution Control District solicits public comment on the proposed issuance of Determination of Compliance to Pastoria Energy Facility, LLC for its electrical power generation facility located at Tejon Ranch, 30 miles south of Bakersfield, California. The project is to install a 164 MW GE natural gas fired turbine engine/electrical generator with dry low NOx combustors and selective catalytic reduction.

The analysis of the regulatory basis for these proposed actions, Project #S-1103990, is available for public inspection at [http://www.valleyair.org/notices/public\\_notices\\_idx.htm](http://www.valleyair.org/notices/public_notices_idx.htm) and the District office at the address below. Written comments on the proposed initial permit must be submitted within 30 days of the publication date of this notice to **DAVID WARNER, DIRECTOR OF PERMIT SERVICES, SAN JOAQUIN VALLEY AIR POLLUTION CONTROL DISTRICT, 1990 E. GETTYSBURG AVE, FRESNO, CA 93726-0244.**

# REVISED DETERMINATION OF COMPLIANCE EVALUATION

**Pastoria Energy Facility, LLC  
California Energy Commission  
Application for Re-certification Docket #: 05-AFC-01**

**Facility Name:** Pastoria Energy Facility, LLC  
**Mailing Address:** 4160 Dublin Boulevard  
Dublin, CA 94568

**Contact Name:** Barbara McBride, Director of Safety, Health & Environment  
**Telephone:** (925) 570-0849  
**Fax:** (925) 431-1313  
**E-Mail:** Bmcbride@calpine.com

**Alternate Contact:** Nancy Matthews, Sierra Research  
**Telephone:** (916) 273-5124  
**E-Mail:** Nmatthews@sierraresearch.com

**Engineer:** Dolores Gough, Air Quality Engineer  
**Lead Engineer:** Richard Karrs, Supervising Air Quality Engineer  
*Ruk 4-27-11*

**Project #:** S-1103990  
**Application #'s:** S-3636-14-1  
**Submitted:** August 9, 2010

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**I. PROPOSAL:**

Pastoria Energy Facility, LLC (Pastoria) is seeking a modification to the prior approval issued by the San Joaquin Valley Air Pollution Control District (the "District") for the expansion of the existing "merchant" electrical power generation facility, which received California Energy Commission (CEC) and District approval in 1999 (99-AFC-01). The original facility, which has been in operation since 2005, is rated at 750 MW, and consists of three natural gas-fired gas turbine engine-generators (GTEs), each with a heat recovery steam generators (HRSG) operating in combined cycle mode with two steam turbines. The facility also includes two cooling towers, a diesel engine driven firewater pump and a natural gas-fired emergency IC engine. The Pastoria Energy Facility expansion (PEFE) project proposes the installation of a 164 MW ("F Class") natural gas-fired gas turbine engine-generator operating in simple cycle mode.

The Pastoria Energy Facility expansion will be incorporated into the 31-acre original plant site. Except for the GTE and associated equipment (selective catalytic reduction (SCR), exhaust gas NO<sub>x</sub> treatment unit, exhaust stack, step up transformer and 230 kV switch gear), no additional equipment is proposed. Existing water and natural gas facilities and supplies are adequate. Additional cooling capacity is not required as the unit operates in simple cycle mode.

The Pastoria Energy Facility expansion received a Final Determination of Compliance from the District in late 2005 and was approved by the CEC in November 2006. The District granted an extension of the PEFE Final Determination of Compliance (FDOC) in 2010.

As originally permitted, the Pastoria Energy Facility was subject to Prevention of Significant Determination (PSD) requirements by the US EPA Region IX. With this project, the facility is proposing to amend the FDOC to reduce allowable annual emissions to below PSD thresholds so that the project will no longer require a PSD permit from EPA. As such, this revision will limit the annual fuel use to 5,059,575 MMBTU/yr on a rolling 12-month basis, which is equivalent to 2,825 full-load operating hours. In addition, the following revisions to the original application are proposed:

- Reduction of CO concentrations to 2 ppmvd, consistent with the District's recent BACT determinations for large gas turbines with DLN combustors;
- Reduction of hourly PM<sub>10/2.5</sub> emissions to 7.0 lb/hr, based on recent source test data from similar units;
- Revision of ambient air quality analysis;
- Revision of screening health risk assessment; and
- Demonstration of project compliance with the new federal 1-hour NO<sub>2</sub> and SO<sub>2</sub> ambient air quality standards.

Although the annual emissions from the project are significantly lower than previously permitted, Pastoria is not proposing to change the offsetting scheme previously



approved (to offset emissions from 100% utilization) to retain optimal operating flexibility, i.e. the ability to operate full time in any calendar quarter.

The Pastoria Energy Facility expansion is subject to approval by the California Energy Commission. CEC is the lead agency for this project for the requirements of the California Environmental Quality Act (CEQA). Pursuant to the District's Rule 2201, Section 5.8, the Determination of Compliance (DOC) review is functionally equivalent to an engineering review. The revised DOC will be issued and submitted to the CEC contingent upon the District's approval of the project.

The equipment that the DOC was issued in 2005 under Project S-1052027 and renewed in 2010 under Project S-1100350 has not been implemented; therefore, the subject GTE in this project will be treated as a new emissions unit.

A draft of the revised DOC conditions is included as **Attachment A**.

## **II. APPLICABLE RULES:**

- Rule 1080** Stack Monitoring (12/17/92)
- Rule 1081** Source Sampling (12/16/93)
- Rule 1100** Equipment Breakdown (12/17/92)
- Rule 2010** Permits Required (12/17/92)
- Rule 2201** New and Modified Stationary Source Review Rule (12/18/08)
- Rule 2520** Federally Mandated Operating Permits (6/21/01)
- Rule 2540** Acid Rain Program (11/13/97)
- Rule 2550** Federally Mandated Preconstruction Review for Major Sources of Air Toxics (6/18/98)
- Rule 4001** New Source Performance Standards (4/14/99)
  - Subpart Dc - Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units
  - Subpart GG - Standards of Performance for Stationary Gas Turbines
  - Subpart KKKK – Standards of Performance for Stationary Combustion Turbines
- Rule 4002** National Emissions Standards for Hazardous Air Pollutants (5/20/2004)
  - Subpart ZZZZ - National Emission Standard for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines
- Rule 4101** Visible Emissions (2/17/05)
- Rule 4102** Nuisance (12/17/92)
- Rule 4201** Particulate Matter Concentration (12/17/92)
- Rule 4202** Particulate Matter Emission Rate (12/17/92)
- Rule 4301** Fuel Burning Equipment (12/17/92)
- Rule 4703** Stationary Gas Turbines (9/20/07)
- Rule 4801** Sulfur Compounds (12/17/92)
- Rule 8011** General Requirements (8/19/04)
- Rule 8021** Construction, Demolition, Excavation, Extraction and Other Earthmoving Activities (8/19/04)

- Rule 8031** Bulk Materials (8/19/04)
- Rule 8041** Carryout and Trackout (8/19/04)
- Rule 8051** Open Areas (8/19/04)
- Rule 8061** Paved and Unpaved Roads (8/19/04)
- Rule 8071** Unpaved Vehicle/Equipment Traffic Areas (9/16/04)
- Rule 8081** Agricultural Sources (9/16/04)

**California Environmental Quality Act (CEQA)**

**California Health & Safety Code (CH&S)**, Sections 41700 (Health Risk Analysis), 42301.6 (School Notice), and 44300 (Air Toxic "Hot Spots")

**III. PROJECT LOCATION:**

The Pastoria Energy Facility is located on a 31 acre site on the Tejon Ranch, 30 miles south of Bakersfield and 6.5 miles east of Interstate Highway 5 at the base of the Tehachapi Mountains, Kern County. The project site is at Section 7, Township 10N, Range 18W, San Bernardino Base and Meridian.

The proposed location is not within 1,000 feet of a K-12 school.

**IV. PROCESS DESCRIPTION:**

Simple-Cycle Combustion Turbine Generator

The natural gas-fired General Electric 7FA-Class simple-cycle gas turbine engine-generator (GTE) will be equipped with dry Low NO<sub>x</sub> combustors and a selective catalytic reduction (SCR) system with ammonia injection. The GTE will drive an electrical generator to produce approximately 164 MW of electricity. Dilution air will be added ahead of the SCR unit to cool the exhaust to within the operating temperature range of the SCR unit, approximately 800°F.

The GTE may be operated up to 24 hours per day, with an annual heat input not to exceed 5,059,575 MMBtu/hr on a rolling 12-month basis, the equivalent of 2,825 full-load hours per year, including 300 hours per year of startup/shutdown activities.

The GTE will utilize Dry Low NO<sub>x</sub> (DLN) combustor, SCR with ammonia injection, and good combustion practices to achieve the following emission rates:

- NO<sub>x</sub>: 2.5 ppmvd @ 15% O<sub>2</sub>
- VOC: 1.3 ppmvd @ 15% O<sub>2</sub>
- CO: 2.0 ppmvd @ 15% O<sub>2</sub>
- SO<sub>x</sub>: 0.002 lb/MMBtu
- PM<sub>10/2.5</sub>: 7.0 lb/hr

Continuous emissions monitoring systems (CEMS) will sample, analyze, and record NO<sub>x</sub>, CO, and O<sub>2</sub> concentrations in the exhaust gas.

**V. EQUIPMENT LISTING:**

**S-3636-14-1:** 164 MW NOMINALLY RATED GENERAL ELECTRIC 7FA NATURAL GAS FIRED GAS TURBINE ENGINE/ELECTRICAL GENERATOR #4 WITH DRY LOW NOX COMBUSTORS AND SELECTIVE CATALYTIC REDUCTION (SCR)

**Equipment Specifications:**

Manufacturer:	General Electric
Model:	7FA
Design Ambient Temperature <sup>a</sup>	Natural gas
Nominal Heat Input Rate	1,791 MMBtu/hr @ HHV
Nominal Power Generation Rate	160 MW
Nominal Exhaust Temperature	800 °F (w/ dilution air)
Nominal Exhaust Flow Rate	3,000,000 acfm
Nominal Exhaust O2 Conc., dry volume	14%
Exhaust CO2 Conc., dry volume	4%
Exhaust Moisture Content, wet volume	8%
Emission Controls	Dry Low-NOx Combustor and SCR (2.5 ppmv NOx @ 15% O2)

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<sup>a</sup> Low-temperature scenario corresponds to maximum heat input-rate.

**VI. EMISSION CONTROL TECHNOLOGY EVALUATION:**

Emissions from natural gas-fired turbines include NO<sub>x</sub>, CO, VOC, PM<sub>10</sub> and SO<sub>x</sub>. The GTE will be equipped with a dry low NO<sub>x</sub> combustor and will exhaust into an SCR system with ammonia injection for the control of NO<sub>x</sub> emissions. The use of dry low NO<sub>x</sub> combustor and an SCR system with ammonia injection can achieve a NO<sub>x</sub> emission rate of 2.5 ppmvd @ 15% O<sub>2</sub>. CO emissions of 2 ppmvd and VOC emissions of 1.3 ppmvd, both @ 15% O<sub>2</sub>, have been demonstrated using good combustion practices for this make and model of gas turbine (see discussion in top-down BACT analysis, Attachment E).

NO<sub>x</sub> is the major pollutant of concern when combusting natural gas. Virtually all gas turbine NO<sub>x</sub> emissions originate as NO. This NO is further oxidized in the exhaust system or later in the atmosphere to form the more stable NO<sub>2</sub> molecule. There are two mechanisms by which NO<sub>x</sub> is formed in turbine combustors: 1) the oxidation of atmospheric nitrogen found in the combustion air (thermal NO<sub>x</sub> and prompt NO<sub>x</sub>), and 2) the conversion of nitrogen chemically bound in the fuel (fuel NO<sub>x</sub>).

Thermal NO<sub>x</sub> is formed by a series of chemical reactions in which oxygen and nitrogen present in the combustion air dissociate and subsequently react to form oxides of nitrogen. Prompt NO<sub>x</sub>, a form of thermal NO<sub>x</sub>, is formed in the proximity of the flame front as intermediate combustion products such as HCN, H, and NH are oxidized to form NO<sub>x</sub>. Prompt NO<sub>x</sub> is formed in both fuel-rich flame zones and dry low NO<sub>x</sub> (DLN) combustion zones. The contribution of prompt NO<sub>x</sub> to overall NO<sub>x</sub> emissions is relatively small in

conventional near-stoichiometric combustors, but this contribution is an increasingly significant percentage of overall thermal NO<sub>x</sub> emissions in DLN combustors. For this reason prompt NO<sub>x</sub> becomes an important consideration for DLN combustor designs, and establishes a minimum NO<sub>x</sub> level attainable in lean mixtures.

Fuel NO<sub>x</sub> is formed when fuels containing nitrogen are burned. Molecular nitrogen, present as N<sub>2</sub> in some natural gas, does not contribute significantly to fuel NO<sub>x</sub> formation. With excess air, the degree of fuel NO<sub>x</sub> formation is primarily a function of the nitrogen content in the fuel. When compared to thermal NO<sub>x</sub>, fuel NO<sub>x</sub> is not currently a major contributor to overall NO<sub>x</sub> emissions from stationary gas turbines firing natural gas.

The level of NO<sub>x</sub> formation in a gas turbine, and hence the NO<sub>x</sub> emissions, is unique (by design factors) to each gas turbine model and operating mode. The primary factors that determine the amount of NO<sub>x</sub> generated are the combustor design, the types of fuel being burned, ambient conditions, operating cycles, and the power output of the turbine.

The design of the combustor is the most important factor influencing the formation of NO<sub>x</sub>. Design parameters controlling air/fuel ratio and the introduction of cooling air into the combustor strongly influence thermal NO<sub>x</sub> formation. Thermal NO<sub>x</sub> formation is primarily a function of flame temperature and residence time. The extent of fuel/air mixing prior to combustion also affects NO<sub>x</sub> formation. Simultaneous mixing and combustion results in localized fuel-rich zones that yield high flame temperatures in which substantial thermal NO<sub>x</sub> production takes place. Injecting water or steam into a conventional combustor provides a heat sink that effectively reduces peak flame temperature, thereby reducing thermal NO<sub>x</sub> formation. Premixing air and fuel at a lean ratio approaching the lean flammability limit (approximately 50% excess air) significantly reduces peak flame temperature, resulting in minimum NO<sub>x</sub> formation during combustion. This is known as dry low NO<sub>x</sub> (DLN) combustion.

Selective Catalytic Reduction systems selectively reduce NO<sub>x</sub> emissions by injecting ammonia (NH<sub>3</sub>) into the exhaust gas stream upstream of a catalyst. Nitrogen oxides, NH<sub>3</sub>, and O<sub>2</sub> react on the surface of the catalyst to form molecular nitrogen (N<sub>2</sub>) and H<sub>2</sub>O. SCR is capable of over 90 percent NO<sub>x</sub> reduction. Titanium oxide is the SCR catalyst material most commonly used, though vanadium pentoxide, noble metals, or zeolites are also used. The ideal operating temperature for a conventional SCR catalyst is 600 to 750 °F. Dilution air will be used to keep the exhaust gas temperature within the manufacturer's recommended range

Carbon monoxide is formed during the combustion process due to incomplete oxidation of the carbon contained in the fuel. Carbon monoxide formation can be limited by ensuring complete and efficient combustion of the fuel. High combustion temperatures, adequate excess air and good air/fuel mixing during combustion minimize CO emissions. Therefore, good combustion practices and careful tuning are required with dry low NO<sub>x</sub> combustion to achieve low CO emissions without employing an oxidation catalyst. CO emissions of 2 ppmvd is consistent with the District's BACT and is expected at all operating scenarios of the proposed GTE.

High combustion temperatures, adequate excess air, good air/fuel mixing during combustion, and the use of high quality fuel and inlet fuel scrubbers are being proposed to minimize VOC emissions. Based on the source test results from Pastoria, Elk Hills Power and Sunrise Power in Kern County, VOC emissions are expected to be less than 1.3 ppmv.

The GTE will operate with inlet air-cooling. Inlet air temperature and density directly affect turbine performance. The hotter and drier the inlet air temperature, the lower the efficiency and capacity of the turbine. Conversely, colder air improves the efficiency and reduces emissions by reducing the amount of fuel required to achieve the required turbine output. The inlet air cooler will allow the turbine to operate in a more efficient manner than it would without it. The increased efficiency will reduce the amount of fuel necessary to achieve the required power output. The reduction in fuel consumption will result in lower combustion contaminant emissions.

The inlet air filter will remove particulate matter from the combustion air stream, reducing the amount of particulate matter emitted. The lube oil coalescer will result in the merging together of oil mist to form larger droplets. The larger droplets will return to the oil stream instead of being emitted.

A maximum of two hours per day and 300 hours per year of startup/shutdown activities are approved. Turbine commissioning activities up to 300 hours are also approved. During these activities, emissions of NOx, CO and VOC are expected to be higher (see Section VII below).

## **VII. GENERAL CALCULATIONS:**

### **A. Assumptions**

- Pastoria has proposed maximum annual emissions based on 2,825 hours per year of operation at maximum capacity and a worst-case ambient temperature of 35 °F, including 300 hours per year of startup/shutdown operation. The maximum annual emissions for CO is fixed at 198,000 lb to be below PSD threshold.
- Pastoria may operate 24 hours per day and may have up to two 1-hour (total of 2 hours) per day for startup/shutdown activities.
- The expansion turbine will undergo initial commissioning, which includes activities defined as, but not limited to, all testing, adjustment, tuning, and calibration activities recommended by the equipment manufacturers and construction contractor to insure safe and reliable steady state operation of the gas turbines, CEM and emissions control systems and associated electrical delivery systems. Initial commissioning is a one-time event, lasting over a period of up to three months.
- For the initial commissioning period, Pastoria has proposed several high-emissions scenarios possible. The first period is prior to SCR system installation, when the combustor is being tuned. The second period may occur when the combustor has been tuned but the SCR has not been

completely installed and the other parts of the turbine operating system are being checked out. Commissioning activities and expected emissions are included in **Attachment B**.

- Actual measured emissions during the commissioning period and emissions occurring during startup/shutdown will accrue towards the annual emissions limits.
- BACT emission limits of 2.5 ppmvd @ 15% O<sub>2</sub>, 1.3 ppmvd @ 15% O<sub>2</sub> and 2.0 ppmvd @ 15% O<sub>2</sub> are proposed for NO<sub>x</sub>, VOC and CO respectively, at all operating loads and all ambient conditions (except during startups, shutdowns and combustor tuning).
- The applicant proposes NO<sub>x</sub>, CO and VOC mass emission rates of 16.25 lb/hr, 7.92 lb/hr and 2.95 lb/hr, respectively, at 100% load and 35 °F (worst case ambient temperature).
- The applicant proposes a PM<sub>2.5</sub>/PM<sub>10</sub> mass emission rate of 7.0 lb/hr, at 100% load 35 °F (worst case ambient temperature), based on results of source tests of similar turbines. PM<sub>2.5</sub> emissions were determined based on the assumption that all gas turbine exhaust PM emissions are less than 2.5 microns in size.
- The applicant proposed a maximum SO<sub>x</sub> emissions rate of 3.50 lb/hr, based on annual average natural gas sulfur content of less than 0.75 gr/100 scf and the hourly SO<sub>2</sub> permit limit of the existing Pastoria Energy facility. As shown below, the hourly emissions limit proposed by the operator is lower than the maximum calculated, worst-case emissions limit at 100% load at 35 °F (1791.1 MMBtu/hr) and the maximum permitted natural gas sulfur content of 0.75 gr S/100 scf

$$\begin{aligned} & (0.75 \text{ gr S}/100 \text{ scf} \times 1 \text{ lb S}/7000 \text{ gr} \times 64 \text{ lb SO}_x/32 \text{ lb S} \times 1 \text{ scf}/1000 \text{ Btu} \times 10^6 \\ & \text{Btu/MMBtu}) \\ & = 0.0021 \text{ lb/MMBtu} \end{aligned}$$

$$(0.0021 \text{ lb/MMBtu}) \times (1791.1 \text{ MMBtu/hr}) = 3.76$$

- The applicant has proposed the same maximum daily emissions that were approved for the existing Pastoria Energy Facility, Units S-3636-1, -2 and -3 for NO<sub>x</sub> (450 lb/day) and SO<sub>x</sub> (84 lb/day). The maximum daily emissions for CO, VOC and PM<sub>10</sub> are 1,978.2 lb/day, 96.8 lb/day and 180.0 lb/day, respectively.

## **B. Emission Factors**

The maximum air contaminant mass emission rates (lb/hr), concentrations (ppmvd @ 15% O<sub>2</sub>), heat input (lb/MMBtu), and startup and shutdown emission rates (lb/hr) estimated by the applicant (**see Attachment C**) for the proposed GTE are summarized below:

<b>Maximum Full Load Emission Rates and Concentrations (@ 100% Load &amp; 35 °F)</b>						
	NO <sub>x</sub>	CO	VOC	PM <sub>10/2.5</sub>	SO <sub>x</sub>	NH <sub>3</sub>
Mass Emission Rates (lb/hr)	16.25 <sup>a</sup>	7.92 <sup>a</sup>	2.95 <sup>a</sup>	7.00	3.50	24.06
ppmvd @ 15% O <sub>2</sub> limits	2.5 <sup>a</sup>	2.0 <sup>a</sup>	1.3 <sup>a</sup>	--	0.402	10.0
Lb/MMBtu	0.0091 <sup>a</sup>	0.0044 <sup>a</sup>	0.0016 <sup>a</sup>	0.0042	0.0020	--

<sup>a</sup> excluding startups and shutdowns

<b>Maximum Startup and Shutdown Emissions</b>					
	NO <sub>x</sub>	CO	VOC	PM <sub>10/2.5</sub>	SO <sub>x</sub>
Mass Emission Rate (lb/hr)	80.00	902.00	16.00	7.00	3.50

**C. Calculations**

**1. Pre- Project Potential to Emit (PE1):**

Section 3.26 of Rule 2201 defines the Potential to Emit (PE) as the maximum capacity of an emissions unit to emit a pollutant under its physical and operational design. Since this is a new unit, the Pre-Project Potential to Emit (PE1) is equal to zero.

**2. Post- Project Potential to Emit (PE2):**

**a. Maximum Hourly PE**

The maximum hourly PE for NO<sub>x</sub>, CO, and VOC will occur when the unit is operating under startup or shutdown mode. Maximum hourly emissions for PM<sub>10</sub>, SO<sub>x</sub>, and NH<sub>3</sub> will occur when the unit is operating at full load. Startup emissions of PM<sub>10</sub>, SO<sub>x</sub>, and NH<sub>3</sub> are no higher than during full load operation. The maximum hourly emissions are summarized in the table below:

<b>Maximum Hourly Startup Emission Rates (lb/hr)</b>						
	NO <sub>x</sub>	CO	VOC	PM <sub>10/2.5</sub>	SO <sub>x</sub>	NH <sub>3</sub>
Mass Emission Rates	80.00	902.00	16.00	7.00	3.50	24.06

**b. Maximum Daily PE**

The maximum daily PE is the total of 2 hours per day of hourly startup/shutdown emissions and 22 hours per day of base load emissions (except for NO<sub>x</sub> – see note below).

For example, for CO:

$$7.92 \text{ lb/hr} \times (22 \text{ hr/day}) + 902 \text{ lb/hr} \times (2 \text{ hr/day}) \approx 1,978.2 \text{ lb/day}$$

The results are summarized in the table below:

	Startup Emissions (lb/hr)	Full Load Emissions (lb/hr)	Maximum Daily Emissions (lb/day) <sup>a</sup>
NO <sub>x</sub>	80.00	16.25	450.0 <sup>b</sup>
CO	902.00	7.92	1,978.2
VOC	16.00	2.95	96.8
PM <sub>10/2.5</sub>	N/A <sup>c</sup>	7.00	168.0
SO <sub>x</sub>	N/A <sup>c</sup>	3.50	83.9
NH <sub>3</sub>	N/A <sup>c</sup>	24.06	577.4

<sup>a</sup> Daily emission limits are based on 2 hours of startup and 22 hours of full load operation per day (except for NO<sub>x</sub>).

<sup>b</sup> NO<sub>x</sub> emissions are identical to the maximum daily limits approved for the initial Pastoria gas turbine engines.

<sup>c</sup> Hourly PM<sub>10</sub>, SO<sub>x</sub> and NH<sub>3</sub> emissions are the same during startup and during full load.

**c. Maximum Annual and Quarterly PE**

The maximum annual PE is the total of 300 hours per year of worst-case hourly startup emissions and 2,525 hours per year of full load emissions, as shown in the following example calculation and summarized in the table below. The quarterly emissions calculations are in Section VII.C.3 below.

For example, for NO<sub>x</sub>:

$$16.25 \text{ lb/hr} \times (2,525 \text{ hrs/yr}) + 80 \text{ lb/hr} \times (300 \text{ hrs/yr}) \approx 65,033 \text{ lb/yr}$$

The results are summarized in the table below:

Maximum Annual and Quarterly PE						
	NO <sub>x</sub>	CO	VOC	PM <sub>10/2.5</sub>	SO <sub>x</sub>	NH <sub>3</sub>
Annual PE (lb/yr)	65,033	198,000 <sup>a</sup>	12,240	19,775	9,873	67,970
Q1 (lb/qtr)	16,258	49,500	3,060	4,944	2,468	16,993
Q2 (lb/qtr)	16,258	49,500	3,060	4,944	2,468	16,993



Q3 (lb/qtr)	16,258	49,500	3,060	4,944	2,468	16,993
Q4 (lb/qtr)	16,258	49,500	3,060	4,944	2,468	16,993

<sup>a</sup> Proposed by applicant to be below PSD threshold.

Tables of emissions data of the proposed GTE at all proposed operating conditions are included as **Attachment B**.

**d. Quarterly Delta Potential to Emit ( $\Delta$ PE):**

The quarterly delta potential to emit (see above table) is used to complete the emissions profile for the emission unit and is calculated as follows:

$$\Delta\text{PE (lb/qtr)} = \text{PE2 (lb/qtr)} - \text{PE1 (lb/qtr)}$$

Since the pre-project potential to emit (PE1) is equal to zero,  $\Delta$ PE will be equivalent to the PE2 calculated above in Section VII.C.2.

**3. Pre-Project Stationary Source Potential to Emit (SSPE1)**

Pursuant to Section 4.9 of District Rule 2201, the Pre-project Stationary Source Potential to Emit (SSPE1) is the Potential to Emit (PE) from all units with valid permits at the Stationary Source and the quantity of emission reduction credits (ERC) which have been banked since September 19, 1991 for Actual Emissions Reductions that have occurred at the source, and which have not been used on-site.

The facility does not have any ERC certificates for reductions that have occurred on-site. The PE for DOC S-3636-14-0 was not included in the SSPE1 calculation as this DOC will be cancelled and replaced by this project. The SSPE1 is shown below:

<b>Pre-Project Stationary Source Potential to Emit [SSPE1] (lb/year)</b>					
Permit	NO <sub>x</sub>	CO	VOC	PM <sub>10/2.5</sub>	SO <sub>x</sub>
S-3636-1-3	114,828	406,722	75,873	74,781	28,260
S-3636-2-3	114,828	406,722	75,873	74,781	28,260
S-3636-3-3	114,828	406,722	75,873	74,781	28,260
S-3636-4-3	--	--	--	8,059	--
S-3636-5-3	--	--	--	4,059	--
S-3636-7-3	184	362	23	11	1
S-3636-12-0	889	46	17	11	27
S-3636-13-0	--	--	--	3,577	--
<b>SSPE1</b>	<b>345,557</b>	<b>1,220,574</b>	<b>227,659</b>	<b>240,060</b>	<b>84,808</b>

**4. Post-Project Stationary Source Potential to Emit (SSPE2)**

Pursuant to Section 4.10 of District Rule 2201, the Post Project Stationary Source Potential to Emit (SSPE2) is the Potential to Emit (PE) from all units with valid permits at the Stationary Source and the quantity of emission reduction credits (ERC) which have been banked since September 19, 1991 for Actual Emissions Reductions that have occurred at the source, and which have not been used on-site.

The SSPE2 will reflect the addition of this proposed unit S-3636-14-1 as shown below:

<b>Post-Project Stationary Source Potential to Emit [SSPE2] (lb/year)</b>					
Permit	NO <sub>x</sub>	CO	VOC	PM <sub>10/2.5</sub>	SO <sub>x</sub>
S-3636-1-3	114,828	406.722	75,873	74,781	28,260
S-3636-2-3	114,828	406.722	75,873	74,781	28,260
S-3636-3-3	114,828	406.722	75,873	74,781	28,260
S-3636-4-3	--	--	--	8,059	--
S-3636-5-3	--	--	--	4,059	--
S-3636-7-3	184	362	23	11	1
S-3636-12-0	889	46	17	11	27
S-3636-13-0	--	--	--	3,577	--
S-3636-14-1	65,033	198,000	12,240	19,775	9,873
<b>SSPE2</b>	<b>410,590</b>	<b>1,418,574</b>	<b>239,899</b>	<b>259,835</b>	<b>94,681</b>

**5. Major Source Determination**

Pursuant to Section 3.23 of District Rule 2201, a major source is a stationary source with post-project emissions or a Post-project Stationary Source Potential to Emit (SSPE2), equal to or exceeding one or more of the following threshold values.

<b>Major Source Determination</b>					
	NO <sub>x</sub> (lb/year)	CO (lb/year)	VOC (lb/year)	PM <sub>10/2.5</sub> (lb/year)	SO <sub>x</sub> (lb/year)
SSPE2	410,590	1,418,574	239,899	259,835	94,681
Major Source Threshold	20,000	200,000	20,000	140,000	140,000
Major Source?	Yes	Yes	Yes	Yes	No

As shown above, the facility is a major source for all the criteria pollutants except SO<sub>x</sub>.

**6. Annual Baseline Emissions (BE)**

Per District Rule 2201, Section 3.7, the baseline emissions, for a given pollutant, shall be equal to the pre-project potential to emit for:

- Any emission unit located at a non-major source,
- Any highly utilized emission unit, located at a major source,
- Any fully-offset emission unit, located at a major source, or
- Any clean emission unit located at a major source

otherwise,

BE = Historic Actual Emissions (HAE), calculated pursuant to Section 3.22 of District Rule 2201

As the subject GTE is a new emissions unit. BE = PE1 =0 for all criteria pollutants.

**7. SB 288 Major Modification**

SB 288 Major Modification is defined in 40 CFR Part 51.165 (as in effect on Dec. 19, 2002) as *“any physical change in or change in the method of operation of a major stationary source that would result in a significant net emissions increase of any pollutant subject to regulation under the Act.”* The calculation procedure, as outlined in the version of 40 CFR 51.165 that existed on 12/19/02, states that for a major source, if a project results in a net emissions increase, i.e. the sum of the differences between the potential to emit and the actual emissions for all new and modified emission units are greater than the values listed in Rule 2201 Table 3-5, the project is an SB 288 Major Modification.

Pursuant to the District draft guideline “Implementation of Rule 2201 (as amended on 12/18/08 and effective on 6/10/10) for SB288 Major Modifications and Federal Major Modifications”, for new emissions units:

- The Potential to Emit is the post project potential to emit for the emission unit
- The actual emissions are equal to zero.

Since the GTE is a new unit, the project's emission increase is equal to the PE2.

<b>SB 288 Major Modification Thresholds (lb/yr)</b>				
	<b>NOx</b>	<b>VOC</b>	<b>PM<sub>10</sub></b>	<b>SOx</b>
Project PE**	65,033	12,240	19,775	9,873
Threshold	50,000	50,000	30,000	80,000
SB 288 Major Mod?	Yes	No	No	No

\*\* From Section VII(C)(2)(c)

As shown above, this project constitutes an SB 288 major modification.

### **8. Federal Major Modification**

District Rule 2201, Section 3.17 defines Federal Major Modification the same as "Major modification" as defined in 40 CFR 51.165 and Part D of Title I of the CAA. Section 3.17 also states that an SB 288 Major Modification is not a Federal Major Modification if the emission increase for the project or the net emission increase for the facility (calculated pursuant to 40 CFR 51.165(a)(2)(ii)(B) through (D) and (F) does not result in a significant emission increase as defined in Rule 2201 Table 3-1 (shown below) or the modification does not cause facility wide emissions to exceed a previously established plant wide applicability limit (PAL).

Pursuant to the District draft policy mentioned above, Federal Major Modification determination involves two steps. The first step is to determine if the project itself results in a significant emissions increase. In this determination, only emissions increases are counted. The second step is to determine if the project results in a significant net emissions increase.

However, for projects involving NOx and VOC emission increases (those pollutants for which the District is in extreme non-attainment), only Step 1 is performed as required in the Federal Clean Air Act Section 182 (e)(2). Step 2 does not need to be performed. Notwithstanding the above, a facility with a project that has an emission increase in NOx or VOCs can elect to offset the emission increase at a ratio of 1.3:1 using emission reductions that occurred at the same stationary source. Such emission reductions must be surplus of all current Federally enforceable requirements. Such projects shall not constitute a Federal Major Modification.

The project's emissions increase for each pollutant is equal to the sum of the differences between the projected actual emissions of PE and the baseline actual emissions (BAE) (for existing units) or the sum of the potential to emit (for new emission units). For new emission units, BAE = 0.

Additionally, the project's PM<sub>2.5</sub> emissions increase shall also be calculated to determine Federal New Source Review requirements for PM<sub>2.5</sub>. As indicated above, it is assumed that all gas turbine exhaust PM emissions are less than 2.5 microns. As of January 1, 2011, PM<sub>2.5</sub> emissions include filterable and condensable fractions of PM<sub>2.5</sub>.

<b>Federal Major Modification Thresholds (lb/yr)</b>					
	<b>NOx</b>	<b>VOC</b>	<b>PM<sub>10</sub></b>	<b>PM<sub>2.5</sub></b>	<b>SOx</b>
Project PE**	65,033	12,240	19,775	19,775	9,873
Threshold	0	0	30,000	20,000	80,000
Federal Major Mod?	Yes	Yes	No	No	No

\*\* From Section VII(C)(2)(c)

As shown above, this project will result in an increase in NO<sub>x</sub> and VOC emissions greater than the Federal Major Modification threshold. In addition, Pastoria is unable to provide offsets from the same stationary source; therefore, the project constitutes a Federal Major Modification.

## **VIII. COMPLIANCE:**

### **Rule 1080 Stack Monitoring**

This Rule grants the APCO the authority to request the installation and use of continuous emissions monitors (CEMs), and specifies performance standards for the equipment and administrative requirements for recordkeeping, reporting, and notification.

The proposed GTE will be equipped with operational CEMs for NO<sub>x</sub>, CO, and O<sub>2</sub>. Provisions included in the operating permit are consistent with the requirements of this Rule. Compliance with the requirements of this Rule is anticipated.

#### **Proposed Rule 1080 Conditions:**

- The owner or operator shall install, certify, maintain, operate and quality-assure a Continuous Emission Monitoring System (CEMS) which continuously measures and records the exhaust gas NO<sub>x</sub>, CO and O<sub>2</sub> concentrations. Continuous emissions monitor(s) shall be capable of monitoring emissions during normal operating conditions, and during startups and shutdowns provided the CEMS passes the relative accuracy requirement for startups and shutdowns specified herein. If relative accuracy of CEMS cannot be demonstrated during startup conditions, CEMS results during startup and shutdown events shall be replaced with startup emission rates obtained from source testing to determine compliance with emission limits contained in this document. [District Rules 1080 and 4703 and 40 CFR 60.4340(b)(1)]
- The CEMS shall complete a minimum of one cycle of operation (sampling, analyzing, and data recording) for each successive 15-minute period or shall meet equivalent specifications established by mutual agreement of the District, the ARB and the EPA. [District Rule 1080 and 40 CFR 60.4345(b)]
- The NO<sub>x</sub> and O<sub>2</sub> CEMS shall be installed and certified in accordance with the requirements of 40 CFR Part 75. The CO CEMS shall meet the requirements in 40 CFR 60, Appendix F Procedure 1 and Part 60, Appendix B Performance Specification 2 (PS 2), or shall meet equivalent specifications established by mutual agreement of the District, the ARB, and the EPA. [District Rule 1080 and 40 CFR 60.4345(a)]

- Audits of the CO continuous emission monitors shall be conducted quarterly, except during quarters in which relative accuracy and compliance source testing are both performed, in accordance with EPA guidelines. The District shall be notified prior to the audits. The NO<sub>x</sub> and O<sub>2</sub> CEMS shall be audited in accordance with the applicable requirements of 40 CFR Part 75. Audit reports and linearity reports shall be submitted along with quarterly compliance reports to the District. [District Rule 1080]
- The owner/operator shall perform a relative accuracy test audit (RATA) for NO<sub>x</sub>, CO and O<sub>2</sub> as specified by 40 CFR Part 60, Appendix F, 5.11, at least once every four calendar quarters. The permittee shall comply with the applicable requirements for quality assurance testing and maintenance of the continuous emission monitor equipment in accordance with the procedures and guidance specified in 40 CFR Part 60, Appendix F. [District Rule 1080]
- APCO or an authorized representative shall be allowed to inspect, as determined to be necessary, the required monitoring devices to ensure that such devices are functioning properly. [District Rule 1080]
- Results of the CEM system shall be averaged over a one hour period for NO<sub>x</sub> emissions and a three hour period for CO emissions using consecutive 15-minute sampling periods in accordance with all applicable requirements of CFR 60.13. [District Rule 4703 and 40 CFR 60.13]
- Results of continuous emissions monitoring shall be reduced according to the procedures established in 40 CFR, Part 51, Appendix P, paragraphs 5.0 through 5.3.3, or by other methods deemed equivalent by mutual agreement with the District, the ARB, and the EPA. [District Rule 1080]
- The owner or operator shall, upon written notice from the APCO, provide a summary of the data obtained from the CEM systems. This summary shall be in the form and the manner prescribed by the APCO. [District Rule 1080]
- The facility shall install and maintain equipment, facilities, and systems compatible with the District's CEM data polling software system and shall make CEM data available to the District's automated polling system on a daily basis. [District Rule 1080]
- Upon notice by the District that the facility's CEM system is not providing polling data, the facility may continue to operate without providing automated data for a maximum of 30 days per calendar year provided the CEM data is sent to the District by a District-approved alternative method. [District Rule 1080]

- The permittee shall maintain the following records: the date, time and duration of any malfunction of the continuous monitoring equipment; dates of performance testing; dates of evaluations, calibrations, checks, and adjustments of the continuous monitoring equipment; date and time period which a continuous monitoring system or monitoring device was inoperative. [District Rules 1080 and 2201 and 40 CFR 60.8(d)]
- The owner or operator shall submit a written report of CEM operations for each calendar quarter to the APCO. The report is due on the 30th day following the end of the calendar quarter and shall include the following: Time intervals, data and magnitude of excess NO<sub>x</sub> emissions, nature and the cause of excess (if known), corrective actions taken and preventive measures adopted; Averaging period used for data reporting corresponding to the averaging period specified in the emission test period used to determine compliance with an emission standard; Applicable time and date of each period during which the CEM was inoperative (monitor downtime), except for zero and span checks, and the nature of system repairs and adjustments; A negative declaration when no excess emissions occurred. [District Rule 1080 and 40 CFR 60.4375(a) and 60.4395]

#### **Rule 1081 Source Sampling**

This Rule requires adequate and safe facilities for use in sampling to determine compliance with emissions limits, and specifies methods and procedures for source testing and sample collection.

The requirements of this Rule will be included in the operating permits. Compliance with this Rule is anticipated.

#### **Proposed Rule 1081 Conditions:**

- The exhaust stack shall be equipped with permanent provisions to allow collection of stack gas samples consistent with EPA test methods and shall be equipped with safe permanent provisions to sample stack gases with a portable NO<sub>x</sub>, CO, and O<sub>2</sub> analyzer during District inspections. The sampling ports shall be located in accordance with the CARB regulation titled California Air Resources Board Air Monitoring Quality Assurance Volume VI, Standard Operating Procedures for Stationary Emission Monitoring and Testing. [District Rule 1081]
- Source testing to measure startup NO<sub>x</sub>, CO, and VOC mass emission rates shall be conducted prior to the end of the commissioning period and at least once every seven years thereafter. CEM relative accuracy shall be determined during startup source testing in accordance with 40 CFR 60, Appendix B. [District Rule 1081]

- Source testing to measure the PM10 emission rate and the ammonia emission rate shall be conducted within 60 days after the end of the commissioning period and at least once every twelve months thereafter. [District Rule 1081]
- Compliance with natural gas sulfur content limit shall be demonstrated within 60 days after the end of the commissioning period and weekly thereafter. If the sulfur content is demonstrated to be less than 0.75 gr/100 scf for eight consecutive weeks, then the monitoring frequency shall be every six months. If the result of any six month monitoring demonstrates that the fuel does not meet the fuel sulfur content limit, weekly monitoring shall resume. [District Rules 1081, 2540, and 4001]
- Demonstration of compliance with the annual average sulfur content limit shall be demonstrated by a 12 month rolling average of the sulfur content either (i) documented in a valid purchase contract, a supplier certification, a tariff sheet or transportation contract or (ii) tested using ASTM Methods D1072, D3246, D4084, D4468, D4810, D6228, D6667 or Gas Processors Association Standard 2377. [District Rules 1081 and 2201]
- Compliance demonstration (source testing) shall be District witnessed, or authorized and samples shall be collected by a California Air Resources Board certified testing laboratory. Source testing shall be conducted using the methods and procedures approved by the District. The District must be notified 30 days prior to any compliance source test, and a source test plan must be submitted for approval 15 days prior to testing. The results of each source test shall be submitted to the District within 60 days thereafter. [District Rule 1081]
- The following test methods shall be used: NO<sub>x</sub> - EPA Method 7E or 20; CO - EPA Method 10 or 10B; VOC - EPA Method 18 or 25; PM10 - EPA Method 5 (front half and back half) or 201A and 202; ammonia - BAAQMD ST-1B; and O<sub>2</sub> - EPA Method 3, 3A, or 20. EPA approved alternative test methods as approved by the District may also be used to address the source testing requirements of this permit. [District Rules 1081 and 4703 and 40 CFR 60.4400(1)(i)]

#### **Rule 1100 Equipment Breakdown (12/17/92)**

This Rule defines a breakdown condition and the procedures to follow if one occurs. The corrective action, the issuance of an emergency variance, and the reporting requirements are also specified.

The requirements of this Rule will be included in the operating permits. Compliance with this Rule is anticipated.



**Proposed Rule 1100 Conditions:**

- Permittee shall notify the District of any breakdown condition as soon as reasonably possible, but no later than one hour after its detection, unless the owner or operator demonstrates to the District's satisfaction that the longer reporting period was necessary. [District Rule 1100, 6.1]
- The District shall be notified in writing within ten days following the correction of any breakdown condition. The breakdown notification 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 methods utilized to restore normal operations. [District Rule 1100, 7.0]

**Rule 2010 Permits Required**

This Rule requires any person building, altering, or replacing any operation, article, machine, equipment, or other contrivance, the use of which may cause the issuance of air contaminants, to first obtain authorization from the District in the form of a DOC. By the submission of a revised DOC application, Pastoria is complying with the requirements of this Rule.

**Rule 2201 New and Modified Stationary Source Review Rule**

**A. BACT:**

**1. BACT Applicability**

BACT requirements are triggered on a pollutant-by-pollutant basis and on an emissions unit-by-emissions unit basis for the following\*:

- a. Any new emissions unit with a potential to emit exceeding two pounds per day,
- b. The relocation from one Stationary Source to another of an existing emissions unit with a potential to emit exceeding two pounds per day,
- c. Modifications to an existing emissions unit with a valid Permit to Operate resulting in an AIPE exceeding two pounds per day, and/or
- d. Any new or modified emissions unit, in a stationary source project, which results in a Major Modification.

\* Except for CO emissions from a new or modified emissions unit at a Stationary Source with an SSPE2 of less than 200,000 pounds per year of CO.

As seen in Section VII.C.2.b of this evaluation, the applicant is proposing to install a new combustion turbine generator with PEs greater than 2 lb/day for NO<sub>x</sub>, CO, VOC, PM<sub>10</sub>, and SO<sub>x</sub>. BACT is triggered for NO<sub>x</sub>, VOC, PM<sub>10</sub> and SO<sub>x</sub>

criteria pollutants since the PEs are greater than 2 lbs/day. Since the SSPE2 for CO is greater than 200,000 lbs/year, BACT is also triggered for CO emissions.

The PE of ammonia is greater than two pounds per day for the GTE. However, the ammonia emissions are intrinsic to the operation of the SCR system, which is BACT for NO<sub>x</sub>. The emissions from a control device that is determined by the District to be BACT are not subject to BACT.

## **2. BACT Guidance**

The District BACT Clearinghouse was created to assist applicants in selecting appropriate control technology for new and modified sources, and to assist the District staff in conducting the necessary BACT analysis. The Clearinghouse will include, for various class and category of sources, available control technologies and methods that meet one or more of the following conditions:

- Have been achieved in practice for such emissions unit and class of source; or
- Are contained in any SIP approved by the EPA for such emissions unit category and class of source; or
- Are any other emission limitation or control technique, including process and equipment changes of basic or control equipment, found to be technologically feasible for such class or category of sources or for a specific source.

BACT Guideline 3.4.7 from the District's BACT Clearinghouse is applicable to the GTE installation [Gas Fired Turbine = or > 50 MW, Uniform Load, without Heat Recovery] (**Attachment D**).

## **3. Top-Down Best Available Control Technology (BACT) Analysis**

Per Permit Services Policies and Procedures for BACT, a Top-Down BACT analysis shall be performed as part of the application review for each application subject to the BACT requirements pursuant to the District's NSR Rule.

A top down BACT analysis is included as **Attachment E**.

## **4. BACT Summary**

BACT has been satisfied by the following:

NO<sub>x</sub>: 2.5 ppmv @ 15% O<sub>2</sub> (1-hour rolling average, except during startup/shutdown) with Dry Low NO<sub>x</sub> Combustors, SCR with ammonia injection and natural gas fuel

VOC: 1.3 ppmv @ 15% O<sub>2</sub> (3-hour rolling average, except during startup/shutdown) with good combustion practices and natural gas fuel

PM<sub>10</sub>: Air inlet filter cooler, lube oil vent coalescer, and PUC regulated quality natural gas fuel with no more than 0.75 grain S/100 dscf

SO<sub>x</sub>: PUC regulated quality natural gas fuel with no more than 0.75 grain S/100 dscf

CO: 2 ppmv @ 15% O<sub>2</sub> based on a three-hour average (oxidation catalyst or equal)

**B. Offsets:**

**1. Offset Applicability:**

Pursuant to Section 4.5.3, offset requirements shall be triggered on a pollutant by pollutant basis and shall be required if the Post-project Stationary Source Potential to Emit (SSPE2) equals to or exceeds emissions of 20,000 lbs/year for NO<sub>x</sub> and VOC, 200,000 lbs/year for CO, 54,750 lbs/year for SO<sub>x</sub> and 29,200 lbs/year for PM<sub>10</sub>. As seen in the table below, the facility's SSPE2 is greater than the offset thresholds for NO<sub>x</sub>, CO, VOC, PM<sub>10</sub>, and SO<sub>x</sub> emissions. Therefore, offset calculations are necessary for this project.

<b>Offset Determination</b>					
	NO <sub>x</sub> (lb/year)	CO (lb/year)	VOC (lb/year)	PM <sub>10</sub> (lb/year)	SO <sub>x</sub> (lb/year)
Pre-Project SSPE1	345,557	1,220,574	227,759	240,060	84,808
Post-Project SSPE2	410,590	1,418,574	239,899	259,835	94,681
Offset Threshold	20,000	200,000	20,000	29,200	54,750
Offsets Required?	Yes	Yes	Yes	Yes	Yes

**2. Quantity of Offsets Required:**

Per Sections 4.7.2 and 4.7.3, the quantity of offsets in pounds per year for NO<sub>x</sub>, SO<sub>x</sub>, VOC, and PM<sub>10</sub> is calculated as follows for sources with an SSPE1 greater than the offset threshold levels before implementing the project being evaluated.

$$\text{Offsets Required (lb/year)} = (\Sigma[\text{PE2} - \text{BE}] + \text{ICCE}) \times \text{DOR, for all new or modified emissions units in the project,}$$

Where,

PE2 = Post Project Potential to Emit, (lb/year)

BE = Baseline Emissions, (lb/year)

ICCE = Increase in Cargo Carrier Emissions, (lb/year)

OR = Offset Ratio, determined pursuant to Section 4.8 (Distance Offset Ratio) or (Interpollutant Offset Ratio) pursuant to Section 4.13.3

BE = Pre-project Potential to Emit for:

- Any unit located at a non-Major Source,
- Any Highly-Utilized Emissions Unit, located at a Major Source,
- Any Fully-Offset Emissions Unit, located at a Major Source, or
- Any Clean Emissions Unit, Located at a Major Source.

otherwise,

BE = Historic Actual Emissions (HAE)

The facility is proposing to install a new emissions unit; therefore, Baseline Emissions are equal to zero. Also, there is only one emissions unit associated with this project and there are no increases in cargo carrier emissions; therefore offsets can be determined as follows:

Offsets Required (lb/year) = PE2 x OR

Pastoria is proposing to use emissions reduction credits that were generated at locations greater than 15 miles from the location of the Pastoria Energy Facility; therefore, a distance-offset ratio of 1.5:1.0 is required.

As indicated in the proposal (Section I above), although Pastoria will only operate up to the equivalent of 2,825 hours per year, offsets will be provided based on increases for potential full-time operation during any calendar quarter for maximum operational flexibility in each quarter.

The maximum quarterly emissions (QE) that Pastoria will offset are calculated based on full-time annual emissions (previously calculated and approved) adjusted to the maximum number of operating days per quarter, as shown and summarized below:

QE (lb/qtr) = Annual Full-time PE (lb/yr) ÷ (365 days/yr) x (days/qtr)

	<b>**Annual Full-time PE (lb/yr)</b>	<b>Qtr-1</b>	<b>Qtr-2</b>	<b>Qtr-3</b>	<b>Qtr-4</b>
<b>Days/qtr</b>		90	91	92	92
<b>NOx</b>	161,480	39,817	40,260	40,702	40,702
<b>SOx</b>	30,616	7,549	7,549	7,549	7,549
<b>PM10</b>	61,320	15,120	15,288	15,456	15,456
<b>VOC</b>	29,730	7,330	7,411	7,493	7,493

\*\* Full-time PE includes baseload and startups/shutdown emissions (previously approved – See Appendix J – Supplemental Information) except PM<sub>10</sub> as the emission factor is lower in this project.

**Interpollutant Offsets:** Per Rule 2201 Section 4.13.3.2, interpollutant offsets between PM<sub>10</sub> and PM<sub>10</sub> precursors may be allowed. The applicant is proposing the use of oxides of nitrogen (NO<sub>x</sub>) to offset the PM<sub>10</sub> emissions. As defined in Section 3.29 of Rule 2201, nitrogen oxides are a precursor to the nitrate fraction of PM<sub>10</sub>. The District currently uses an interpollutant ratio of 2.629 NO<sub>x</sub>:1.0 PM<sub>10</sub> for stationary sources in Kern County, not including any required distance offset ratios (**Attachment G**). Additionally, Pastoria is proposing to use NO<sub>x</sub> to offset a small portion of the VOC emissions as allowed in Section 4.13.3.4 of Rule 2201. A technical justification was provided to the District in Project S-1082279 for the use of NO<sub>x</sub> ERC for VOC increases at a 1.0 to 1.0 ratio, not including any required distance offset ratio, based on the District's 8 hour ozone attainment plan. Because ozone is a regional pollutant, attainment of the AAQS depends on attainment at all locations within the SJVAPCD. Therefore, the interpollutant offset ratio of 1.0 NO<sub>x</sub> to 1.0 VOC can also be used for this project.

The following tables summarizes Pastoria's proposed quarterly increases (full time equivalent), the required offset ratio, the amounts of offsets required and the Emission Reduction Credit certificates proposed for use in this project.

<b>NO<sub>x</sub> – Offsets Required and Proposed Credits</b>				
	<b>Q1 (lb/qtr)</b>	<b>Q2 (lb/qtr)</b>	<b>Q3 (lb/qtr)</b>	<b>Q4 (lb/qtr)</b>
NO <sub>x</sub> emissions increase	39,817	40,260	40,702	40,702
Distance Offset Ratio (DOR)	1.5	1.5	1.5	1.5
NO <sub>x</sub> offsets required with DOR	59,726	60,390	61,053	61,053
Available NO <sub>x</sub> credits from ERC S-3114-2	178,929	181,004	183,080	184,561
NO <sub>x</sub> credits withdrawn from ERC S-3114-2	59,726	60,390	61,053	61,053
Remaining NO <sub>x</sub> credits from ERC S-3114-2	119,204	120,614	122,027	123,508

<b>PM<sub>10</sub> – Offsets Required and Proposed Credits**</b>				
	<b>Q1 (lb/qtr)</b>	<b>Q2 (lb/qtr)</b>	<b>Q3 (lb/qtr)</b>	<b>Q4 (lb/qtr)</b>
PM <sub>10</sub> emissions increase	15,120	15,288	15,456	15,456
DOR	1.5	1.5	1.5	1.5
Interpollutant Ratio (2.629 NO <sub>x</sub> :1.0 PM <sub>10</sub> )	2.629	2.629	2.629	2.629
Total NO <sub>x</sub> credits required (for PM <sub>10</sub> )	59,626	60,288	60,951	60,951
Available NO <sub>x</sub> credits from ERC S-3114-2	119,204	120,614	122,027	123,508
NO <sub>x</sub> credits withdrawn from ERC S-3114-2	59,626	60,288	60,951	60,951
Remaining NO <sub>x</sub> credits from ERC S-3114-2 after offsetting PM <sub>10</sub>	59,578	60,326	61,076	62,557

\*\* will use NO<sub>x</sub> ERCs at Interpollutant Ratio of 2.629 NO<sub>x</sub> : 1.0 PM<sub>10</sub>

<b>VOC – Offsets Required and Proposed Credits</b>				
	<b>Q1 (lb/qtr)</b>	<b>Q2 (lb/qtr)</b>	<b>Q3 (lb/qtr)</b>	<b>Q4 (lb/qtr)</b>
VOC emissions increase	7,330	7,411	7,493	7,493
DOR	1.5	1.5	1.5	1.5
Total VOC offsets required	10,995	11,117	11,240	11,240
Available VOC credits from ERC N-927-1	10,503	10,981	11,573	11,536
VOC credits withdrawn from ERC N-927-1	10,503	10,981	11,240	11,240
Additional VOC offsets required	492	136	0	0
Remaining VOC credits from ERCs N-927-1	0	0	333	296
Available NOx ERCs S-3114-2	59,578	60,326	61,076	62,557
Withdraw NOx ERC (1:1 Interpollutant ratio)**	492	136	0	0
Remaining NOx ERCs from S-3114-2	59,086	60,190	61,076	62,557
Additional VOCs required	0	0	0	0

\*\* The remaining VOC offsets required will be offset using NOx ERCs. As discussed above, use interpollutant ratio of 1.0 NOx : 1.0 VOC

<b>SOx – Offsets Required and Proposed Credits</b>				
	<b>Q1 (lb/qtr)</b>	<b>Q2 (lb/qtr)</b>	<b>Q3 (lb/qtr)</b>	<b>Q4 (lb/qtr)</b>
SOx emissions increase	7,549	7,633	7,717	7,717
DOR	1.5	1.5	1.5	1.5
Total SOx offsets required	11,324	11,450	11,576	11,576
Available SOx credits from ERC S-2744-5	11,324	11,450	11,576	11,576
SOx credits withdrawn from ERC S-2744-5	11,324	11,450	11,576	11,576
Additional SOx offsets required	0	0	0	0
Remaining SOx credits from ERC S-2744-5	0	0	0	0

As seen above, the facility has sufficient credits to fully offset the quarterly NOx, SO<sub>x</sub>, VOC and PM<sub>10</sub> emissions increases associated with this project.

**Emission Offset Exemptions (CO Emissions):**

Pursuant to Section 4.6.1, "Emission offsets shall not be required for increases in carbon monoxide in attainment areas if the applicant demonstrates to the satisfaction of the APCO that the Ambient Air Quality Standards are not violated in the areas to be affected, and such emissions will be consistent with Reasonable Further Progress, and will not cause or contribute to a violation of Ambient Air Quality Standards (AAQS)."

The Technical Services Section of the San Joaquin Valley Unified Air Pollution Control District performed a CO modeling run, using AERMOD air dispersion model, to determine if the CO emissions from the new emissions unit would exceed the State and Federal AAQS (**Attachment F**). Modeling of the worst case 1 hour and 8 hour CO impacts were performed. Results of the modeling demonstrate that the proposed increase in CO emissions will not cause a violation of the CO ambient air quality standards. Therefore, the increase in CO emissions is exempt from offsets pursuant to Section 6.4.1.

**Offset Conditions:**

The following conditions will ensure compliance with the offset requirements of this rule:

- Prior to initial operation, permittee shall provide emission reduction credits to offset the calendar quarter emissions increases set forth below: NOx (as NO<sub>2</sub>) - Q1: 59,726 lb, Q2: 60,390 lb, Q3: 61,053 lb, and Q4: 61,053 lb; PM<sub>10</sub> (based on NO<sub>x</sub> ERCs) - Q1: 59,626 lb, Q2: 60,288 lb, Q3: 60,951 lb and Q4: 60,951 lb; SO<sub>x</sub> (as SO<sub>2</sub>) - Q1: 11,324 lb, Q2: 11,450 lb, Q3: 11,576 lb and Q4: 11,576 lb; and VOC - Q1: 10,995 lb, Q2: 11,117 lb, Q3: 11,240 lb and Q4: 11,240 lb. These offset quantities include the applicable distance offset ratio. [District Rule 2201]
- ERC Certificate Numbers S-3114-2 (or certificates split from these certificates) shall be used to supply the required NO<sub>x</sub>, PM<sub>10</sub> and VOC offsets, ERC Certificate Number N-927-1 (or a certificates split from these certificates) shall be used to supply the required VOC offsets and ERC Certificate Number S-2744-5 (or a certificate split from this certificate) shall be used to supply the required SO<sub>x</sub>, unless a revised offsetting proposal is received and approved by the District, upon which this Determination of Compliance shall be reissued, administratively specifying the new offsetting proposal. Original public noticing requirements, if any, shall be duplicated prior to reissuance of this Determination of Compliance. [District Rule 2201]

- NOx ERCs may be used to offset: PM10 emission increase at a ratio of 2.629 lb NOx:1 lb PM10, and VOC emission increase at a ratio of 1.0 lb NOx:1 lb VOC. [District Rule 2201]

**C. Public Notification:**

**1. Applicability**

District Rule 2201, section 5.4, requires a public notification for the affected pollutants from the following types of projects:

- New Major Sources
- Major Modifications
- New emission units with a PE > 100 lb/day of any one pollutant (IPE Notifications)
- Any project which results in the offset thresholds being surpassed (Offset Threshold Notification), and/or
- Any permitting action with a SSIPE exceeding 20,000 lb/yr for any one pollutant. (SSIPE Notice)

**a. New Major Source Notice Determination**

New Major Sources are new facilities, which are also Major Sources.

The source is an existing major source and not a new major source. Therefore, public noticing is not required for this project under this provision.

**b. Major Modification**

As discussed above in Section VII. 8, the Pastoria Energy Facility expansion results in increases in emissions exceeding the Major Modification thresholds for NOx and VOC. Thus, the project results in a Major Modification and public noticing is required.

**c. PE Notification**

Applications which include a new emissions unit with a Potential to Emit greater than 100 pounds during any one day for any pollutant will trigger public noticing requirements. The potential to emit for each unit is summarized in the table below:



<b>Post-Project Potential to Emit</b>						
Permit Unit	NO <sub>x</sub> (lb/day)	CO (lb/day)	VOC (lb/day)	PM <sub>10</sub> (lb/day)	SO <sub>x</sub> (lb/day)	NH <sub>3</sub> (lb/day)
S-3636-14-1	450.0	1978.2	96.8	168.0	84.0	577.4
<b>Threshold (lb/day)</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>
Notification Required?	<b>Yes</b>	<b>Yes</b>	<b>No</b>	<b>Yes</b>	<b>No</b>	<b>Yes</b>

According to the table above, the subject unit will have a Potential to Emit greater than 100 lb/day for NO<sub>x</sub>, CO, PM<sub>10</sub> and NH<sub>3</sub> emissions. Therefore, public noticing will be required for PE > 100 lb/day purposes.

**d. Existing Facility - Offset Threshold**

Public notification is required if the Pre-Project Stationary Source Potential to Emit (SSPE1) is increased from a level below the offset threshold to a level exceeding the emissions offset threshold, for any pollutant.

The following table compares the pre-project SSPE1 with the post-project SSPE2 in order to determine if any offset thresholds have been surpassed.

<b>Offset Threshold</b>				
Pollutant	SSPE1 (lb/year)	SSPE2 (lb/year)	Offset Threshold	Public Notice Required?
NO <sub>x</sub>	345,557	410,590	20,000 lb/year	No
SO <sub>x</sub>	1,220,574	1,418,574	54,750 lb/year	No
PM <sub>10</sub>	227,659	239,899	29,200 lb/year	No
CO	240,060	259,835	200,000 lb/year	No
VOC	84,808	94,681	20,000 lb/year	No

As shown above, the offset thresholds for all five pollutants have been exceeded prior to this project; therefore, public noticing is not required for this project for offset purposes.

**e. SSIPE Notification**

Public notification is required for any permitting action that results in a Stationary Source Increase in Permitted Emissions (SSIPE) of more than 20,000 lb/year of any affected pollutant. According to District policy, the SSIPE is calculated as the Post Project Stationary Source Potential to Emit (SSPE2) minus the Pre-Project Stationary Source Potential to Emit (SSPE1), i.e. SSIPE = SSPE2 – SSPE1. The values for SSPE2 and SSPE1 are calculated according to Rule 2201, Sections 4.9 and 4.10, respectively. The SSIPE is compared to the SSIPE Public Notice thresholds in the following table:

<b>SSIPE Notification</b>					
<b>Pollutant</b>	<b>SSPE2 (lb/year)</b>	<b>SSPE1 (lb/year)</b>	<b>SSIPE (lb/year)</b>	<b>SSIPE Public Notice Threshold</b>	<b>Public Notice Required?</b>
NO <sub>x</sub>	410,590	345,557	65,033	20,000 lb/year	Yes
CO	1,418,574	1,220,574	198,000	20,000 lb/year	Yes
VOC	239,899	227,659	12,240	20,000 lb/year	No
PM <sub>10</sub>	259,835	240,060	19,775	20,000 lb/year	No
SO <sub>x</sub>	94,681	84,808	9,873	20,000 lb/year	No

As demonstrated above, the SSIPEs for NO<sub>x</sub> and CO emissions are greater than 20,000 lb/year; therefore, public noticing for SSIPE purposes is required.

## **2. Public Notice Requirements**

Section 5.5 details the actions taken by the District when public noticing is triggered according to the application types above. Since public noticing requirements are triggered for this project, the District shall public notice this project according to the requirements of Section 5.5.

### **D. Daily Emission Limits:**

Daily emissions limitations (DELs) and other enforceable conditions are required by Section 3.15 to restrict a unit's maximum daily emissions, to a level at or below the emissions associated with the maximum design capacity. Per Sections 3.15.1 and 3.15.2, the DEL must be contained in the latest permit and contained in or enforced by the latest PTO and enforceable, in a practicable manner, on a daily basis.

### **Proposed Rule 2201 (DEL) Conditions:**

The following conditions will be included to demonstrate compliance with facility wide annual NO<sub>x</sub> and CO emissions limits.

- Emission rates from this unit, except during startup and shutdown periods, shall not exceed any of the following limits: NO<sub>x</sub> (as NO<sub>2</sub>) – 16.25 lb/hr and 2.5 ppmvd @ 15% O<sub>2</sub>; VOC (as methane) – 2.95 lb/hr and 1.3 ppmvd @ 15% O<sub>2</sub>; CO – 7.92 lb/hr and 2.0 ppmvd @ 15% O<sub>2</sub>; PM<sub>10</sub> – 7.00 lb/hr; or SO<sub>x</sub> (as SO<sub>2</sub>) – 3.50 lb/hr. NO<sub>x</sub> (as NO<sub>2</sub>) emission limits are one hour rolling averages. All other emission limits are three hour rolling averages. [District Rules 2201, 4001, and 4703]
- Emissions from this unit, during start-up and shutdown, shall not exceed any of the following limits: NO<sub>x</sub> (as NO<sub>2</sub>) – 80.00 lb/hr; CO – 902.00 lb/hr;

VOC (as methane) – 16.00 lb/hr; PM<sub>10</sub> – 7.00 lb/hr; SO<sub>x</sub> (as SO<sub>2</sub>) – 3.50 lb/hr; or NH<sub>3</sub> – 24.06 lb/hr. [District Rules 2201 and 4703]

- Daily emissions from the GTE shall not exceed the following limits: NO<sub>x</sub> (as NO<sub>2</sub>) – 450.0 lb/day; CO – 1978.2 lb/day; VOC – 96.8 lb/day; PM<sub>10</sub> – 168.0 lb/day; SO<sub>x</sub> (as SO<sub>2</sub>) – 83.9 lb/day, or NH<sub>3</sub> – 577.4 lb/day. [District Rule 2201]
- The ammonia (NH<sub>3</sub>) emissions shall not exceed 10 ppmvd @ 15% O<sub>2</sub> or 24.06 lb/hr over a 24 hour rolling average. [District Rule 2201]
- The GTE shall be fired exclusively on PUC-regulated natural gas with a sulfur content no greater than 0.75 grain of sulfur compounds (as S) per 100 dry scf of natural gas. [District Rule 2201 and 40 CFR 60.4330(a)(2)]

In addition to the hourly and daily emissions limits specified above, the following conditions will also be included to ensure continued compliance for the proposed turbine:

- Annual emissions from the GTE, calculated on a twelve consecutive month rolling basis, shall not exceed any of the following limits: NO<sub>x</sub> (as NO<sub>2</sub>) – 65,033 lb/year; CO – 198,000 lb/year; VOC – 12,240 lb/year; PM<sub>10</sub> – 19,775 lb/year; or SO<sub>x</sub> (as SO<sub>2</sub>) – 9,873 lb/year; or NH<sub>3</sub> – 67,970 lb/year. [District Rule 2201]
- Quarterly emissions from the GTE, calculated based on calendar quarters, shall not exceed the following: NO<sub>x</sub> (as NO<sub>2</sub>) – Q1: 39,817 lb/qtr, Q2: 40,260 lb/qtr, Q3: 40,702, Q4: 40,702; VOC – Q1: 7,330 lb/qtr, Q2: 7,411 lb/qtr, Q3: 7,493 lb/qtr, Q4: 7,493 lb/qtr; PM<sub>10</sub> - Q1: 15,120 lb/qtr, Q2: 15,288 lb/qtr, Q3: 15,456 lb/qtr and Q4: 15,456; SO<sub>x</sub> – Q1: 7,549 lb/qtr, Q2: 7,633 lb/qtr, Q3: 7,717 lb/qtr and Q4: 7,717 lb/qtr. [District Rule 2201]
- Each one hour period shall commence on the hour. Each one hour period in a three hour rolling average will commence on the hour. The three hour average will be compiled from the three most recent one hour periods. Each one hour period in a twenty-four hour average for ammonia slip will commence on the hour. [District Rule 2201]
- Daily emissions will be compiled for a twenty-four hour period starting and ending at twelve-midnight. Each month in the twelve consecutive month rolling average emissions shall commence at the beginning of the first day of the month. The twelve consecutive month rolling average emissions to determine compliance with annual emissions limitations shall be compiled from the twelve most recent calendar months. [District Rule 2201]

**E. Air Quality Impact Analysis:**

Section 4.14.2 of this Rule requires that an air quality impact analysis (AQIA) be conducted for the purpose of determining whether the operation of the proposed equipment will cause or make worse a violation of an air quality standard. The Technical Services Division of the SJVACPD conducted the required analysis. Refer to **Attachment F** of this document for the AQIA summary sheet.

The proposed location is in an attainment area for NO<sub>x</sub>, CO, and SO<sub>x</sub> and in a non-attainment area for PM<sub>10/2.5</sub>. As shown by the table below, the proposed equipment will not cause a violation of an air quality standard for NO<sub>x</sub>, CO, SO<sub>x</sub> or PM<sub>10</sub>.

Criteria Pollutant Modeling Results\*  
 Values are in µg/m<sup>3</sup>

Gas Turbine	1 Hour	3 Hours	8 Hours.	24 Hours	Annual
CO	Pass	X	Pass	X	X
NO <sub>x</sub>	Pass <sup>1</sup>	X	X	X	Pass
SO <sub>x</sub>	Pass <sup>2</sup>	Pass	X	Pass	Pass
PM <sub>10</sub>	X	X	X	Pass <sup>3</sup>	Pass <sup>3</sup>

\*Results were taken from the attached PSD spreadsheet.

<sup>1</sup>The project was compared to the 1-hour NO<sub>2</sub> National Ambient Air Quality Standard that became effective on April 12, 2010 using the District's approved procedures. The criteria pollutant 1-hour value passed using TIER I NO<sub>2</sub> NAAQS modeling

<sup>2</sup>The project was compared to the 1-hour SO<sub>2</sub> National Ambient Air Quality Standard that became effective on August 23, 2010 using the District's approved procedures.

<sup>3</sup>The maximum predicted concentration for emissions of these criteria pollutants from the proposed unit are below EPA's level of significance as found in 40 CFR Part 51.165 (b)(2).

As shown above, the emissions from the proposed equipment will not cause or contribute significantly to a violation of the State and National AAQS.

**F. Compliance Assurance:**

**1. Source Testing**

District Rule 4703 requires NO<sub>x</sub> and CO emission testing as well as percent turbine efficiency testing on an annual basis. The District Source Test Policy (APR 1705 10/09/97) requires annual testing for all pollutants controlled by catalysts. The control equipment will include an SCR system. Ammonia slip is an indicator of how well the SCR system is performing and PM<sub>10</sub> emissions are a good indicator of how well the inlet air cooler/filter are performing.

Therefore, source testing for NO<sub>x</sub>, CO, VOC, PM<sub>10</sub>, and ammonia slip will be required within 60 days after the end of the commissioning period and at least once every 12 months thereafter.

Also, source testing of NO<sub>x</sub>, CO, and VOC startup emissions will be required for one of the four Pastoria Energy GTEs (including this unit) at least once every seven years. If, in the judgment of source test staff, CEMS data is not reliable to determine compliance with NO<sub>x</sub> and CO startup emission limits, then source testing to measure startup NO<sub>x</sub> and CO mass emission rates shall be conducted at least once every 12 months. This testing will serve two purposes: to validate the startup emission estimates used in the emission calculations and to verify that the CEMs accurately measure startup emissions.

The unit will be equipped with CEMS for NO<sub>x</sub>, CO, and O<sub>2</sub>. The CEMS will have two ranges to allow accurate measurements of NO<sub>x</sub> and CO emissions during startup. The CEMS must meet the installation, performance, relative accuracy, and quality assurance requirements specified in 40 CFR 60.13 and Appendix B (referenced in the CEMS requirements of Rule 4703) and the acid rain requirements in 40 CFR Part 75.

40 CFR Part 60 subpart KKKK requires that fuel sulfur content be documented or monitored. Refer to the monitoring section of this document for a discussion of the fuel sulfur testing requirements.

## **2. Monitoring**

Monitoring of NO<sub>x</sub> emissions is required by District Rule 4703. The applicant has proposed a CEMS for NO<sub>x</sub>.

CO monitoring is not specifically required by any applicable Rule or Regulation. Nevertheless, due to erratic CO emission concentrations during start-up and shutdown periods, it is necessary to limit the CO emissions on a pound per hour basis. Therefore, a CO CEMS is necessary to show compliance with the CO limits of this permit. The applicant has proposed a CO CEMS.

Ammonia slip will be monitored by measuring the ammonia injection rates.

40 CFR Part 60 Subpart KKKK and District Rule 4703 requires monitoring of the fuel consumption. Fuel consumption monitoring will be required.

40 CFR Part 60 Subpart KKKK requires monitoring of the fuel sulfur content. The gas is supplied from a regulated interstate pipeline (Kern River/Mojave) and has a maximum sulfur content of 0.75 gr/scf. Since the sulfur content of the natural gas would not exceed this value, it is District practice to allow the facility to demonstrate compliance with the limit by providing gas purchase contracts, supplier certification, tariff sheet or transportation contract; or, if these documents cannot be provided, physically monitor the fuel sulfur content weekly for eight consecutive weeks and semi-annually thereafter, if the fuel sulfur content remains at or below 0.75 gr/scf. Pastoria will be operating the turbine in compliance with the fuel sulfur content monitoring requirements as described in

the Rule 4001, Subpart KKKK discussion below. Therefore, compliance with the monitoring requirements will be satisfied.

### **3. Recordkeeping**

The applicant will be required to keep records of all of the parameters that are required to be monitored. Refer to section VIII.F.2 of this document for a discussion of the parameters that will be monitored.

### **4. Reporting**

40 CFR Part 60 Subpart KKKK requires that the facility report the use of fuel with a sulfur content of more than 0.8% by weight. Such reporting will be required.

40 CFR Part 60 Subpart KKKK requires the reporting of exceedences of the NO<sub>x</sub> emission limit of the permit. Such reporting will be required.

### **G. Alternate Siting**

Section 4.15.1 of this Rule requires that an analysis of alternative sites, sizes and production processes is required under Section 173 of the Federal Clean Air Act. The applicant is required to prepare an analysis functionally equivalent to the requirements of Division 13, Section 21000 et seq. of the Public Resources Code.

The proposed GTE will be located at an existing facility to support current operations; therefore, an alternate site would be impractical.

### **H. Compliance by Other Owned, Operated or Controlled Source**

In addition to the alternative siting discussed above, pursuant to Section 4.15.2, the owner of the proposed new major source or federal major modification shall demonstrate to the satisfaction of the APCO that all major stationary sources owned or operated by such person (or any entity controlling, controlled by, or under common control with such person) in California which are subject to emission limitations are in compliance or on a schedule for compliance with all applicable limitations and standards. Pastoria provided verification that all major Stationary Sources owned or operated by Calpine Corporation in California are in compliance or on a schedule for compliance with all applicable emission limitations and standards (**Attachment H**) Pastoria Energy Facility, LLC is owned by Calpine Corporation.

### **Rule 2520 Federally Mandated Operating Permits**

This facility is subject to this Rule, and has received their Title V Operating Permit. The proposed modification may be considered a significant modification

to the Title V Permit. As discussed above, the facility has applied for a Certificate of Conformity (COC); therefore, the facility must apply to modify their Title V permit with an administrative amendment/minor modification, prior to operating with the proposed modifications. Pastoria's Title V compliance certification form is included as **Attachment I**. The following permit conditions will be listed to ensure compliance:

- {1830} This Determination of Compliance serves as a written certificate of conformity with the procedural requirements of 40 CFR 70.7 and 70.8 and with the compliance requirements of 40 CFR 70.6(c). [District Rule 2201]
- {1831} Prior to operating with modifications authorized by this Determination of Compliance, the facility shall submit an application to modify the Title V permit with an administrative amendment in accordance with District Rule 2520 Section 5.3.4. [District Rule 2520, 5.3.4]

#### **Rule 2540 Acid Rain Program**

The proposed GTE is subject to the acid rain program as Phase II units, i.e. they will be installed after 11/15/90 and each has a generator nameplate rating greater than 25 MW.

The acid rain program will be implemented through a Title V operating permit. Federal regulations require submission of an acid rain permit application at least 24 months before the later of 1/1/2000 or the date the unit expects to generate electricity. The facility anticipates beginning commercial operation in June of 2013.

The acid rain program requirements for this facility are relatively minimal. Monitoring of the NO<sub>x</sub> and SO<sub>x</sub> emissions and a relatively small quantity of SO<sub>x</sub> allowances (from a national SO<sub>x</sub> allowance bank) will be required as well as the use of a NO<sub>x</sub> CEM.

The following condition will be placed on the permit S-3636-14-1 to ensure that Pastoria Energy submits an application to comply with the requirements of the acid rain program within the appropriate timeframe:

- Permittee shall submit an Acid Rain Permit application to comply with SJVUAPCD District Rule 2540 - Acid Rain Program, at least 24 months before the date on which the unit commences operation. [District Rule 2540]

#### **Rule 2550 Federally Mandated Preconstruction Review for Major Sources of Air Toxics**

Section 2.0 states, "*The provisions of this rule shall only apply to applications to construct or reconstruct a major air toxics source with Authority to Construct issued*

on or after June 28, 1998.” The applicant has provided the following analysis for non-criteria pollutants/hazardous air pollutants (HAPs).

Non-criteria pollutants are compounds that have been identified as pollutants that pose a significant health hazard. Nine of these pollutants are regulated under the Federal New Source Review program: lead, asbestos, beryllium, mercury, fluorides, sulfuric acid mist, hydrogen sulfide, total reduced sulfur, and reduced sulfur compounds.<sup>1</sup>

In addition to these nine compounds, the federal Clean Air Act lists 189 substances as potential hazardous air pollutants (Clean Air Act Sec. 112(b)(1)). The SJVAPCD has also published a list of compounds it defines as potential toxic air contaminants (Toxics Policy, May 1991; Rule 2-1-316). Any pollutant that may be emitted from the project and is on the federal New Source Review List, the federal Clean Air Act list, and/or the SJVAPCD toxic air contaminant list has been evaluated.

Non-criteria pollutant emission factors for the analysis of emissions from the gas turbine were obtained from AP-42 (Table 3.1-3, 4/00, and Table 3.4-1 of the Background Document for Section 3.1), from the California Air Resources Board’s CATEF database for gas turbines, and from source tests on a similar turbine. Specifically, factors for all pollutants except formaldehyde, hexane, propylene, and naphthalene and other PAHs were taken from AP-42. AP-42 did not contain factors for hexane or propylene, and did not include speciated data for PAHs. Factors for these pollutants and for naphthalene were taken from the CATEF database (mean values). The emission factor for formaldehyde reflects the 25 ppbv MACT limit.

**Hazardous Air Pollutant Emissions (per CATEF)**

**Pastoria Energy Facility – Expansion and Total Facility**

<b>Pollutant</b>	<b>Emission Factor<sup>a</sup> (lb/MMBtu)</b>	<b>Unit Max. Hourly Emissions<sup>b</sup> (lb/hr)</b>	<b>Unit<sup>1-14</sup> Max. Annual Emissions<sup>c</sup> (tpy)</b>	<b>Units<sup>1-1, 2 &amp; 3</sup> Max. Annual Emissions<sup>d</sup> (tpy/unit)</b>	<b>Total Max. Annual Emissions (tpy)</b>
Acetaldehyde	4.14E-05	7.42E-02	1.05E-01	3.30E-01	1.09E+00
Acrolein	6.63E-06	1.19E-02	1.68E-02	5.33E-02	1.77E-01
Benzene	1.24E-05	2.22E-02	3.14E-02	1.00E-01	3.31E-01
1,3-Butadiene	4.45E-07	7.97E-04	1.13E-03	3.58E-03	1.19E-02
Ethylbenzene	3.31E-05	5.93E-02	8.37E-02	2.70E-01	8.94E-01
Formaldehyde	6.01E-05	1.08E-01	1.52E-01	4.80E-01	1.59E+00
Hexane	2.45E-04	4.39E-01	6.20E-01	1.97E+00	6.53E+00

<sup>1</sup> These pollutants are regulated under federal and state air quality programs; however, they are evaluated as noncriteria pollutants by the California Energy Commission (CEC).



Naphthalene	1.35E-06	2.42E-03	3.42E-03	1.08E-02	3.58E-02
PAHs (excluding naphthalene)	9.32E-07	1.67E-03	2.36E-03	7.50E-03	2.49E-02
<i>Benzo(a)anthracene</i>	1.61E-07	2.88E-04	4.07E-04	1.29E-03	4.28E-03
<i>Benzo(a)pyrene</i>	9.89E-08	1.77E-04	2.50E-04	7.95E-04	2.64E-03
<i>Benzo(b)fluoranthene</i>	8.04E-08	1.44E-04	2.03E-04	6.47E-04	2.14E-03
<i>Benzo(k)fluoranthene</i>	7.82E-08	1.40E-04	1.98E-04	6.30E-04	2.09E-03
<i>Chrysene</i>	1.79E-07	3.21E-04	4.53E-04	1.44E-03	4.77E-03
<i>Dibenz(a,h)anthracene</i>	1.67E-07	2.99E-04	4.22E-04	1.34E-03	4.44E-03
<i>Indeno(1,2,3-cd)pyrene</i>	1.67E-07	2.99E-04	4.22E-04	1.34E-03	4.44E-03
Propylene oxide	3.00E-05	5.37E-02	7.59E-02	2.40E-01	7.96E-01
Toluene	1.38E-04	2.47E-01	3.49E-01	1.11E+00	3.68E+00
Xylene	6.63E-05	1.19E-01	1.68E-01	5.30E-01	1.76E+00
<b>Total HAPs</b>		1.14E+00	<b>1.61E+00</b>	5.11E+00	<b>1.69E+01</b>
Ammonia	(f)	24.06	32.63		
Propylene	7.30E-04	1.31E+00	1.85E+00		

- <sup>a</sup> All factors except PAHs, hexane, formaldehyde and propylene are from AP-42, Table 3.1-3, 4/00. Individual PAHs, hexane and propylene are CATEF mean results as AP-42 does not include factors for these compounds. Adjusted for fuel HHV of 1,056.4 Btu/scf per Footnote c to Table 3.1-3.
- <sup>b</sup> Based on a maximum turbine firing rate of 1791 MMBtu/hr.
- <sup>c</sup> Based on a maximum turbine firing rate (from (2)) for 2825 hr/yr and 5,059,575 MMBtu/yr.
- <sup>d</sup> Based on a maximum turbine firing rate of 1837 MMBtu/hr per GTE and 8760 hr/yr.
- <sup>e</sup> Emission factors for individual PAHs adjusted proportionally so that total of "Adjusted EF" plus naphthalene equals total PAH EF of 2.2E-06 lb/MMBtu shown in AP-42, Table 3.13. (lb/MMscf converted to lb/MMBtu using 1056 Btu/scf)
- <sup>f</sup> Based on 10 ppm ammonia slip from SCR

As shown above, the emissions of each individual HAP are below 10 tons per year and the total HAP emissions (16.9 tpy) are below 25 tons per year; therefore, the Pastoria Energy Facility Project will not be a major air toxics source and the provisions of this rule do not apply.

## **Rule 4001 New Source Performance Standards**

### **40 CFR 60 – Subpart GG**

40 CFR Part 60 Subpart GG applies to all stationary gas turbines with a heat input greater than 10.7 gigajoules per hour (10.2 MMBtu/hr), that commence construction, modification, or reconstruction after October 3, 1977. Pastoria Energy Facility has indicated that the installation and construction of the proposed turbine will be completed in June of 2013. Therefore, the turbine meets the applicability requirements of this subpart.

40 CFR 60 Subpart KKKK, Section 60.4305(a), states that this subpart applies to all stationary gas turbines with a heat input greater than 10.7 gigajoules (10 MMBtu) per hour, which commenced construction, modification, or reconstruction after February 18, 2005. Pastoria Energy LLC has indicated that the installation and construction of the proposed turbines will be completed in June of 2013. Therefore, the turbine also meets the applicability requirements of this subpart.

40 CFR 60 Subpart KKKK, Section 60.4305(b), states that stationary combustion turbines regulated under this subpart are exempt from the requirements of 40 CFR 60 Subpart GG. As discussed below, 40 CFR 60 Subpart KKKK is applicable to the proposed turbine. Therefore, it is exempt from the requirements of 40 CFR 60 Subpart GG and no further discussion is required.

#### **40 CFR 60 – Subpart KKKK**

40 CFR Part 60 Subpart KKKK applies to all stationary gas turbines rated at greater than or equal to 10 MMBtu/hr that commence construction, modification, or reconstruction after February 18, 2005. The proposed gas turbine in this project has a rating of 1,791 MMBtu/hr and will be installed after February 18, 2005; therefore, this subpart applies to the gas turbine.

Subpart KKKK established requirements for nitrogen oxide (NO<sub>x</sub>) and sulfur dioxide (SO<sub>x</sub>) emissions.

#### **Section 60.4320 - Standards for Nitrogen Oxides:**

Paragraph (a) states that NO<sub>x</sub> emissions shall not exceed the emission limits specified in Table 1 of this subpart. Paragraph (b) states that if you have two or more turbines that are connected to a single generator, each turbine must meet the emission limits for NO<sub>x</sub>. Table 1 states that new, modified, or reconstructed turbines firing natural gas with a combustion turbine heat input at peak load of greater than 850 MMBtu/hr shall meet a NO<sub>x</sub> emissions limit of 15 ppmvd @ 15% O<sub>2</sub> or 54 ng/J of useful output (0.43 lb/MWh).

Pastoria Energy is proposing a NO<sub>x</sub> emission concentration limit of 2.5 ppmvd @ 15% O<sub>2</sub> for the turbine; therefore, the proposed turbine will be operating in compliance with the NO<sub>x</sub> emission requirements of this subpart. The following previously identified condition will be in the permit to ensure compliance with the requirements of this section:

- Emission rates from this unit, except during startup and shutdown periods, shall not exceed any of the following limits: NO<sub>x</sub> (as NO<sub>2</sub>) – 16.25 lb/hr and 2.5 ppmvd @ 15% O<sub>2</sub>; VOC (as methane) – 2.95 lb/hr and 1.3 ppmvd @ 15% O<sub>2</sub>; CO – 7.92 lb/hr and 2.0 ppmvd @ 15% O<sub>2</sub>; PM<sub>10</sub> – 7.00 lb/hr; or SO<sub>x</sub> (as SO<sub>2</sub>) – 3.50 lb/hr. NO<sub>x</sub> (as NO<sub>2</sub>) emission limits are

one hour rolling averages. All other emission limits are three hour rolling averages. [District Rules 2201, 4001, and 4703]

Section 60.4330 - Standards for Sulfur Dioxide:

Paragraph (a) states that if your turbine is located in a continental area, you must comply with one of the following:

- (1) Operator must not cause to be discharged into the atmosphere from the subject stationary combustion turbine any gases which contain SO<sub>2</sub> in excess of 110 nanograms per Joule (ng/J) (0.90 pounds per megawatt-hour (lb/MWh)) gross output; or
- (2) Operator must not burn in the subject stationary combustion turbine any fuel which contains total potential sulfur emissions in excess of 26 ng SO<sub>2</sub>/J (0.060 lb SO<sub>2</sub>/MMBtu) heat input.

Pastoria is proposing to burn PUC-regulated natural gas fuel in the turbine with a maximum sulfur content of 0.75 grain/100 scf (0.002 lb/MMBtu). Therefore, the proposed turbine will be operating in compliance with the SO<sub>x</sub> emission requirements of this section. The following condition will ensure continued compliance with the requirements of this section:

- The GTE shall be fired exclusively on PUC-regulated natural gas with a sulfur content of no greater than 0.75 grains of sulfur compounds (as S) per 100 dry scf of natural gas. [District Rule 2201 and 40 CFR 60.4330(a)(2)]

Section 60.4335 – NO<sub>x</sub> Compliance Demonstration, with Water or Steam Injection:

Paragraph (a) states that when a turbine is using water or steam injection to reduce NO<sub>x</sub> emissions, you must install, calibrate, maintain and operate a continuous monitoring system to monitor and record the fuel consumption and the ratio of water or steam to fuel being fired in the turbine when burning a fuel that requires water or steam injection for compliance.

Pastoria does not use water or steam injection in the turbine; therefore, the requirements of this section are not applicable to the turbine in this project.

Section 60.4340 – NO<sub>x</sub> Compliance Demonstration, without Water or Steam Injection:

Paragraph (a) states that if water or steam injection is not use to control NO<sub>x</sub> emissions, then an annual performance test in accordance with Section 60.4400 of this subpart be performed to demonstrate cinuous compliance. If the NO<sub>x</sub> emission result from the performance test is less than or equal to 75 percent of the NO<sub>x</sub> emission limit for the turbine, the frequency of subsequent performance tests may be reduced to once every 2 years (no more than 26 calendar months

following the previous performance test). If the results of any subsequent performance test exceed 75 percent of the NO<sub>x</sub> emission limit for the turbine, the frequency will resume to annual performance tests.

Paragraph (b) states that as an alternative to annual source testing, the facility may install, calibrate, maintain and operate one of the following continuous monitoring systems:

- (1) Continuous emission monitoring as described in §§60.4335(b) and 60.4345, or
- (2) Continuous parameter monitoring

Pastoria has proposed to install a CEMS system as described in §§60.4335(b) and 60.4345; therefore, the following condition will ensure compliance with the requirements of this section:

- The owner or operator shall install, certify, maintain, operate and quality-assure a Continuous Emission Monitoring System (CEMS) which continuously measures and records the exhaust gas NO<sub>x</sub>, CO and O<sub>2</sub> concentrations. All CEMS shall be dedicated to this unit. NO<sub>x</sub> and O<sub>2</sub> CEMS shall meet the requirements of 40 Part 75 and CO CEMS shall meet the requirements of 40 CFR Part 60. Continuous emissions monitor(s) shall be capable of monitoring emissions during normal operating conditions, and during startups and shutdowns provided the CEMS passes the relative accuracy requirement for startups and shutdowns specified herein. If relative accuracy of CEMS cannot be demonstrated during startup conditions, CEMS results during startup and shutdown events shall be replaced with startup emission rates obtained from source testing to determine compliance with emission limits contained in this document. [District Rules 1080 and 4703 and 40 CFR 60.4340(b)(1)]

Section 60.4345 – CEMS Equipment Requirements:

Paragraph (a) states that each NO<sub>x</sub> diluent CEMS must be installed and certified according to Performance Specification 2 (PS 2) in Appendix B to this part, except the 7-day calibration drift is based on unit operating days, not calendar days. With state approval, Procedure 1 in Appendix F to this part is not required. Alternatively, a NO<sub>x</sub> diluent CEMS that is installed and certified according to Appendix A of Part 75 of this chapter is acceptable for use under this subpart. The relative accuracy test audit (RATA) of the CEMS shall be performed on a lb/MMBtu basis.

Paragraph (b) states that as specified in §60.13(e)(2), during each full unit operating hour, both the NO<sub>x</sub> monitor and the diluent monitor must complete a minimum of one cycle of operation (sampling, analyzing, and data recording) for each 15-minute quadrant of the hour, to validate the hour. For partial unit

operating hours, at least one valid data point must be obtained with each monitor for each quadrant of the hour in which the unit operates. For unit operating hours in which required quality assurance and maintenance activities are performed on the CEMS, a minimum of two valid data points (one in each of two quadrants) are required for each monitor to validate the NO<sub>x</sub> emission rate for the hour.

Paragraph (c) states that each fuel flowmeter shall be installed, calibrated, maintained, and operated according to the manufacturer's instructions. Alternatively, with state approval, fuel flowmeters that meet the installation, certification, and quality assurance requirements of Appendix D to Part 75 of this chapter are acceptable for use under this subpart.

Paragraph (d) states that each watt meter, steam flow meter, and each pressure or temperature measurement device shall be installed, calibrated, maintained, and operated according to manufacturer's instructions.

Paragraph (e) states that the owner or operator shall develop and keep on-site a quality assurance (QA) plan for all of the continuous monitoring equipment described in paragraphs (a), (c), and (d) of this section. For the CEMS and fuel flow meters, the owner or operator may, with state approval, satisfy the requirements of this paragraph by implementing the QA program and plan described in section 1 of Appendix B to Part 75 of this chapter.

Pastoria will be required to install and operate a NO<sub>x</sub> CEMS in accordance with the requirements of this section. The following conditions will ensure compliance with the requirements of this section:

- The NO<sub>x</sub> and O<sub>2</sub> CEMS shall meet the requirements in 40 CFR 75 and CO CEMS shall meet the requirements in 40 CFR 60, Appendix F Procedure 1 and Part 60, Appendix B Performance Specification 2 (PS 2), or shall meet equivalent specifications established by mutual agreement of the District, the ARB, and the EPA. [District Rule 1080 and 40 CFR 60.4345(a)]
- The CEMS shall complete a minimum of one cycle of operation (sampling, analyzing, and data recording) for each successive 15-minute period or shall meet equivalent specifications established by mutual agreement of the District, the ARB and the EPA. [District Rule 1080 and 40 CFR 60.4345(b)]

Section 60.4350 – CEMS Data and Excess NO<sub>x</sub> Emissions:

Section 60.4350 states that for purposes of identifying excess emissions:

- (a) All CEMS data must be reduced to hourly averages as specified in §60.13(h).

(b) For each unit operating hour in which a valid hourly average, as described in §60.4345(b), is obtained for both NO<sub>x</sub> and diluent monitors, the data acquisition and handling system must calculate and record the hourly NO<sub>x</sub> emission rate in units of ppm or lb/MMBtu, using the appropriate equation from Method 19 in Appendix A of this part. For any hour in which the hourly average O<sub>2</sub> concentration exceeds 19.0 percent O<sub>2</sub> (or the hourly average CO<sub>2</sub> concentration is less than 1.0 percent CO<sub>2</sub>), a diluent cap value of 19.0 percent O<sub>2</sub> or 1.0 percent CO<sub>2</sub> (as applicable) may be used in the emission calculations.

(c) Correction of measured NO<sub>x</sub> concentrations to 15 percent O<sub>2</sub> is not allowed.

(d) If you have installed and certified a NO<sub>x</sub> diluent CEMS to meet the requirements of Part 75 of this chapter, states can approve that only quality assured data from the CEMS shall be used to identify excess emissions under this subpart. Periods where the missing data substitution procedures in Subpart D of Part 75 are applied are to be reported as monitor downtime in the excess emissions and monitoring performance report required under §60.7(c).

(e) All required fuel flow rate, steam flow rate, temperature, pressure, and megawatt data must be reduced to hourly averages.

(f) Calculate the hourly average NO<sub>x</sub> emission rates, in units of the emission standards under §60.4320, using either ppm for units complying with the concentration limit or the equations 1 (simple cycle turbines) or 2 (combined cycle turbines) listed in §60.4350, paragraph (f).

Pastoria Energy is proposing to monitor the NO<sub>x</sub> emissions rates from the turbines with a CEMS. The CEMS system will be used to determine if, and when, any excess NO<sub>x</sub> emissions are released to the atmosphere from the turbine exhaust stacks. The CEMS will be operated in accordance with the methods and procedures described above. Therefore, the proposed turbines will be operating in compliance with the requirements of this section. The following condition will ensure continued compliance with the requirements of this section:

- Results of continuous emissions monitoring shall be reduced according to the procedure established in 40 CFR, Part 51, Appendix P, paragraphs 5.0 through 5.3.3, or by other methods deemed equivalent by mutual agreement with the District, the ARB, and the EPA. [District Rule 1080]

**Section 60.4355 – Parameter Monitoring Plan:**

This section sets forth the requirements for operators that elect to continuously monitor parameters in lieu of installing a CEMS for NO<sub>x</sub> emissions. As discussed above, Pastoria is proposing to install CEMS on three turbine that will directly measure NO<sub>x</sub> emissions. Therefore, the requirements of this section are not applicable and no further discussion is required.

Sections 60.4360, 60.4365 and 60.4370 – Monitoring of Fuel Sulfur Content:

Section 60.4360 states that an operator must monitor the total sulfur content of the fuel being fired in the turbine, except as provided in §60.4365. The sulfur content of the fuel must be determined using total sulfur methods described in §60.4415. Alternatively, if the total sulfur content of the gaseous fuel during the most recent performance test was less than half the applicable limit, ASTM D4084, D4810, D5504, or D6228, or Gas Processors Association Standard 2377 (all of which are incorporated by reference, see §60.17), which measure the major sulfur compounds, may be used.

Section 60.4365 states that an operator may elect not to monitor the total sulfur content of the fuel combusted in the turbine, if the fuel is demonstrated not to exceed potential sulfur emissions of 26 ng SO<sub>2</sub>/J (0.060 lb SO<sub>2</sub>/MMBtu) heat input for units located in continental areas and 180 ng SO<sub>2</sub>/J (0.42 lb SO<sub>2</sub>/MMBtu) heat input for units located in noncontinental areas or a continental area that the Administrator determines does not have access to natural gas and that the removal of sulfur compounds would cause more environmental harm than benefit. You must use one of the following sources of information to make the required demonstration:

- (a) The fuel quality characteristics in a current, valid purchase contract, tariff sheet or transportation contract for the fuel, specifying that the maximum total sulfur content for oil use in continental areas is 0.05 weight percent (500 ppmw) or less and 0.4 weight percent (4,000 ppmw) or less for noncontinental areas, the total sulfur content for natural gas use in continental areas is 20 grains of sulfur or less per 100 standard cubic feet and 140 grains of sulfur or less per 100 standard cubic feet for noncontinental areas, has potential sulfur emissions of less than less than 26 ng SO<sub>2</sub>/J (0.060 lb SO<sub>2</sub>/MMBtu) heat input for continental areas and has potential sulfur emissions of less than less than 180 ng SO<sub>2</sub>/J (0.42 lb SO<sub>2</sub>/MMBtu) heat input for noncontinental areas; or
- (b) Representative fuel sampling data which show that the sulfur content of the fuel does not exceed 26 ng SO<sub>2</sub>/J (0.060 lb SO<sub>2</sub>/MMBtu) heat input for continental areas or 180 ng SO<sub>2</sub>/J (0.42 lb SO<sub>2</sub>/MMBtu) heat input for noncontinental areas. At a minimum, the amount of fuel sampling data specified in section 2.3.1.4 or 2.3.2.4 of Appendix D to Part 75 of this chapter is required.

Pastoria is proposing to operate the turbine on natural gas that contains a maximum sulfur content of 0.75 grains/100 scf. Primarily, the natural gas supplier should be able to provide a purchase contract, tariff sheet or transportation contract for the fuel that demonstrates compliance with the natural gas sulfur content limit. However, Pastoria will have the option of either using a purchase contract, tariff sheet or transportation contract or actually physically monitoring the sulfur content be incorporated into their permit.

Section 60.4370 states that the frequency of determining the sulfur content of the fuel must be as follows:

- (a) *Fuel oil.* For fuel oil, use one of the total sulfur sampling options and the associated sampling frequency described in sections 2.2.3, 2.2.4.1, 2.2.4.2, and 2.2.4.3 of Appendix D to Part 75 of this chapter (*i.e.*, flow proportional sampling, daily sampling, sampling from the unit's storage tank after each addition of fuel to the tank, or sampling each delivery prior to combining it with fuel oil already in the intended storage tank).
- (b) *Gaseous fuel.* If you elect not to demonstrate sulfur content using options in §60.4365, and the fuel is supplied without intermediate bulk storage, the sulfur content value of the gaseous fuel must be determined and recorded once per unit operating day.
- (c) *Custom schedules.* Notwithstanding the requirements of paragraph (b) of this section, operators or fuel vendors may develop custom schedules for determination of the total sulfur content of gaseous fuels, based on the design and operation of the affected facility and the characteristics of the fuel supply. Except as provided in paragraphs (c)(1) and (c)(2) of this section, custom schedules shall be substantiated with data and shall be approved by the Administrator before they can be used to comply with the standard in §60.4330.

When actually required to physically monitor the sulfur content in the fuel burned in the turbine, Pastoria will follow a custom monitoring schedule. The District and EPA have previously approved a custom monitoring schedule of at least one per week. Then, if compliance with the fuel sulfur content limit is demonstrated for eight consecutive weeks, the monitoring frequency shall be at least once every six months. If any six month monitoring period shows an exceedance, weekly monitoring shall resume. Pastoria will follow this same pre-approved fuel sulfur content monitoring scheme for the turbine. The following previously identified conditions will ensure compliance with the requirements of this section:

- Compliance with natural gas sulfur content limit shall be demonstrated within 60 days after the end of the commissioning period and weekly thereafter. If the sulfur content is demonstrated to be less than 0.75 gr/100 scf for eight consecutive weeks, then the monitoring frequency shall be every six months. If the result of any six month monitoring demonstrates that the fuel does not meet the fuel sulfur content limit, weekly monitoring shall resume. [District Rules 1081, 2201, 2540, and 4001]
- Demonstration of compliance with the annual average sulfur content limit shall be demonstrated by a 12 month rolling average of the sulfur content either (i) documented in a valid purchase contract, a supplier certification,



a tariff sheet or transportation contract or (ii) tested using ASTM Methods D1072, D3246, D4084, D4468, D4810, D6228, D6667 or Gas Processors Association Standard 2377. [District Rules 1081, 2201 and 4001]

Section 60.4380 – Excess NO<sub>x</sub> Emissions:

Section 60.4380 establishes reporting requirements for periods of excess emissions and monitor downtime. Paragraph (a) lists requirements for operators choosing to monitor parameters associated with water or steam to fuel ratios. As discussed above, Pastoria is not proposing to monitor parameters associated with water or steam to fuel ratios to predict what the NO<sub>x</sub> emissions from the turbines will be. Therefore, the requirements of this paragraph are not applicable and no further discussion is required.

Paragraph (b) states that for turbines using CEMS:

(1) An excess emissions is any unit operating period in which the 4-hour or 30-day rolling average NO<sub>x</sub> emission rate exceeds the applicable emission limit in §60.4320. For the purposes of this subpart, a "4-hour rolling average NO<sub>x</sub> emission rate" is the arithmetic average of the average NO<sub>x</sub> emission rate in ppm or ng/J (lb/MWh) measured by the continuous emission monitoring equipment for a given hour and the three unit operating hour average NO<sub>x</sub> emission rates immediately preceding that unit operating hour. Calculate the rolling average if a valid NO<sub>x</sub> emission rate is obtained for at least 3 of the 4 hours. For the purposes of this subpart, a "30-day rolling average NO<sub>x</sub> emission rate" is the arithmetic average of all hourly NO<sub>x</sub> emission data in ppm or ng/J (lb/MWh) measured by the continuous emission monitoring equipment for a given day and the twenty-nine unit operating days immediately preceding that unit operating day. A new 30-day average is calculated each unit operating day as the average of all hourly NO<sub>x</sub> emissions rates for the preceding 30 unit operating days if a valid NO<sub>x</sub> emission rate is obtained for at least 75 percent of all operating hours.

(2) A period of monitor downtime is any unit operating hour in which the data for any of the following parameters are either missing or invalid: NO<sub>x</sub> concentration, CO<sub>2</sub> or O<sub>2</sub> concentration, fuel flow rate, steam flow rate, steam temperature, steam pressure, or megawatts. The steam flow rate, steam temperature, and steam pressure are only required if you will use this information for compliance purposes.

(3) For operating periods during which multiple emissions standards apply, the applicable standard is the average of the applicable standards during each hour. For hours with multiple emissions standards, the applicable limit for that hour is determined based on the condition that corresponded to the highest emissions standard.

Paragraph (c) lists requirements for operators who choose to monitor combustion parameters that document proper operation of the NO<sub>x</sub> emission

controls. Pastoria is not proposing to monitor combustion parameters that document proper operation of the NO<sub>x</sub> emission controls. Therefore, the requirements of this paragraph are not applicable and no further discussion is required.

Pastoria will follow the NO<sub>x</sub> excess reporting based on NO<sub>x</sub> limits on one hour rolling average, which is more stringent than 4-hour or 30-day rolling average defined in this section.

Section 60.4385 – Excess SO<sub>x</sub> Emissions:

Section 60.4385 states that if an operator chooses the option to monitor the sulfur content of the fuel, excess emissions and monitoring downtime are defined as follows:

(a) For samples of gaseous fuel and for oil samples obtained using daily sampling, flow proportional sampling, or sampling from the unit's storage tank, an excess emission occurs each unit operating hour included in the period beginning on the date and hour of any sample for which the sulfur content of the fuel being fired in the combustion turbine exceeds the applicable limit and ending on the date and hour that a subsequent sample is taken that demonstrates compliance with the sulfur limit.

(b) If the option to sample each delivery of fuel oil has been selected, you must immediately switch to one of the other oil sampling options (i.e., daily sampling, flow proportional sampling, or sampling from the unit's storage tank) if the sulfur content of a delivery exceeds 0.05 weight percent. You must continue to use one of the other sampling options until all of the oil from the delivery has been combusted, and you must evaluate excess emissions according to paragraph (a) of this section. When all of the fuel from the delivery has been burned, you may resume using the as-delivered sampling option.

(c) A period of monitor downtime begins when a required sample is not taken by its due date. A period of monitor downtime also begins on the date and hour of a required sample, if invalid results are obtained. The period of monitor downtime ends on the date and hour of the next valid sample.

Pastoria will be following the definitions and procedures specified above for determining periods of excess SO<sub>x</sub> emissions. Therefore, the proposed turbine will be operating in compliance with the requirements of this section.

Sections 60.4375, 60.4380, 60.4385 and 60.4395 – Reporting:

These sections establish the reporting requirements for each turbine. These requirements include methods and procedures for submitting reports of monitoring parameters, annual performance tests, excess emissions and periods of monitor downtime. Pastoria is proposing to maintain records and submit reports in

accordance with the requirements specified in these sections. Therefore, the proposed turbines will be operating in compliance with the requirements of this section. The following condition will ensure continued compliance with the requirements of this section:

- The owner or operator shall submit a written report of CEM operations for each calendar quarter to the APCO. The report is due on the 30<sup>th</sup> day following the end of the calendar quarter and shall include the following: Time intervals, data and magnitude of excess NO<sub>x</sub> emissions, nature and the cause of excess (if known), corrective actions taken and preventative measures adopted; Averaging period used for data reporting corresponding to the averaging period specified in the emission test period and used to determine compliance with an emissions standard; Applicable time and date of each period during which the CEM was inoperative (monitor downtime), except for zero and span checks, and the nature of system repairs and adjustments; A negative declaration when no excess emissions occurred. [District Rule 1080 and 40 CFR 60.4375(a) and 60.4395]

Section 60.4400 – NO<sub>x</sub> Performance Testing:

Section 60.4400, paragraph (a) states that an operator must conduct an initial performance test, as required in §60.8. Subsequent NO<sub>x</sub> performance tests shall be conducted on an annual basis (no more than 14 calendar months following the previous performance test).

Paragraphs (1), (2) and (3) set forth the requirements for the methods that are to be used during source testing.

Pastoria will be required to source test the exhaust of the turbine within 60 days of initial startup and at least once every 12 months thereafter. They will be required to source test in accordance with the methods and procedures specified in paragraphs (1), (2), and (3). Therefore, the proposed turbines will be operating in compliance with the requirements of this section. The following conditions will ensure continued compliance with the requirements of this section:

- Source testing to determine compliance with the NO<sub>x</sub>, CO and VOC emission rates (lb/hr and ppmvd @ 15% O<sub>2</sub>), NH<sub>3</sub> emission rate (ppmvd @ 15% O<sub>2</sub>) and PM<sub>10</sub> emission rate (lb/hr) shall be conducted within 60 days after the end of the commissioning period and at least once every 12 months thereafter. [District Rules 1081, 2201 and 4703 and 40 CFR 60.4400(a)]
- The following test methods shall be used: NO<sub>x</sub> - EPA Method 7E or 20; CO - EPA Method 10 or 10B; VOC - EPA Method 18 or 25; PM<sub>10</sub> - CARB Method 5 (front half and back half) or 201A and 202; ammonia - BAAQMD ST-1B; and O<sub>2</sub> - EPA Method 3, 3A, or 20. EPA approved alternative test

methods as approved by the District may also be used to address the source testing requirements of this permit. [District Rules 1081 and 4703 and 40 CFR 60.4400(1)(i)]

Section 60.4405 – Initial CEMS Relative Accuracy Testing:

Section 60.4405 states that if you elect to install and certify a NO<sub>x</sub>-diluent CEMS, then the initial performance test required under §60.8 may be performed in the alternative manner described in paragraphs (a), (b), (c) and (d). Pastoria has not indicated that they would like to perform the initial performance test of the CEMS using the alternative methods described in this section. Therefore, the requirements of this section are not applicable and no further discussion is required.

Section 60.4410 – Parameter Monitoring Ranges:

Section 60.4410 sets forth requirements for operators that elect to monitor combustion parameters or parameters indicative of proper operation of NO<sub>x</sub> emission controls. As discussed above, Pastoria is proposing to install a CEMS system to monitor the NO<sub>x</sub> emissions from the turbine and is not proposing to monitor combustion parameters or parameters indicative of proper operation. Therefore, the requirements of this section are not applicable and no further discussion is required.

Section 60.4415– SO<sub>x</sub> Performance Testing:

Section 60.4415 states that an operator must conduct an initial performance test, as required in §60.8. Subsequent SO<sub>2</sub> performance tests shall be conducted on an annual basis (no more than 14 calendar months following the previous performance test). There are three methodologies that you may use to conduct the performance tests.

(1) If you choose to periodically determine the sulfur content of the fuel combusted in the turbine, a representative fuel sample would be collected following ASTM D5287 (incorporated by reference, see §60.17) for natural gas or ASTM D4177 (incorporated by reference, see §60.17) for oil. Alternatively, for oil, you may follow the procedures for manual pipeline sampling in section 14 of ASTM D4057 (incorporated by reference, see §60.17). The fuel analyses of this section may be performed either by you, a service contractor retained by you, the fuel vendor, or any other qualified agency. Analyze the samples for the total sulfur content of the fuel using:

- (i) For liquid fuels, ASTM D129, or alternatively D1266, D1552, D2622, D4294, or D5453 (all of which are incorporated by reference, see §60.17);  
or

- (ii) For gaseous fuels, ASTM D1072, or alternatively D3246, D4084, D4468, D4810, D6228, D6667, or Gas Processors Association Standard 2377 (all of which are incorporated by reference, see §60.17).

Pastoria is proposing to periodically determine the sulfur content of the fuel combusted in the turbine when valid purchase contracts, tariff sheets or transportation contract is not available. The sulfur content will be determined using the methods specified above. Therefore, the proposed turbine will be operating in compliance with the requirements of this section. The following condition will ensure continued compliance with the requirements of this section:

- Fuel sulfur content shall be monitored using one of the following methods: ASTM Methods D1072, D3246, D4084, D4468, D4810, D6228, D6667 or Gas Processors Association Standard 2377. [40 CFR 60.4415(a)(1)(i)]

Methodologies (2) and (3) are applicable to operators that elect to measure the SO<sub>2</sub> concentration in the exhaust stream. Pastoria is not proposing to measure the SO<sub>2</sub> in the exhaust stream of the turbine. Therefore, the requirements of these methodologies are not applicable and no further discussion is required.

Conclusion:

Conditions will be incorporated into the revised DOC in order to ensure compliance with each applicable section of this subpart. Therefore, compliance with the requirements of Subpart KKKK is expected and no further discussion is required.

**Rule 4002 National Emissions Standards for Hazardous Air Pollutants (NESHAP)**

Pursuant to Section 2.0, "*All sources of hazardous air pollution shall comply with the standards, criteria, and requirements set forth therein;*" therefore, the requirements of this rule applies to the Pastoria Energy Facility. The Facility is not a major source of HAP emissions and there are no applicable requirements for a non-major HAPs source; therefore, no actions are necessary to show compliance with this rule.

**Rule 4101 Visible Emissions**

Per Section 5.0, no person shall discharge into the atmosphere emissions of any air contaminant aggregating more than 3 minutes in any hour which is as dark as or darker than Ringelmann 1 (or 20% opacity).

The GTE lube oil vents will be limited to not have visible emissions, except for three minutes in any hour, greater than 5% opacity as a BACT requirement and the exhaust stack emissions will be limited by permit condition to no greater than 20% opacity except for three minutes in any hour. Therefore compliance is expected.

The following conditions will be listed on the DOC to ensure compliance:

- {15} 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 as, or darker than, Ringelmann 1 or 20% opacity. [District Rule 4101]
- The gas turbine engine and electrical generator lube oil vents shall be equipped with mist eliminators. Visible emissions from lube oil vents shall not exhibit opacity of 5% or greater, except for up to three minutes in any hour. [District Rules 2201 and 4101]

**Rule 4102 Nuisance**

Section 4.0 prohibits discharge of air contaminants which could cause injury, detriment, nuisance or annoyance to the public. Public nuisance conditions are not expected as a result of these operations, provided the equipment is well maintained as required by permit conditions. Therefore, the following condition will be added to the DOC to assure compliance with this rule.

- {98} No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102]

**A. California Health & Safety Code 41700 (Health Risk Analysis)**

A Health Risk Assessment (HRA) is required for any increase in hourly or annual emissions of hazardous air pollutants (HAPs). HAPs are limited to substances included on the list in CH&SC 44321 and that have an OEHHA approved health risk value. The installation of the proposed turbine for the power plant results in increases in emissions of HAPs.

A health risk screening assessment was performed for the proposed project. The acute and chronic hazard indices were less than 1.0 and the cancer risk was less than one in a million (**Attachment F**). Under the District's risk management policy, Policy APR 1905, TBACT is not required for any proposed emissions unit as shown in the table below:

<b>Screen HRA Summary</b>				
	Acute Hazard Index	Chronic Hazard Index	70 yr Cancer Risk	T-BACT Required?
S-3636-14	0.00	0.00	$<1.0 \times 10^6$	No

To ensure that human health risks will not exceed District allowable levels, the following condition will be included in the DOC.

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- {1898} The exhaust stack shall vent vertically upward. The vertical exhaust flow shall not be impeded by a rain cap (flapper ok), roof overhang, or other obstruction. [District Rule 4102]

## **B. Discussion of Toxics BACT (TBACT)**

TBACT is triggered if the cancer risk exceeds one in one million and if either the chronic or acute hazard index exceeds 1. The results of the health risk assessment show that none of the TBACT thresholds are exceeded. TBACT is not triggered.

### **Rule 4201 Particulate Matter Concentration**

Section 3.1 prohibits discharge of dust, fumes, or total particulate matter into the atmosphere from any single source operation in excess of 0.1 grain per dry standard cubic foot.

PM Emissions = 7.0 lb/hr

Heat Input at 100% load and 35 °F = 1791.1 MMBtu/hr

EPA F-Factor for natural gas combustion = 8710 dscf/MMBtu

Assume 13.86% O<sub>2</sub> in exhaust

Exhaust Gas Flow, dscfm = 1791.1 MMBtu/hr x 8710 dscf/MMBtu x (20.9%/20.9%-13.86%) x 1 hr/60 min = 771,899 dscfm

Grain Loading =  $\frac{(7.0 \text{ lb/hr} \times 1 \text{ hour/60 min} \times 7000 \text{ grains/lb})}{771,899 \text{ dscf/min}}$  = 0.0011 gr/dscf

As shown above, PM emissions for the proposed GTE will be less than 0.1 gr/dscf. Therefore, compliance with Rule 4201 is expected and the following condition will be listed:

- {14} Particulate matter emissions shall not exceed 0.1 grains/dscf in concentration. [District Rule 4201]

### **Rule 4301 Fuel Burning Equipment**

Rule 4301 limits air contaminant emissions from fuel burning equipment as defined in the rule. Section 3.1 defines fuel burning equipment as "any furnace, boiler, apparatus, stack, and all appurtenances thereto, used in the process of burning fuel for the primary purpose of producing heat or power by indirect heat transfer".

The GTE produces power mechanically, i.e. the products of combustion pass across the power turbine blades which causes the turbine shaft to rotate. The turbine shaft is coupled to an electrical generator shaft which is rotated to produce electricity. Because the GTE primarily produces power by mechanical

means, it does not meet the definition of fuel burning equipment. Therefore, Rule 4301 does not apply to the affected equipment and no further discussion is required.

### **Rule 4703 Stationary Gas Turbines**

Rule 4703 is applicable to stationary gas turbines with a rating greater than 0.3 megawatts. The facility proposes to install one 164 MW gas turbine. Therefore the requirements of this rule apply to the proposed turbine.

#### Section 5.1 – NO<sub>x</sub> Emission Requirements:

Section 5.1.1 (Tier 1) of this rule limits the NO<sub>x</sub> emissions from stationary gas turbine systems greater than 10 MW, and equipped with Selective Catalytic Reduction (SCR). Since the proposed turbine will meet the more stringent Tier 2 emission requirements in Section 5.1.2, compliance with this section is assured.

Section 5.1.2 (Tier 2) of this rule limits the NO<sub>x</sub> emissions from simple cycle, stationary gas turbine systems rated at greater than 10 MW to 5 ppmv @ 15% O<sub>2</sub> (Standard option) and 3 ppmv @ 15% O<sub>2</sub> (Enhanced Option). Section 7.2.1 (Table 7-1) sets a compliance date of April 30, 2005 for the Standard Option and Section 7.2.4 sets a compliance date of April 30, 2008 for the Enhanced Option. As discussed above, the proposed turbine will be limited to 2.5 ppmv @ 15% O<sub>2</sub> (based on a 1-hour average), therefore compliance with this section is expected. The following previously listed conditions will ensure compliance with the requirements of this section:

- Emission rates from this unit, except during startup and shutdown periods, shall not exceed any of the following limits: NO<sub>x</sub> (as NO<sub>2</sub>) – 16.25 lb/hr and 2.5 ppmvd @ 15% O<sub>2</sub>; VOC (as methane) – 2.95 lb/hr and 1.3 ppmvd @ 15% O<sub>2</sub>; CO – 7.92 lb/hr and 2.0 ppmvd @ 15% O<sub>2</sub>; PM<sub>10/2.5</sub> – 7.0 lb/hr; or SO<sub>x</sub> (as SO<sub>2</sub>) – 3.50 lb/hr. NO<sub>x</sub> (as NO<sub>2</sub>) emission limits are one hour rolling averages. All other emission limits are three hour rolling averages. [District Rules 2201, 4001, and 4703]

#### Section 5.2 – CO Emission Requirements:

Per Table 5-4 of Section 5.2, the CO emissions concentration from the proposed turbine (General Electric Frame 7) must be ≤ 25 ppmvd @ 15% O<sub>2</sub>. Rule 4703 does not include a specific averaging period requirement for demonstrating compliance with the CO emission limit. However, District practice is to have an applicant demonstrate compliance with the CO emissions on a turbine with three hour averaging periods. Therefore, compliance with the CO emission limit shall be demonstrated by an average over a three hour period.

Pastoria Energy Facility is proposing a CO emission concentration limit of 2 ppmvd @ 15% O<sub>2</sub> and will demonstrate compliance using three hour averaging



periods. Therefore, the proposed turbine will be operating in compliance with the CO emission requirements of this rule. The DEL conditions shown in the Section 5.1.2 compliance section will ensure continued compliance with the requirements of this section.

Section 5.3 – Startup and Shutdown Requirements:

This section states that the emission limit requirements of Sections 5.1.1, 5.1.2 or 5.2 shall not apply during startup, shutdown, or a reduced load period provided an operator complies with the requirements specified below:

- The duration of each startup or each shutdown shall not exceed two hours, and the duration of each reduced load period shall not exceed one hour, except as provided below.
- The emission control system shall be in operation and emissions shall be minimized insofar as technologically feasible during startup, shutdown, or a reduced load period.
- An operator may submit an application to allow more than two hours for each startup or each shutdown or more than one hour for each reduced load period provided the operator meets all of the conditions specified in the rule.

Pastoria Energy is proposing to incorporate startup and shutdown provisions into the operating requirements for the proposed turbine. They have proposed that the duration of each startup or shutdown event will last no more than 2 hours per day.

The following conditions will ensure compliance with the requirements of this section:

- During start-up and shutdown, GTE exhaust emission rates shall not exceed any of the following limits: NO<sub>x</sub> (as NO<sub>2</sub>) – 80 lb/hr; CO – 902 lb/hr; VOC (as methane) – 16 lb/hr; PM<sub>10</sub> – 7.00 lb/hr; SO<sub>x</sub> (as SO<sub>2</sub>) – 3.50 lb/hr; or NH<sub>3</sub> – 24.06 lb/hr. [District Rules 2201 and 4703]
- Startup shall be defined as the period of time during which a unit is brought from a shutdown status to its operating temperature and pressure, including the time required by the unit's emission control system to reach full operations. Shutdown shall be defined as the period of time during which a unit is taken from an operational to a non-operational status by allowing it to cool down from its operating temperature to ambient temperature as the fuel supply to the unit is completely turned off. [District Rules 2201 and 4703]
- The duration of each startup or shutdown shall not exceed two hours. Startup and shutdown emissions shall be counted toward all applicable emission limits. [District Rules 2201 and 4703]

- The emission control systems shall be in operation and emissions shall be minimized insofar as technologically feasible during startup and shutdown. [District Rule 4703]

Section 6.2 - Monitoring and Recordkeeping:

Section 6.2.1 requires the owner to operate and maintain continuous emissions monitoring equipment for NO<sub>x</sub> and oxygen, or install and maintain APCO-approved alternate monitoring. As discussed earlier in this evaluation, the applicant operates a Continuous Emissions Monitoring System (CEMS) that monitors the NO<sub>x</sub> and oxygen content of the turbine exhaust. Therefore, the requirements of this section have been satisfied. The following condition will ensure continued compliance with the requirements of this section:

- The owner or operator shall install, certify, maintain, operate and quality-assure a Continuous Emission Monitoring System (CEMS) which continuously measures and records the exhaust gas NO<sub>x</sub>, CO and O<sub>2</sub> concentrations. Continuous emissions monitor(s) shall be capable of monitoring emissions during normal operating conditions, and during startups and shutdowns provided the CEMS pass the relative accuracy requirement for startups and shutdowns specified herein. If relative accuracy of CEMS cannot be demonstrated during startup conditions, CEMS results during startup and shutdown events shall be replaced with startup emission rates obtained from source testing to determine compliance with emission limits contained in this document. [District Rules 1080 and 4703 and 40 CFR 60.4335(b)(1)]

Section 6.2.2 specifies monitoring requirements for turbine without exhaust-gas NO<sub>x</sub> control devices. The proposed turbine will be equipped with an SCR system that is designed to control NO<sub>x</sub> emissions. Therefore, the requirements of this section are not applicable and no further discussion is required.

Section 6.2.3 requires that for units 10 MW and greater that operated an average of more than 4,000 hours per year over the last three years before August 18, 1994, the owner or operator shall monitor the exhaust gas NO<sub>x</sub> emissions. The proposed turbine has not been installed. Therefore, it is not in operation prior to August 18, 1994 and the requirements of this section are not applicable. No further discussion is required.

Section 6.2.4 requires the facility to maintain all records for a period of five years from the date of data entry and shall make such records available to the APCO upon request. Pastoria Energy will be required to maintain all records for at least five years and make them available to the APCO upon request. Therefore, the proposed turbine will be operating in compliance with the five year recordkeeping requirements of this rule. The following condition will ensure continued compliance with the requirements of this section:

- The owner or operator of a stationary gas turbine system shall maintain all records of required monitoring data and support information for inspection at any time for a period of five years. [District Rules 2201 and 4703]

Section 6.2.5 requires that the owner or operator shall submit to the APCO, before issuance of the Permit to Operate, information correlating the control system operating to the associated measured NO<sub>x</sub> output. This information may be used by the APCO to determine compliance when there is no continuous emission monitoring system for NO<sub>x</sub> available or when the continuous emissions monitoring system is not operating properly. Pastoria will be required, by permit condition, to submit information correlating the NO<sub>x</sub> control system operating parameters to the associated measured NO<sub>x</sub> output. Therefore, the proposed turbine will be operating in compliance with the control system operating parameter requirements of this rule. The following condition will ensure continued compliance with the requirements of this section:

- The permittee shall submit to the District information correlating the NO<sub>x</sub> control system operating parameters to the associated measured NO<sub>x</sub> output. The information must be sufficient to allow the District to determine compliance with the NO<sub>x</sub> emission limits of this permit during times that the CEMS is not functioning properly. [District Rule 4703]

Section 6.2.6 requires the facility to maintain a stationary gas turbine system operating log that includes, on a daily basis, the actual local startup and stop time, length and reason for reduced load periods, total hours of operation, and the type and quantity of fuel used. Pastoria Energy will be required to maintain records of each item listed above. Therefore, the proposed turbine will be operating in compliance with the recordkeeping requirements of this rule. The following conditions will ensure continued compliance with the requirements of this section:

- The permittee shall maintain the following records for the GTE: date and time, duration, and type of any startup, shutdown, or malfunction; performance testing, emissions measurements, total daily and rolling 12-month average hours of operation and fuel consumption. [District Rules 2201 and 4703]
- The permittee shall maintain the following records for the CEMS: performance testing, evaluations, calibrations, checks, maintenance, adjustments, and any period during which a continuous monitoring system or monitoring device was inoperative. [District Rules 2201 and 4703]

Section 6.2.7 establishes recordkeeping requirements for units that are exempt pursuant to the requirements of Section 4.2. The proposed turbine is not exempt from the requirements of this rule; therefore, the requirements of this section are not applicable and no further discussion is required.

Section 6.2.8 requires owners or operators performing startups or shutdowns to keep records of the duration of each startup and shutdown. As discussed in the Section 6.2.6 discussion above for this rule, Pastoria Energy will be required, by permit condition, to maintain records of the date, time and duration of each startup and shutdown. Therefore, the proposed turbines will be operating in compliance with the recordkeeping requirements of this rule.

Sections 6.3 and 6.4 - Compliance Testing:

Section 6.3.1 states that the owner or operator of any stationary gas turbine system subject to the provisions of Section 5.0 of this rule shall provide source test information annually regarding the exhaust gas NO<sub>x</sub> and CO concentrations. The turbine is subject to the provisions of Section 5.0 of this rule. Therefore, the turbine is required to test annually to demonstrate compliance with the exhaust gas NO<sub>x</sub> and CO concentrations. The following condition will ensure continued compliance with the requirements of this section:

- Source testing to determine compliance with the NO<sub>x</sub>, CO and VOC emission rates (lb/hr and ppmvd @ 15% O<sub>2</sub>), NH<sub>3</sub> emission rate (ppmvd @ 15% O<sub>2</sub>) and PM<sub>10</sub> emission rate (lb/hr) shall be conducted within 60 days after the end of the commissioning period and at least once every 12 months thereafter. [District Rules 1081, 2201 and 4703 and 40 CFR 60.4400(a)]

Section 6.3.2 specifies source testing requirements for units operating less than 877 hours per year. As discussed above, the proposed turbines will be allowed to operate in excess of 877 hours per year. Therefore, the requirements of this section are not applicable and no further discussion is required.

Section 6.4 states that the facility must demonstrate compliance annually with the NO<sub>x</sub> and CO emission limits using the following test methods, unless otherwise approved by the APCO and EPA:

- Oxides of nitrogen emissions for compliance tests shall be determined by using EPA Method 7E or EPA Method 20.
- Carbon monoxide emissions for compliance tests shall be determined by using EPA Test Methods 10 or 10B.
- Oxygen content of the exhaust gas shall be determined by using EPA Methods 3, 3A, or 20.

- HHV and LHV of gaseous fuels shall be determined by using ASTM D3588-91, ASTM 1826-88, or ASTM 1945-81.

The following condition will ensure continued compliance with the test method requirements of this section:

- The following test methods shall be used: NO<sub>x</sub> - EPA Method 7E or 20; CO - EPA Method 10 or 10B; VOC - EPA Method 18 or 25; PM10 - CARB Method 5 (front half and back half) or 201A and 202; ammonia - BAAQMD ST-1B; and O<sub>2</sub> - EPA Method 3, 3A, or 20. EPA approved alternative test methods as approved by the District may also be used to address the source testing requirements of this permit. [District Rules 1081 and 4703 and 40 CFR 60.4400(1)(i)]

Conclusion:

Conditions will be incorporated into these permits in order to ensure compliance with each applicable section of this rule. Therefore, compliance with the requirements of Rule 4703 is expected and no further discussion is required.

**Rule 4801 Sulfur Compounds**

Per Section 3.1, a person shall not discharge into the atmosphere sulfur compounds, which would exist as a liquid or gas at standard conditions, exceeding in concentration at the point of discharge: 0.2 % by volume calculated as SO<sub>2</sub> on a dry basis averaged over 15 consecutive minutes:

The sulfur of the natural gas fuel is 0.75 gr/100 dscf.

The ratio of the volume of the SO<sub>x</sub> exhaust to the entire exhaust for one MMBtu of fuel combusted is:

Volume of SO<sub>x</sub>: 
$$V = \frac{n \cdot R \cdot T}{P}$$

Where:

- n = number of moles of SO<sub>x</sub> produced per MMBtu of fuel.
- Weight of SO<sub>x</sub> as SO<sub>2</sub> is 64 lb/(lb-mol)
- $n = \frac{0.0020 \text{ lb}}{\text{MMBtu}} \times \frac{1 \text{ (lb-mol)}}{64 \text{ lb}} = 0.000031 \text{ (lb-mol)}$
- $R = \frac{0.7302 \text{ ft}^3 \cdot \text{atm}}{\text{(lb-mol)}^\circ\text{R}}$
- T = 500 °R

- $P = 1 \text{ atm}$

Thus, volume of  $\text{SO}_x$  per MMBtu is:

$$V = \frac{n \cdot R \cdot T}{P}$$
$$V = \frac{0.000031 \text{ (lb - mol)} \cdot \frac{0.7302 \text{ ft}^3 \cdot \text{atm}}{\text{(lb - mol)} \cdot ^\circ\text{R}} \cdot 500 \text{ } ^\circ\text{R}}{1 \text{ atm}}$$
$$V = 0.011 \text{ ft}^3$$

Since the total volume of exhaust per MMBtu is 8,578 scf, the ratio of  $\text{SO}_x$  volume to exhaust volume is

$$= \frac{0.011}{8,578} = 0.0000013 = 1.3 \text{ ppmv} = 0.00013\% \text{ by volume}$$

1.9 ppmv  $\leq$  2000 ppmv, therefore the GTE is expected to comply with Rule 4801.

**District Rule 8011 General Requirements**

**District Rule 8021 Construction, Demolition, Excavation, Extraction And Other Earthmoving Activities**

**District Rule 8031 Bulk Materials**

**District Rule 8041 Carryout And Trackout**

**District Rule 8051 Open Areas**

**District Rule 8061 Paved And Unpaved Roads**

**District Rule 8071 Unpaved Vehicle/Equipment Traffic Areas**

**District Rule 8081 Agricultural Sources**

The construction of this new GTE will involve excavation, extraction, construction, demolition, outdoor storage piles, paved and unpaved roads.

The regulations from the 8000 Series District Rules contain requirements for the control of fugitive dust. These requirements apply to various sources, including construction, demolition, excavation, extraction, mining activities, outdoor storage piles, paved and unpaved roads. Compliance with these regulations will be required and will be listed on the DOC as follows:

- Disturbances of soil related to any construction, demolition, excavation, extraction, or other earthmoving activities shall comply with the requirements for fugitive dust control in District Rule 8021 unless specifically exempted under Section 4.0 of Rule 8021 or Rule 8011. [District Rules 8011 and 8021]

- An owner/operator shall submit a Dust Control Plan to the APCO prior to the start of any construction activity on any site that will include 10 acres or more of disturbed surface area for residential developments, or 5 acres or more of disturbed surface area for non-residential development, or will include moving, depositing, or relocating more than 2,500 cubic yards per day of bulk materials on at least three days. [District Rules 8011 and 8021]
- An owner/operator shall prevent or cleanup any carryout or trackout in accordance with the requirements of District Rule 8041 Section 5.0, unless specifically exempted under Section 4.0 of Rule 8041 (8/19/04) or Rule 8011(8/19/04). [District Rules 8011 and 8021]
- Whenever open areas are disturbed, or vehicles are used in open areas, the facility shall comply with the requirements of Section 5.0 of District Rule 8051, unless specifically exempted under Section 4.0 of Rule 8051 or Rule 8011. [District Rules 8011 and 8051]
- Any paved road or unpaved road shall comply with the requirements of District Rule 8061 unless specifically exempted under Section 4.0 of Rule 8061 or Rule 8011. [District Rules 8011 and 8061]
- Water, gravel, roadmix, or chemical/organic dust stabilizers/suppressants, vegetative materials, or other District-approved control measure shall be applied to unpaved vehicle travel areas as required to limit Visible Dust Emissions to 20% opacity and comply with the requirements for a stabilized unpaved road as defined in Section 3.59 of District Rule 8011. [District Rule 8011 and 8071]
- Where dusting materials are allowed to accumulate on paved surfaces, the accumulation shall be removed daily or water and/or chemical/organic dust stabilizers/suppressants shall be applied to the paved surface as required to maintain continuous compliance with the requirements for a stabilized unpaved road as defined in Section 3.59 of District Rule 8011 and limit Visible Dust Emissions (VDE) to 20% opacity. [District Rule 8011 and 8071]
- On each day that 50 or more Vehicle Daily Trips or 25 or more Vehicle Daily Trips with 3 axles or more will occur on an unpaved vehicle/equipment traffic area, permittee shall apply water, gravel, roadmix, or chemical/organic dust stabilizers/suppressants, vegetative materials, or other District-approved control measure as required to limit Visible Dust Emissions to 20% opacity and comply with the requirements for a stabilized unpaved road as defined in Section 3.59 of District Rule 8011. [District Rule 8011 and 8071]
- Whenever any portion of the site becomes inactive, Permittee shall restrict access and periodically stabilize any disturbed surface to comply with the

conditions for a stabilized surface as defined in Section 3.58 of District Rule 8011. [District Rules 8011 and 8071]

- Records and other supporting documentation shall be maintained as required to demonstrate compliance with the requirements of the rules under Regulation VIII only for those days that a control measure was implemented. Such records shall include the type of control measure(s) used, the location and extent of coverage, and the date, amount, and frequency of application of dust suppressant, manufacturer's dust suppressant product information sheet that identifies the name of the dust suppressant and application instructions. Records shall be kept for one year following project completion that results in the termination of all dust generating activities. [District Rules 8011, 8031, and 8071]

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

The District determined that the California Energy Commission (CEC) is the public agency having principal responsibility for approving the project, therefore establishing the CEC as the Lead Agency (CEQA Guidelines §15051(b)). The District is a Responsible Agency for the project because of its discretionary approval power over the project via its Permits Rule (Rule 2010) and New Source Review Rule (Rule 2201), (CEQA Guidelines §15381). The District's engineering evaluation of the project (this document) demonstrates that compliance with District rules and permit conditions would reduce Stationary Source emissions from the project to levels below the District's significance thresholds for criteria pollutants. The District has determined that no additional findings are required (CEQA Guidelines §15096(h)).

### **California Health & Safety Code, Section 42301.6 (School Notice)**

As discussed in Section III of this evaluation, this site is not located within 1,000 feet of a school. Therefore, pursuant to California Health and Safety Code 42301.6, a school notice is not required.

### **California Health & Safety Code, Section 44300 (Air Toxic "Hot Spots")**

Section 44300 of the California Health and Safety Code requires submittal of an air toxics "Hot Spot" information and assessment report for sources with criteria pollutant emissions greater than 10 tons per year. However, Section 44344.5 (b) states that a new facility shall not be required to submit such a report if all of the following conditions are met:

1. The facility is subject to a district permit program established pursuant to Section 42300.



2. The district conducts an assessment of the potential emissions or their associated risks, and finds that the emissions will not result in a significant risk.
3. The district issues a permit authorizing construction or operation of the new facility.

A health risk screening assessment was performed for the proposed project. The acute and chronic hazard indices are less than 1.0 and the cancer risk is less than ten (10) in a million, which are the thresholds of significance for toxic air contaminants. This project qualifies for exemption per the above exemption criteria.

**IX. RECOMMENDATION:**

Compliance with all applicable prohibitory rules and regulations is expected. Issue the Revised Determination of Compliance for the facility subject to the conditions presented in **Attachment A**.

**X. BILLING INFORMATION:**

<b>Annual Permit Fees</b>			
<b>Permit Number</b>	<b>Fee Schedule</b>	<b>Fee Description</b>	<b>Annual Fee</b>
S-3636-14-1	3020-08B-H	164 MW	\$13,208

**Attachments**

- A: Revised DOC Conditions
- B: GTE Emissions Data
- C: GTE Commissioning Period Emissions Data
- D: SJVAPCD BACT Guideline 3.4.7
- E: Top Down BACT Analysis
- F: Health Risk Assessment and Ambient Air Quality Analysis
- G: NOx for PM10 Interpollutant Offset Analysis
- H: Compliance Certification
- I: Title V Compliance Certification
- J: Supplemental Information

**ATTACHMENT A**  
***Revised DOC CONDITIONS***

**EQUIPMENT DESCRIPTION, UNIT S-3636-14-1:**

164 MW NOMINALLY RATED GENERAL ELECTRIC 7FA NATURAL GAS FIRED GAS TURBINE ENGINE/ELECTRICAL GENERATOR #4 WITH DRY LOW NOX COMBUSTORS AND SELECTIVE CATALYTIC REDUCTION (SCR)

1. This Determination of Compliance serves as a written certificate of conformity with the procedural requirements of 40 CFR 70.7 and 70.8 and with the compliance requirements of 40 CFR 70.6(c). [District Rule 2201]
2. Prior to operating with modifications authorized by this Determination of Compliance, the facility shall submit an application to modify the Title V permit with an administrative amendment in accordance with District Rule 2520 Section 5.3.4. [District Rule 2520]
3. Permittee shall submit an Acid Rain Permit application to comply with SJVUAPCD District Rule 2540 - Acid Rain Program, at least 24 months before the date on which the unit commences operation. [District Rule 2540]
4. Prior to initial operation, permittee shall provide emission reduction credits to offset the calendar quarter emissions increases set forth below: NO<sub>x</sub> (as NO<sub>2</sub>) - Q1: 59,726 lb, Q2: 60,390 lb, Q3: 61,053 lb, and Q4: 61,053 lb; PM<sub>10</sub> (based on NO<sub>x</sub> ERCs) - Q1: 59,626 lb, Q2: 60,288 lb, Q3: 60,951 lb and Q4: 60,951 lb; SO<sub>x</sub> (as SO<sub>2</sub>) - Q1: 11,324 lb, Q2: 11,450 lb, Q3: 11,576 lb and Q4: 11,576 lb; and VOC - Q1: 10,995 lb, Q2: 11,117 lb, Q3: 11,240 lb and Q4: 11,240 lb. These offset quantities include the applicable distance offset ratio. [District Rule 2201]
5. ERC Certificate Numbers S-3114-2 (or certificates split from these certificates) shall be used to supply the required NO<sub>x</sub>, VOC and PM<sub>10</sub> offsets, ERC Certificate Number N-927-1 (or a certificates split from these certificates) shall be used to supply the required VOC offsets and ERC Certificate Number S-2744-5 (or a certificate split from this certificate) shall be used to supply the required SO<sub>x</sub>, unless a revised offsetting proposal is received and approved by the District, upon which this Determination of Compliance shall be reissued, administratively specifying the new offsetting proposal. Original public noticing requirements, if any, shall be duplicated prior to reissuance of this Determination of Compliance. [District Rule 2201]
6. NO<sub>x</sub> ERCs may be used to offset: PM<sub>10</sub> emission increase at a ratio of 2.629 lb NO<sub>x</sub>:1 lb PM<sub>10</sub>, and VOC emission increase at a ratio of 1.0 lb NO<sub>x</sub>:1.0 lb VOC. [District Rule 2201]
7. Permittee shall minimize the emissions from GTE to the maximum extent possible during the commissioning period. Conditions #7 through #17 shall apply only during the commissioning period as defined below. Unless otherwise indicated, Conditions #17 through #66 shall only apply after the commissioning period has ended. [District Rule 2201]
8. Commissioning activities are defined as, but not limited to, 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 GTE and all ancillary equipment. [District Rule 2201]

9. Commissioning period shall commence when all mechanical, electrical, and control systems are installed and individual system startup has been completed, or when the GTE is first fired, whichever occurs first. The commissioning period shall terminate when the GTE has successfully completed initial performance testing and is available for commercial operation. [District Rule 2201]
10. At the earliest feasible opportunity, in accordance with the recommendations of the equipment manufacturer and the construction contractor, the combustors of this unit shall be tuned to minimize emissions. [District Rule 2201]
11. At the earliest feasible opportunity, in accordance with the recommendations of the equipment manufacturer and the construction contractor, the Selective Catalytic Reduction (SCR) system shall be installed, adjusted, and operated to minimize emissions from this unit. [District Rule 2201]
12. The permittee shall submit a plan to the District at least four weeks prior to the first firing of this unit, describing the procedures to be followed during the commissioning period. 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 limited to, the tuning of the combustors, the installation and operation of the SCR systems, the installation, calibration, and testing of the NO<sub>x</sub> and CO continuous emissions monitors, and any activities requiring the firing of this unit without abatement by the SCR system. [District Rule 2201]
13. Emission rates from this unit during the commissioning period shall not exceed any of the following limits: NO<sub>x</sub> (as NO<sub>2</sub>) - 125 lb/hr or 1393 lb/day; VOC (as methane) - 16 lb/hr or 192 lb/day; CO - 902 lb/hr or 7216 lb/day; PM<sub>10</sub> - 108 lb/day; or SO<sub>x</sub> (as SO<sub>2</sub>) - 41.9 lb/day. [District Rule 2201, 40 CFR 51- Appendix S]
14. During the commissioning period, the permittee shall demonstrate compliance with emission limits specified above through the use of properly operated and maintained continuous emissions monitors and recorders as specified in this permit. The monitored parameters for this unit shall be recorded at least once every 15 minutes (excluding normal calibration periods or when the monitored source is not in operation). [District Rule 2201]
15. The continuous monitors specified in this permit shall be installed, calibrated, and operational prior to the first firing of this unit. After first firing, the detection range of the CEMS shall be adjusted as necessary to accurately measure the resulting range of NO<sub>x</sub> and CO emission concentrations. [District Rule 2201]
16. Firing of GTE without abatement of emissions by the SCR system shall be minimized to the extent possible. Such operation of this unit without abatement shall be limited to discrete commissioning activities that can only be properly executed without the SCR system catalyst in place. [District Rule 2201]
17. The total mass emissions of NO<sub>x</sub>, CO, VOC, PM<sub>10</sub>, and SO<sub>x</sub> that are emitted during the commissioning period shall accrue towards the consecutive twelve month emission limits specified below. [District Rule 2201 and 40 CFR 51- Appendix S]

18. Compliance with short term NO<sub>x</sub>, CO and VOC emissions limitations shall not be required during combustor tuning activities. Combustor tuning activities are defined as any testing, adjustment, tuning, or calibration activities necessary to insure safe and reliable steady state operation of the GTE following replacement of the combustor components, during seasonal tuning events, when recommended by the turbine manufacturer, or as necessary to maintain low emissions performance. This includes, but is not limited to, adjusting the amount of fuel distributed between the combustion turbine's staged fuel systems to simultaneously minimize NO<sub>x</sub> and CO emissions while minimizing combustor dynamics and ensuring combustor stability. The combustor tuning activities shall be limited to 6 hours per calendar year. [District Rule 2201]
19. Emission rates from GTE during combustor tuning shall not exceed any of the following: NO<sub>x</sub> (as NO<sub>2</sub>) - 125.00 lb/hr and 600 lb/period; VOC - 16.00 lb/hr and 96 lb/period; and CO - 902.00 lb/hr and 2514 lb/period. Hourly emissions are on a one-hour average basis. [District Rule 2201]
20. {15} 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 as, or darker than, Ringelmann 1 or 20% opacity. [District Rule 4101]
21. {98} No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102]
22. {14} Particulate matter emissions shall not exceed 0.1 grains/dscf in concentration. [District Rule 4201]
23. {1898} The exhaust stack shall vent vertically upward. The vertical exhaust flow shall not be impeded by a rain cap (flapper ok), roof overhang, or any other obstruction. [District Rule 4102]
24. The owner or operator shall install, certify, maintain, operate and quality-assure a Continuous Emission Monitoring System (CEMS) which continuously measures and records the exhaust gas NO<sub>x</sub>, CO and O<sub>2</sub> concentrations. All CEMS shall be dedicated to this unit. NO<sub>x</sub> and O<sub>2</sub> CEMS shall meet the requirements of 40 Part 75 and CO CEMS shall meet the requirements of 40 CFR Part 60. CEMS shall be capable of monitoring emissions during normal operating conditions, and during startups and shutdowns provided the CEMS passes the relative accuracy requirement for startups and shutdowns specified herein. If relative accuracy of CEMS cannot be demonstrated during startup conditions, CEMS results during startup and shutdown events shall be replaced with startup emission rates obtained from source testing to determine compliance with emission limits contained in this document. [District Rule 1080 and 4703 and 40 CFR 60.4340(b)(1)]
25. The CEMS shall complete a minimum of one cycle of operation (sampling, analyzing, and data recording) for each successive 15-minute period or shall meet equivalent specifications established by mutual agreement of the District, the ARB and the EPA. [District Rule 1080 and 40 CFR 60.4345(b)]

26. The NO<sub>x</sub> and O<sub>2</sub> CEMS shall be installed and certified in accordance with the requirements of 40 CFR Part 75. The CO CEMS shall meet the requirements in 40 CFR 60, Appendix F Procedure 1 and Part 60, Appendix B Performance Specification 2 (PS 2), or shall meet equivalent specifications established by mutual agreement of the District, the ARB, and the EPA. [District Rule 1080 and 40 CFR 60.4345(a)]
27. Audits of the CO continuous emission monitors shall be conducted quarterly, except during quarters in which relative accuracy and compliance source testing are both performed, in accordance with EPA guidelines. The District shall be notified prior to the audits. The NO<sub>x</sub> and O<sub>2</sub> CEMS shall be audited in accordance with the applicable requirements of 40 CFR Part 75. Audit reports and linearity reports shall be submitted along with quarterly compliance reports to the District. [District Rule 1080]
28. The owner/operator shall perform a relative accuracy test audit (RATA) for CO as specified by 40 CFR Part 60, Appendix F, 5.11, at least once every four calendar quarters. The permittee shall comply with the applicable requirements for quality assurance testing and maintenance of the continuous emission monitor equipment in accordance with the procedures and guidance specified in 40 CFR Part 60, Appendix F. [District Rule 1080]
29. APCO or an authorized representative shall be allowed to inspect, as determined to be necessary, the required monitoring devices to ensure that such devices are functioning properly. [District Rule 1080]
30. Results of the CEM system shall be averaged over a one hour period for NO<sub>x</sub> emissions and a three hour period for CO emissions using consecutive 15-minute sampling periods in accordance with all applicable requirements of CFR 60.13. [District Rule 4703 and 40 CFR 60.13]
31. Results of continuous emissions monitoring shall be reduced to hourly averages as specified in Section 60.13(h) and in accordance with Section 60.4350 or by other methods deemed equivalent by mutual agreement with the District, the ARB, and the EPA. [District Rule 1080]
32. The owner or operator shall, upon written notice from the APCO, provide a summary of the data obtained from the CEM systems. This summary shall be in the form and the manner prescribed by the APCO. [District Rule 1080]
33. The facility shall install and maintain equipment, facilities, and systems compatible with the District's CEM data polling software system and shall make CEM data available to the District's automated polling system on a daily basis. [District Rule 1080]
34. Upon notice by the District that the facility's CEM system is not providing polling data, the facility may continue to operate without providing automated data for a maximum of 30 days per calendar year provided the CEM data is sent to the District by a District-approved alternative method. [District Rule 1080]
35. The owner or operator shall submit a written report of CEM operations for each calendar quarter to the APCO. The report is due on the 30th day following the end of the calendar quarter and shall include the following: Time intervals, data and magnitude of excess NO<sub>x</sub>

emissions, nature and the cause of excess (if known), corrective actions taken and preventive measures adopted; Averaging period used for data reporting corresponding to the averaging period specified in the emission test period used to determine compliance with an emission standard; Applicable time and date of each period during which the CEM was inoperative (monitor downtime), except for zero and span checks, and the nature of system repairs and adjustments; A negative declaration when no excess emissions occurred. [District Rule 1080 and 40 CFR 60.4375(a) and 60.4395]

36. Permittee shall notify the District of any breakdown condition as soon as reasonably possible, but no later than one hour after its detection, unless the owner or operator demonstrates to the District's satisfaction that the longer reporting period was necessary. [District Rule 1100, 6.1]
37. The District shall be notified in writing within ten days following the correction of any breakdown condition. The breakdown notification 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 methods utilized to restore normal operations. [District Rule 1100, 7.0]
38. The annual quantity of natural fuel gas burned by this GTE shall not exceed 5,059,575 MMBtu/yr on a rolling 12-month basis. [District Rule 2201]
39. Emission rates from this unit, except during startup and shutdown periods, shall not exceed any of the following limits: NO<sub>x</sub> (as NO<sub>2</sub>) – 16.25 lb/hr and 2.5 ppmvd @ 15% O<sub>2</sub>; VOC (as methane) – 2.95 lb/hr and 1.3 ppmvd @ 15% O<sub>2</sub>; CO – 7.92 lb/hr and 2.0 ppmvd @ 15% O<sub>2</sub>; PM<sub>10/2.5</sub> – 7.00 lb/hr; or SO<sub>x</sub> (as SO<sub>2</sub>) – 3.50 lb/hr. NO<sub>x</sub> (as NO<sub>2</sub>) emission limits are one hour rolling averages. All other emission limits are three hour rolling averages. [District Rules 2201, 4001, and 4703, and 40 CFR 51-Appendix S]
40. Emission rates from this unit, during start-up and shutdown, shall not exceed any of the following limits: NO<sub>x</sub> (as NO<sub>2</sub>) - 80.00 lb/hr; CO - 902.00 lb/hr; VOC (as methane) - 16.00 lb/hr; PM<sub>10</sub> - 7.00 lb/hr; SO<sub>x</sub> (as SO<sub>2</sub>) - 3.50 lb/hr. [District Rules 2201 and 4703, and 40 CFR 51-Appendix S]
41. Daily emissions from the GTE shall not exceed the following limits: NO<sub>x</sub> (as NO<sub>2</sub>) – 450.0 lb/day; CO – 1978.2 lb/day; VOC – 96.8 lb/day; PM<sub>10/2.5</sub> – 168.0 lb/day; SO<sub>x</sub> (as SO<sub>2</sub>) – 83.9 lb/day, or NH<sub>3</sub> – 577.4 lb/day. [District Rule 2201 and 40 CFR 51-Appendix S]
42. The ammonia (NH<sub>3</sub>) emissions shall not exceed 10 ppmvd @ 15% O<sub>2</sub> or 24.06 lb/hr over a 24 hour rolling average. [District Rule 2201]
43. The GTE shall be fired exclusively on natural gas with a sulfur content no greater than 0.75 grain of sulfur compounds (as S) per 100 dry scf of natural gas. [District Rule 2201 and 40 CFR 60.4330(a)(2)]
44. Annual emissions from the GTE, calculated on a twelve month rolling basis, shall not exceed any of the following limits: NO<sub>x</sub> (as NO<sub>2</sub>) – 65,033 lb/year; CO – 198,000 lb/year; VOC – 12,240 lb/year; PM<sub>10</sub> – 19,775 lb/year; or SO<sub>x</sub> (as SO<sub>2</sub>) – 9,873 lb/year; or NH<sub>3</sub> – 67,970 lb/year. [District Rule 2201 and 40 CFR 51 – Appendix S]

45. Quarterly emissions from the GTE, calculated based on calendar quarters, shall not exceed the following: NO<sub>x</sub> (as NO<sub>2</sub>) - Q1: 39,817 lb/qtr, Q2: 40,260 lb/qtr, Q3: 40,702, Q4: 40,702; VOC - Q1: 7,330 lb/qtr, Q2: 7,411 lb/qtr, Q3: 7,493 lb/qtr, Q4: 7,493 lb/qtr; PM<sub>10</sub> - Q1: 15,120 lb/qtr, Q2: 15,288 lb/qtr, Q3: 15,456 lb/qtr and Q4: 15,456; SO<sub>x</sub> - Q1: 7,549 lb/qtr, Q2: 7,633 lb/qtr, Q3: 7,717 lb/qtr and Q4: 7,717 lb/qtr. [District Rule 2201] N
46. The duration of each startup or shutdown shall not exceed two hours. Startup and shutdown emissions shall be counted toward all applicable emission limits. [District Rules 2201 and 4703]
47. The emission control systems shall be in operation and emissions shall be minimized insofar as technologically feasible during startup and shutdown. [District Rule 4703] N
48. Startup shall be defined as the period of time during which a unit is brought from a shutdown status to its operating temperature and pressure, including the time required by the unit's emission control system to reach full operations. Shutdown shall be defined as the period of time during which a unit is taken from an operational to a non-operational status by allowing it to cool down from its operating temperature to ambient temperature as the fuel supply to the unit is completely turned off. [District Rules 2201 and 4703]
49. Ammonia shall be injected when the selective catalytic reduction system catalyst temperature exceeds the minimum operating temperature recommended by the manufacturer. Permittee shall monitor and record catalyst temperature during periods of startup. [District Rule 2201] N
50. Each one hour period shall commence on the hour. Each one hour period in a three hour rolling average will commence on the hour. The three hour average will be compiled from the three most recent one hour periods. Each one hour period in a twenty-four hour average for ammonia slip will commence on the hour. [District Rule 2201]
51. Daily emissions will be compiled for a twenty-four hour period starting and ending at twelve-midnight. Each month in the twelve consecutive month rolling average emissions shall commence at the beginning of the first day of the month. The twelve consecutive month rolling average emissions to determine compliance with annual emissions limitations shall be compiled from the twelve most recent calendar months. [District Rule 2201]
52. The exhaust stack shall be equipped with permanent provisions to allow collection of stack gas samples consistent with EPA test methods and shall be equipped with safe permanent provisions to sample stack gases with a portable NO<sub>x</sub>, CO, and O<sub>2</sub> analyzer during District inspections. The sampling ports shall be located in accordance with the CARB regulation titled California Air Resources Board Air Monitoring Quality Assurance Volume VI, Standard Operating Procedures for Stationary Emission Monitoring and Testing. [District Rule 1081]
53. Ammonia injection grid shall be equipped with operational ammonia flowmeter and injection pressure indicator. [District Rule 2201]



54. Permittee shall monitor and record exhaust gas temperature at selective catalytic reduction catalyst inlet. [District Rule 2201]
55. Source testing to measure startup NO<sub>x</sub>, CO, and VOC mass emission rates shall be conducted prior to the end of the commissioning period and at least once every seven years thereafter. CEM relative accuracy shall be determined during startup source testing in accordance with 40 CFR 60, Appendix B. [District Rule 1081]
56. Source testing to measure the NO<sub>x</sub>, CO, and VOC emission rates (lb/hr and ppmvd @ 15% O<sub>2</sub>) shall be conducted within 60 days after the end of the commissioning period and at least once every twelve months thereafter. [District Rules 1081, 2201, 4703 and 40 CFR 60.4400(a)]
57. Source testing to measure the PM<sub>10</sub> emission rate (lb/hr) and the ammonia emission rate shall be conducted within 60 days after the end of the commissioning period and at least once every twelve months thereafter. [District Rule 1081]
58. Compliance with ammonia slip limit shall be demonstrated by using the following calculation procedure: ammonia slip ppmv @ 15% O<sub>2</sub> = ((a-(bxc/1,000,000)) x 1,000,000 / b) x d, where a = ammonia injection rate(lb/hr)/17(lb/lb. mol), b = dry exhaust gas flow rate (lb/hr)/(29(lb/lb. mol), c = change in measured NO<sub>x</sub> concentration ppmv at 15% O<sub>2</sub> across catalyst, and d = correction factor. The correction factor shall be derived annually during compliance testing by comparing the measured and calculated ammonia slip. Alternatively, permittee may utilize a continuous in-stack ammonia monitor, acceptable to the District, to monitor compliance. At least 60 days prior to using a NH<sub>3</sub> CEM, the permittee must submit a monitoring plan for District review and approval. [District Rule 4102]
59. The sulfur content of each fuel source shall be: (i) documented in a valid purchase contract, a supplier certification, a tariff sheet or transportation contract or (ii) monitored within 60 days of the end of the commissioning period and weekly thereafter. If the sulfur content is demonstrated to be less than 0.75 gr/100 scf for eight consecutive weeks, then the monitoring frequency shall be every six months. If the result of any six month monitoring demonstrates that the fuel does not meet the fuel sulfur content limit, weekly monitoring shall resume. [District Rules 1081, 2201, 2540 and 40 CFR 60.4360, 60.4365(a) and 60.4370(c)]
60. Demonstration of compliance with the annual average sulfur content limit shall be demonstrated by a 12 month rolling average of the sulfur content either (i) documented in a valid purchase contract, a supplier certification, a tariff sheet or transportation contract or (ii) tested using ASTM Methods D1072, D3246, D4084, D4468, D4810, D6228, D6667 or Gas Processors Association Standard 2377. [District Rules 1081 and 2201]
61. Compliance demonstration (source testing) shall be District witnessed, or authorized and samples shall be collected by a California Air Resources Board certified testing laboratory. Source testing shall be conducted using the methods and procedures approved by the District. The District must be notified 30 days prior to any compliance source test, and a source test plan must be submitted for approval 15 days prior to

- testing. The results of each source test shall be submitted to the District within 60 days thereafter. [District Rule 1081]
62. The following test methods shall be used: NO<sub>x</sub> - EPA Method 7E or 20; CO - EPA Method 10 or 10B; VOC - EPA Method 18 or 25; PM<sub>10</sub> - CARB Method 5 (front half and back half) or EPA Method 201A and 202; and ammonia - BAAQMD ST-1B; and O<sub>2</sub> - EPA Method 3, 3A, or 20. EPA approved alternative test methods as approved by the District may also be used to address the source testing requirements of this permit. [District Rules 1081 and 4703 and 40 CFR 60.4400(1)(i)]
  63. Fuel sulfur content shall be monitored using one of the following methods: ASTM Methods D1072, D3246, D4084, D4468, D4810, D6228, D6667 or Gas Processors Association Standard 2377. [40 CFR 60.4415(a)(1)(i)]
  64. The permittee shall submit to the District information correlating the NO<sub>x</sub> control system operating parameters to the associated measured NO<sub>x</sub> output. The information must be sufficient to allow the District to determine compliance with the NO<sub>x</sub> emission limits of this permit during times that the CEMS is not functioning properly. [District Rule 4703]
  65. The permittee shall maintain the following records: the date, time, duration and type of any startup, shutdown or malfunction of the continuous monitoring equipment; dates of performance testing; dates of evaluations, calibrations, checks, and adjustments of the continuous monitoring equipment; date and time period which a continuous monitoring system or monitoring device was inoperative, and maintenance of any continuous emission monitor. [District Rules 1080, 2201 and 4703 and 40 CFR 60.8(d)]
  66. The permittee shall maintain the following records: hours of operation, fuel consumption (scf/hr and scf/rolling twelve month period), continuous emission monitor measurements, calculated ammonia slip, and calculated NO<sub>x</sub> mass emission rates (lb/hr and lb/twelve month rolling period). [District Rules 2201 and 4703]
  67. The owner or operator of a stationary gas turbine system shall maintain all records of required monitoring data and support information for inspection at any time for a period of five years. [District Rules 2201 and 4703]
  68. Disturbances of soil related to any construction, demolition, excavation, extraction, or other earthmoving activities shall comply with the requirements for fugitive dust control in District Rule 8021 unless specifically exempted under Section 4.0 of Rule 8021 or Rule 8011. [District Rules 8011 and 8021]
  69. An owner/operator shall submit a Dust Control Plan to the APCO prior to the start of any construction activity on any site that will include 10 acres or more of disturbed surface area for residential developments, or 5 acres or more of disturbed surface area for non-residential development, or will include moving, depositing, or relocating more than 2,500 cubic yards per day of bulk materials on at least three days. [District Rules 8011 and 8021]
  70. An owner/operator shall prevent or cleanup any carryout or trackout in accordance with the requirements of District Rule 8041 Section 5.0, unless specifically exempted under Section

- 4.0 of Rule 8041 (8/19/04) or Rule 8011(8/19/04). [District Rules 8011 and 8021]
71. Whenever open areas are disturbed, or vehicles are used in open areas, the facility shall comply with the requirements of Section 5.0 of District Rule 8051, unless specifically exempted under Section 4.0 of Rule 8051 or Rule 8011. [District Rules 8011 and 8051]
  72. Any paved road or unpaved road shall comply with the requirements of District Rule 8061 unless specifically exempted under Section 4.0 of Rule 8061 or Rule 8011. [District Rules 8011 and 8061]
  73. Water, gravel, roadmix, or chemical/organic dust stabilizers/suppressants, vegetative materials, or other District-approved control measure shall be applied to unpaved vehicle travel areas as required to limit Visible Dust Emissions to 20% opacity and comply with the requirements for a stabilized unpaved road as defined in Section 3.59 of District Rule 8011. [District Rule 8011 and 8071]
  74. Where dusting materials are allowed to accumulate on paved surfaces, the accumulation shall be removed daily or water and/or chemical/organic dust stabilizers/suppressants shall be applied to the paved surface as required to maintain continuous compliance with the requirements for a stabilized unpaved road as defined in Section 3.59 of District Rule 8011 and limit Visible Dust Emissions (VDE) to 20% opacity. [District Rule 8011 and 8071]
  75. On each day that 50 or more Vehicle Daily Trips or 25 or more Vehicle Daily Trips with 3 axles or more will occur on an unpaved vehicle/equipment traffic area, permittee shall apply water, gravel, roadmix, or chemical/organic dust stabilizers/suppressants, vegetative materials, or other District-approved control measure as required to limit Visible Dust Emissions to 20% opacity and comply with the requirements for a stabilized unpaved road as defined in Section 3.59 of District Rule 8011. [District Rule 8011 and 8071]
  76. Whenever any portion of the site becomes inactive, Permittee shall restrict access and periodically stabilize any disturbed surface to comply with the conditions for a stabilized surface as defined in Section 3.58 of District Rule 8011. [District Rules 8011 and 8071]  
be maintained as required to demonstrate compliance with the requirements of the rules under Regulation VIII only for those days that a control measure was implemented. Such records shall include the type of control measure(s) used, the location and extent of coverage, and the date, amount, and frequency of application of dust suppressant, manufacturer's
  77. Records and other supporting documentation shall dust suppressant product information sheet that identifies the name of the dust suppressant and application instructions. Records shall be kept for one year following project completion that results in the termination of all dust generating activities. [District Rules 8011, 8031, and 8071]

## **ATTACHMENT B**

### ***GTE Emissions Data***

With PM<sub>2.5</sub> Revision

**Table A-2**  
**PEF Expansion Project**  
**Detailed Calculations for Maximum Hourly, Daily, and Annual Criteria Pollutant Emissions for Expansion CTG**  
 Rev 2/1/11

Equipment	Base Load			Startup			NOx		SOx (1)		CO		VOC		PM10	
	max. hour	hrs/day	hrs/yr	max. hour	hrs/day	hrs/yr	Base Load	Startup (2)	Base Load	Startup	Base Load	Startup (2)	Base Load	Startup (2)	Base Load	Startup
Expansion CTG, baseload	0	22	2525	0	0	0	16.25	0.00	3.495	0.00	7.92	0.00	2.95	0.00	7.00	0.00
Expansion CTG, startups	0	0	0	1	2	300	0.00	80.00	0.00	3.495	0.00	902.00	0.00	16.00	0.00	7.00

Equipment	NOx			SOx			CO			VOC			PM10		
	Max lb/hr	Max lb/day	Total lb/yr	Max lb/hr	Max lb/day	Total lb/yr	Max lb/hr	Max lb/day	Total lb/yr	Max lb/hr	Max lb/day	Total lb/yr	Max lb/hr	Max lb/day	Total lb/yr
Expansion CTG, baseload	0.00	357.51	41,033	0.00	76.89	8,825	0.00	174.14	19,986	0.00	64.83	7,441	0.00	154.00	17,675
Expansion CTG, startups	80.00	92.49	24,000	3.50	6.99	1,049	902.00	1804.00	178,014	16.00	32.00	4,800	7.00	14.00	2,100
<b>Total</b>	<b>80.00</b>	<b>450.00</b>	<b>65,033</b>	<b>3.50</b>	<b>84.00</b>	<b>9,873</b>	<b>902.00</b>	<b>1978.14</b>	<b>198,000</b>	<b>16.00</b>	<b>96.83</b>	<b>12,241</b>	<b>7.00</b>	<b>168.00</b>	<b>19,775</b>

Notes:

1. Startup emission rates for the simple cycle turbine are identical to those for the previously permitted combined cycle turbines.
2. Hourly SOx emission rate for the simple cycle turbine is identical to the emission limit for the existing combined cycle turbines.

**Table C-1**  
**PEF Expansion Project**  
**Emission Reduction Credits**  
 Rev 2/1/11

	Q1 (lbs)	Q2 (lbs)	Q3 (lbs)	Q4 (lbs)	Annual, lbs	Notes
<b>NOx</b>						
Project Emissions	90	91	92	92	365	
Project Emissions Subject to Offset	39,817	40,260	40,702	40,702	65,033	No change in quarterly emissions; annual reduced based on operating hours
Required Offsets (1.5 ratio)	39,817	40,260	40,702	40,702	65,033	
ERC Cert S-3114-2	59,726	60,390	61,053	61,053	97,549	
Surplus NOx ERCs	178,929	181,004	183,080	184,561	727,574	
Additional NOx ERCs for PM10	119,203	120,614	122,027	123,508	485,352	
Net Surplus NOx ERCs	59,626	60,288	60,951	60,951	241,815	
Net Surplus NOx ERCs	59,577	60,326	61,076	62,557	243,537	
<b>VOC</b>						
Project Emissions	7,330	7,411	7,493	7,493	12,241	No change in quarterly emissions; annual reduced based on operating hours
Project Emissions Subject to Offset	7,330	7,411	7,493	7,493	12,241	
Required Offsets (1.5 ratio)	10,995	11,117	11,240	11,240	18,361	
ERC Cert N-927-1	10,503	10,981	11,573	11,536	44,593	
Remaining VOC from ERC N-927-1	-492	-136	333	296	1	
Use Q3/Q4 ERCs to offset Q1/Q2	492	136	-333	-295	0	
Net Surplus VOC ERCs	0	0	0	1	1	
<b>SOx</b>						
Project Emissions	7,549	7,633	7,717	7,717	9,873	No change in quarterly emissions; annual reduced based on operating hours
Project Emissions Subject to Offset	7,549	7,633	7,717	7,717	9,873	
Required Offsets (1.5 ratio)	11,324	11,450	11,576	11,576	14,810	
ERC Cert S-2744-5	11,324	11,450	11,576	11,576	45,926	
Net Surplus SOx ERCs	0	0	0	0	0	
<b>PM10</b>						
Project Emissions	15,120	15,288	15,456	15,456	19,775	Quarterly emissions reduced to reflect reduction in PM10/PM2.5 emission rate from 7.5 to 7.0 lb/hr; annual emissions reduced based on operating hours
Project Emissions Subject to Offset	15,120	15,288	15,456	15,456	19,775	
Required Offsets (1.5 ratio)	22,680	22,932	23,184	23,184	29,663	
Required NOx ERCs (2.629 NOx:1.0 PM)	59,626	60,288	60,951	60,951	77,984	
Surplus NOx ERCs Used for PM10	59,626	60,288	60,951	60,951	241,815	
Net Surplus PM10 ERCs	0	0	0	0	0	

**Table A-3**

**PEF Expansion Project**

**Annual and Maximum Hourly Non-Criteria Pollutant Emissions for Expansion CTG**

Rev 2/1/11

Pollutant	Emission Factor(1) lb/MMBtu	Turbine Max. Hourly Emissions lbs/hr (3)	Turbine Annual Emissions tpy (4)
Ammonia	(2)	24.06	32.63
Propylene	7.30E-04	1.31	1.85
<b>Hazardous Air Pollutants</b>			
Acetaldehyde	4.14E-05	7.42E-02	0.10
Acrolein	6.63E-06	1.19E-02	1.68E-02
Benzene	1.24E-05	2.23E-02	3.14E-02
1,3-Butadiene	4.45E-07	7.97E-04	1.13E-03
Ethylbenzene	3.31E-05	5.93E-02	8.38E-02
Formaldehyde	6.01E-05	0.11	0.15
Hexane	2.45E-04	0.44	0.62
Naphthalene	1.35E-06	2.41E-03	3.40E-03
PAHs (excluding naphthalene)(5)	9.32E-07	1.67E-03	2.36E-03
Propylene oxide	3.00E-05	5.38E-02	7.60E-02
Toluene	1.38E-04	0.25	0.35
Xylene	6.63E-05	0.12	0.17
<b>Total HAPs =</b>			<b>1.61</b>

**Notes:**

- (1) All factors except PAHs, hexane, formaldehyde and propylene from AP-42, Table 3.1-3, 4/00. Individual PAHs, hexane and propylene are CATEF mean results as AP-42 does not include factors for these compounds. Adjusted for fuel HHV of 1,056.4 Btu/scf per Footnote c to Table 3.1-3. Reflects formaldehyde MACT standard of 25 ppb
- (2) Based on 10 ppm ammonia slip from SCR system.
- (3) Based on maximum turbine firing rate of 1791.00 MMBtu/hr
- (4) Based on maximum turbine firing rate (from (3)) for 2825 hrs/yr  
5,059,575 MMBtu/yr
- (5) Emission factors for individual PAHs adjusted proportionally so that total of "Adjusted EF" plus naphthalene equals Total PAH EF of 2.2 E-06 lb/MMBtu shown in AP-42, Table 3.1.3. lb/MMscf converted to lb/MMBtu using 1056 Btu/scf

	Mean EF (Note 1)	Adjusted EF (Note 5)	Emissions	
			lb/hr	tpy
Benzo(a)anthracene	2.14E-08	1.61E-07	2.88E-04	4.07E-04
Benzo(a)pyrene	1.32E-08	9.89E-08	1.77E-04	2.50E-04
Benzo(b)fluoranthrene	1.07E-08	8.04E-08	1.44E-04	2.03E-04
Benzo(k)fluoranthrene	1.04E-08	7.82E-08	1.40E-04	1.98E-04
Chrysene	2.39E-08	1.79E-07	3.21E-04	4.53E-04
Dibenz(a,h)anthracene	2.23E-08	1.67E-07	2.99E-04	4.23E-04
Indeno(1,2,3-cd)pyrene	2.23E-08	1.67E-07	2.99E-04	4.23E-04
<b>Total</b>	<b>1.24E-07</b>	<b>9.32E-07</b>	<b>1.67E-03</b>	<b>2.36E-03</b>

**ATTACHMENT C**

***GTE Commissioning Period Emissions Data***



**Table B-7**  
**PEF Expansion Project**  
**Detailed Emission Calculations for Turbine Commissioning**

Commissioning Test	Activity	Days	Daily Operation (hrs/day)	GT Firing Rate (MMBtu/hr)	Pollutant	Emission Factor (lbs/MMBtu)	Hourly Emissions (lbs/hr)	Daily Emissions (lbs/day)	Emissions During Test (lbs)	
FSNL + Ign. Tests	FSNL Operation	2	8	400	NOx		125	1,000.0	2,000.0	
					CO		902	7,216.0	14,432.0	
					VOC		16.0	128.0	256.0	
					SOx	0.0020	0.81	6.5	13.0	
					PM10		9.0	72.0	144.0	
Part Load Tests	Part Load Operation	4	12	1,067	NOx	0.1088	116.09	1,393.0	5,572.1	
					CO		385	4,620.0	18,480.0	
					VOC		16.0	192.0	768.0	
					SOx	0.0020	2.2	26.0	104.0	
					PM10		9.0	108.0	432.0	
Full Load Tests without SCR operational	Full Load Operation	4	12	1,720	NOx	0.0326	56.1	673.6	2,694.5	
					CO	0.0044	7.6	91.2	364.8	
					VOC	0.0016	2.8	34.0	135.8	
					SOx	0.0020	3.5	41.9	167.6	
					PM10		9.0	108.0	432.0	
Multiple Load Tests with SCR at partial control	Startup/Shutdown	5	3	1,720	NOx		80.0	548.9	2,744.4	
					CO		902.0	2774.4	13,872.0	
					VOC		16.0	73.5	367.3	
					SOx	0.0020	3.5	41.9	209.5	
					PM10		9.0	108.0	540.0	
	Full Load Operation	9	9	9	1,720	NOx	0.0200	34.3	inc	inc
						CO	0.0044	7.6	inc	inc
						VOC	0.0016	2.8	inc	inc
						SOx	0.0020	3.5	inc	inc
						PM10		9.0	inc	inc
Performance Tests with SCR at full control	Startup/Shutdown	10	3	1,720	NOx		80.0	380.4	3,804.1	
					CO		902.0	2774.4	27,743.9	
					VOC		16.0	73.5	734.6	
					SOx	0.0020	3.5	41.9	419.0	
					PM10		9.0	108.0	1,080.0	
	Full Load Operation	9	9	9	1,720	NOx	0.0091	15.6	inc	inc
						CO	0.0044	7.6	inc	inc
						VOC	0.0016	2.8	inc	inc
						SOx	0.0020	3.5	inc	inc
						PM10		9.0	inc	inc
Total Commissioning Hours			292							

**Table B-7 (cont'd)**

**Notes:**

1. Emission factors during FSNL and Ignition tests  
NO<sub>x</sub> - based on max expected hourly emission rate of 125 lbs/hr.  
CO - based on startup emission rate of 902 lbs/hr.  
VOC, SO<sub>x</sub> and PM<sub>10</sub> - based on startup emission rates and 1.0 grain S/100 dscf n.g.
2. Emission factors during part load tests  
NO<sub>x</sub> - based on estimate for part load test tuning combustor (ppm @ 15% O<sub>2</sub>) = 30  
CO - based on hourly emission rate used for Crockett Cogeneration plant commissioning period.  
VOC, SO<sub>x</sub> and PM<sub>10</sub> - based on startup emission rates and 1.0 grain S/100 dscf n.g.
3. Emission factors during full load tests without SCR operational  
NO<sub>x</sub> level in ppmvd @ 15% O<sub>2</sub> = 9  
CO, VOC - based on combustor operating in pre-mix mode (2 ppmc CO and 1.3 ppmc for VOC).  
SO<sub>x</sub> and PM<sub>10</sub> - emission factors based on fuel flow and 1.0 grain S/100 dscf n.g.
4. Emission factors during full load tests with SCR partially operational  
NO<sub>x</sub> - based information with combustor operating in pre-mix mode and SCR controlling NO<sub>x</sub> to 5.5 ppmc.  
CO, VOC - based on combustor operating in pre-mix mode (2 ppmc CO and 1.3 ppmc for VOC).  
SO<sub>x</sub> and PM<sub>10</sub> - emission factors based on fuel flow and 1.0 grain S/100 dscf n.g.
5. Emission factors during full load tests with SCR fully operational  
NO<sub>x</sub> - based on combustor operating in pre-mix mode and SCR operational (2 ppmc NO<sub>x</sub>).  
CO, VOC - based on combustor operating in pre-mix mode and ox cat operational, 3 hours of startups  
(2 ppmc CO, 1.3 ppmc for VOC for 9 hours; 902 lb/hr for CO and 16 lb/hr for VOC during startups).  
SO<sub>x</sub> and PM<sub>10</sub> - emission factors based on fuel flow and 1.0 grain S/100 dscf n.g.
6. Startup and shutdown emission rates unchanged.

**ATTACHMENT D**

***SJVAPCD BACT Guideline 3.4.7***

**San Joaquin Valley  
Unified Air Pollution Control District**

**Best Available Control Technology (BACT) Guideline 3.4.7\***

Last Update: 10/1/2002

**Gas Turbine - = or > 50 MW , Uniform Load, without Heat Recovery**

<b>Pollutant</b>	<b>Achieved in Practice or contained in the SIP</b>	<b>Technologically Feasible</b>	<b>Alternate Basic Equipment</b>
CO	6.0 ppmvd** @ 15% O <sub>2</sub> , based on a three-hour average (Oxidation catalyst, or equal).		
NOx	5.0 ppmvd** @ 15% O <sub>2</sub> , based on a three-hour average (high temp SCR, or equal).	1. 2.5 ppmvd** @ 15% O <sub>2</sub> , based on a one-hour average (high temperature Selective Catalytic Reduction (SCR), or equal). 2. 3.0 ppmvd** @ 15% O <sub>2</sub> , based on a three-hour average (high temp SCR, or equal).	
PM10	Air inlet cooler/filter, lube oil vent coalescer (or equal) and either PUC regulated natural gas, LPG, or non-PUC-regulated gas with < 0.75 grams S/100 dscf.		
SOx	PUC-regulated natural gas, LPG, or Non-PUC-regulated gas with = or < 0.75 grams S/100 dscf.		
VOC	2.0 ppmvd** @ 15% O <sub>2</sub> , based on a three-hour average (Oxidation catalyst, or equal).	1. 0.6 ppmvd** @ 15% O <sub>2</sub> , based on a three-hour average (Oxidation catalyst). 2. 1.3 ppmvd** @ 15% O <sub>2</sub> , based on a three-hour average (Oxidation catalyst, or equal).	

BACT is the most stringent control technique for the emissions unit and class of source. Control techniques that are not achieved in practice or contained in a state implementation plan must be cost effective as well as feasible. Economic analysis to demonstrate cost effectiveness is required for all determinations that are not achieved in practice or contained in an EPA approved State Implementation Plan.

**\*This is a Summary Page for this Class of Source - Permit Specific BACT Determinations on Next Page(s)**

## **ATTACHMENT E**

### ***Top Down BACT Analysis***

## **I. NO<sub>x</sub> Top-Down BACT Analysis**

### **Step 1 - Identify All Possible Control Technologies**

SJVAPCD BACT Clearinghouse Guideline 3.4.7 identifies achieved in practice BACT as the following:

1. 5.0 ppmvd @ 15% O<sub>2</sub>, based on a three-hour average (high temp SCR, or equal).

SJVAPCD BACT Clearinghouse Guideline 3.4.7 identifies technologically feasible BACT as the following:

1. 2.5 ppmvd @ 15% O<sub>2</sub>, based on a one-hour average (high temperature Selective Catalytic Reduction (SCR), or equal)
2. 3.0 ppmvd @ 15% O<sub>2</sub>, based on a three-hour average (high temp SCR or equal).

SJVAPCD BACT Clearinghouse Guideline 3.4.7 does not identify any alternate basic equipment BACT control alternatives.

### **Step 2 - Eliminate Technologically Infeasible Options**

All control options listed in step 1 are technologically feasible.

### **Step 3 - Rank Remaining Control Technologies by Control Effectiveness**

The following options are ranked based on their emission factor:

1. 2.5 ppmvd @ 15% O<sub>2</sub>, based on a one-hour average (high temperature Selective Catalytic Reduction (SCR), or equal)
2. 3.0 ppmvd @ 15% O<sub>2</sub>, based on a three-hour average (high temp SCR or equal).
3. 5.0 ppmvd @ 15% O<sub>2</sub>, based on a three-hour average (high temp SCR, or equal).

### **Step 4 - Cost Effective Analysis**

The applicant is proposing the use of a selective catalytic reduction system with NO<sub>x</sub> emissions of 2.5 ppmv @ 15% O<sub>2</sub> (based on on-hour average, excluding startup and shutdown). This is the highest ranking control option listed in Step 3 above. Therefore, in accordance with District policy APR 1305 (BACT Determinations), a cost effective analysis is not necessary.

### **Step 5 - Select BACT**

The applicant is proposing the use of a selective catalytic reduction system with NO<sub>x</sub> emissions of 2.5 ppmv @ 15% O<sub>2</sub> (based on on-hour average, excluding startup and shutdown). Therefore, BACT is satisfied.

## **II. VOC Top-Down BACT Analysis**

### **Step 1 - Identify All Possible Control Technologies**

SJVAPCD BACT Clearinghouse Guideline 3.4.7 identifies achieved in practice BACT as the following:

1. 2.0 ppmvd @ 15% O<sub>2</sub>, based on a three-hour average (oxidation catalyst, or equal)

SJVAPCD BACT Clearinghouse Guideline 3.4.2 identifies technologically feasible BACT as the following:

1. 0.6 ppmvd @ 15% O<sub>2</sub>, based on a three-hour average (oxidation catalyst)
2. 1.3 ppmvd @ 15% O<sub>2</sub>, based on a three-hour average (oxidation catalyst or equal).

SJVAPCD BACT Clearinghouse Guideline 3.4.7 does not identify any alternate basic equipment BACT control alternatives.

### **Step 2 - Eliminate Technologically Infeasible Options**

1. 0.6 ppmvd @ 15% O<sub>2</sub>, based on a three-hour average (oxidation catalyst)

The 0.6 ppmvd @ 15% O<sub>2</sub> level listed in the District BACT guideline 3.4.7 (Gas Fired Turbine ≥ 50 MW, Uniform Load, is not considered "feasible" at this time, based on the following information and discussion:

The District has not permitted any gas turbine engine (combined or simple cycle) with a VOC emissions limit of less than 1.4 ppmvd @ 15% O<sub>2</sub> (San Joaquin Valley Energy, S3959-1, '2 and '3, 180 MW combined cycle, Siemens-Westinghouse were permitted at 1.4 ppmvd @ 15% O<sub>2</sub> VOC.) This facility was not built.

The Sunrise Power Company combustion turbine generators (S-3746-1 and '2, 160 MW, GE Frame 7FA) with VOC emissions limit of 2.0 ppmvd @ 15% O<sub>2</sub> and operating in a combined cycle mode and with oxidation catalysts achieved during source testing VOC emissions rates of 0.65 ppmvd @ 15% O<sub>2</sub>.

Elk Hills Power combustion turbine generators (S-3523-1 and '2, 250 MW, GE Frame 7FA) with VOC emissions limit of 2.0 ppmvd @ 15% O<sub>2</sub> and operating in a combined cycle mode with oxidation catalysts achieved during source testing VOC emission rates of 0.77 and 0.75 ppmv @ 15% O<sub>2</sub>.

Pastoria Energy Facility combustion turbine generator (S-3636-1, '2 and '3) operating in a combined cycle mode and without a oxidation catalysts during source testing achieved VOC emissions rates below the detection limit, 0.13, 0.3 and 0.33 ppmvd @ 15% O<sub>2</sub>.

From the CARB document "*Guidance for Power Plant Siting and Best Available Control Technology*", July 1999, a BACT emission level on 2.0 ppmv @ 15% O<sub>2</sub> is specified as BACT. The document references emissions levels achieved in practice for combustion

gas turbines from the Carson Energy Group, 0.64 to 1.98 ppmvd 15% O<sub>2</sub> for a GE LM 5000 simple cycle unit with oxidation catalyst, and from Crockett Cogeneration, characterized by the BAAQMD as less than 1.0 ppmvd @ 15% O<sub>2</sub>, for a GE F7A combined cycle unit with oxidation catalyst.

### **Conclusion**

VOC emission from the Pastoria Energy Facility expansion combustion gas turbine (S-3636-14) are expected to be consistently < 1 ppmvd @ 15% O<sub>2</sub>, but, as there exists relatively few source test results for simple cycle machines operating without oxidation catalysts and a sufficient degree of variability in these test results, the most stringent VOC emissions limit listed in BACT guideline 3.4.7, 0.6 ppmvd @ 15%, will not be required as BACT.

It should be noted that, based on the results of the testing done on those units operating without oxidation catalysts, it can be concluded that VOC emissions of < 1.0 ppmv @ 15% O<sub>2</sub> can be achieved without the use of an oxidation catalyst. The level of VOC emissions control achieved with an oxidation catalyst is not well documented, but, as stated in the above referenced guidance document from CARB, oxidation catalysts can be designed to achieve control efficiencies of 40 to 50% for VOC and 80 to 90% for CO. However, given the very low levels of uncontrolled emissions of VOC and CO (less than 1.0 ppmvd @ 15% O<sub>2</sub>) and the limitations inherent in the source test method(s) specified to test these pollutants, it may not be possible to determine through measurement the reduction achieved with an oxidation catalyst.

### **Step 3 - Rank Remaining Control Technologies by Control Effectiveness**

The following options are ranked based on their emission factor:

1. 1.3 ppmvd @ 15% O<sub>2</sub>, based on a three-hour average (oxidation catalyst or equal).
2. 2.0 ppmvd @ 15% O<sub>2</sub>, based on a three-hour average (oxidation catalyst, or equal)

### **Step 4 - Cost Effectiveness Analysis**

A cost effective analysis must be performed for all control options in the list from step 3 in the order of their ranking to determine the cost effective option with the lowest emissions.

The applicant is proposing the use of a natural gas fuel and good combustion practices with VOC emissions of 1.3 ppmv @ 15% O<sub>2</sub>. This is the highest ranking option listed above; therefore, a cost effective analysis will not be necessary.

### **Step 5 – Select BACT**

BACT for the emission unit is determined to be the use of natural gas fuel with emissions of less than or equal to 1.3 ppmv @ 15% O<sub>2</sub>. The facility has proposed to use natural gas fuel and good combustion practices with VOC emissions of 1.3 ppmv @ 15% O<sub>2</sub>.



### **III. PM<sub>10</sub> Top-Down BACT Analysis**

#### **Step 1 - Identify All Possible Control Technologies**

**General control for PM<sub>10</sub> emissions include the following options:**

SJVAPCD BACT Clearinghouse Guideline 3.4.7 identifies achieved in practice BACT as the following:

- Air inlet filter, lube oil vent coalescer and either PUC regulated natural gas, LPG, or non-PUC-regulated gas with <0.75 grain S/100dscf

SJVAPCD BACT Clearinghouse Guideline 3.4.7 does not identify any technologically feasible BACT control alternatives.

SJVAPCD BACT Clearinghouse Guideline 3.4.7 does not identify any alternate basic equipment BACT control alternatives.

#### **Step 2 - Eliminate Technologically Infeasible Options**

The listed control is considered technologically feasible for this application.

#### **Step 3 - Rank Remaining Control Technologies by Control Effectiveness**

1. Air inlet filter, lube oil vent coalescer and either PUC regulated natural gas, LPG, or non-PUC-regulated gas with <0.75 grS/100dscf

#### **Step 4 - Cost Effectiveness Analysis**

A cost effective analysis must be performed for all control options in the list from step 3 in the order of their ranking to determine the cost effective option with the lowest emissions.

The applicant is proposing to use an air in inlet filter, lube oil vent coalescer and PUC quality natural gas fuel with sulfur not exceeding 0.75 grain/100scf. Since this is the most effective control, a cost effective analysis is not necessary.

#### **Step 5 - Select BACT**

BACT for the emission unit is determined to be the use of an air inlet filter, lube oil vent coalescer and and PUC quality natural gas fuel with sulfur not exceeding 0.75 grain/100scf. The facility is proposing to use an air inlet filter, lube oil vent coalescer and and PUC quality natural gas fuel with sulfur not exceeding 0.75 grain/100scf; therefore, BACT is satisfied.

#### **IV. SO<sub>x</sub> Top-Down BACT Analysis**

##### **Step 1 - Identify All Possible Control Technologies**

SJVAPCD BACT Clearinghouse Guideline 3.4.7 identifies achieved in practice BACT as the following:

- PUC-regulated natural gas fuel; or
- Non-PUC-regulated gas with  $\leq 0.75$  grains S/100 dscf

SJVAPCD BACT Clearinghouse Guideline 3.4.7 does not identify any technologically feasible BACT control alternatives.

SJVAPCD BACT Clearinghouse Guideline 3.4.7 does not identify any alternate basic equipment BACT control alternatives.

##### **Step 2 - Eliminate Technologically Infeasible Options**

All of the listed controls are considered technologically feasible for this application.

##### **Step 3 - Rank Remaining Control Technologies by Control Effectiveness**

1. PUC-regulated natural gas fuel; or Non-PUC-regulated gas with  $\leq 0.75$  grains S/100 dscf

##### **Step 4 - Cost Effectiveness Analysis**

A cost effective analysis must be performed for all control options in the list from step 3 in the order of their ranking to determine the cost effective option with the lowest emissions.

The applicant is proposing to use PUC-quality natural gas fuel with sulfur not exceeding 0.75 grain/100 dscf. Since this is the most effective control option, a cost effective analysis is not necessary.

##### **Step 5 - Select BACT**

BACT for the emission unit is determined to be the use of PUC quality natural gas fuel. The facility is proposing to use PUC quality natural gas fuel with sulfur not exceeding 0.75 grain/100 dscf; therefore, BACT is satisfied.

## V. CO Top-Down BACT Analysis

### Step 1 - Identify All Possible Control Technologies

SJVACPD BACT Clearinghouse Guideline 3.4.7 identifies achieved in practice BACT as the following:

- 6.0 ppmvd @ 15% O<sub>2</sub>, based on a three-hour average (oxidation catalyst, or equal)

Through the use of good combustion practices and without an oxidation catalyst, CO emissions of less than 6.0 have been achieved in practice.

Pastoria Energy Facility GTE S-3636-3 operating in a combined cycle mode and without a oxidation catalysts achieved during the 2010 source testing CO emissions rates < 1 ppmvd @ 15% O<sub>2</sub>.

### Step 2 - Eliminate Technologically Infeasible Options

The control option listed in step 1 is technologically feasible.

### Step 3 - Rank Remaining Control Technologies by Control Effectiveness

The following options are ranked based on their emission factor:

1. 6.0 ppmv @ 15% O<sub>2</sub> with an oxidation catalyst (or equivalent)

### Step 4 - Cost Effective Analysis

A cost effective analysis must be performed for all control options in the list from step 3 in the order of their ranking to determine the cost effective option with the lowest emissions.

The applicant is proposing CO emissions of 2.0 ppmv @ 15% O<sub>2</sub>, achieved through good combustion practices. This is more effective control than the option listed in the guideline; therefore, a cost effective analysis is not necessary.

### Step 5 - Select BACT

BACT for the emission unit is an emissions limit of less than or equal to 6.0 ppmv @ 15% O<sub>2</sub>. The facility has proposed a limit of 2.0 ppmv @ 15% O<sub>2</sub>; therefore, BACT is satisfied.

## **ATTACHMENT F**

### ***Health Risk Assessment and Ambient Air Quality Analysis***

**San Joaquin Valley Air Pollution Control District  
Risk Management Review  
REVISED**

To: Dolores Gough, AQE – Permit Services  
 From: Trevor Joy – Technical Services  
 Date: February 28, 2011  
 Facility Name: Pastoria Energy Facility  
 Location: Lebec  
 Application #(s): S-3636-14-1  
 Project #: 1103990

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 Southern Region

**A. RMR SUMMARY**

<b>RMR Summary</b>			
<b>Categories</b>	<b>160 MW Gas Turbine (Unit 14-1)</b>	<b>Project Totals</b>	<b>Facility Totals</b>
<b>Prioritization Score</b>	0.32	0.32	>1
<b>Acute Hazard Index</b>	0.00	0.00	0.03
<b>Chronic Hazard Index</b>	0.00	0.00	0.16
<b>Maximum Individual Cancer Risk (10<sup>-6</sup>)</b>	0.00	0.00	1.0
<b>T-BACT Required?</b>	<b>No</b>		
<b>Special Permit Conditions?</b>	<b>No</b>		

**Proposed Permit Conditions**

To ensure that human health risks will not exceed District allowable levels; the following permit conditions must be included for:

Unit # 14-1

{1898} The exhaust stack shall vent vertically upward. The vertical exhaust flow shall not be impeded by a rain cap (flapper ok), roof overhang, or any other obstruction. [District Rule 4102] N

**B. RMR REPORT**

**I. Project Description** 168 MW

Technical Services received a request on December 15, 2010, to perform an Ambient Air Quality Analysis and a Risk Management Review for a General Electric 7FA gas turbine generator rated at ~~596~~ bhp operating in simple cycle mode with selective catalytic reduction (SCR) for control of emissions of oxides of nitrogen. While the proposed modification associated with project 1103990 doesn't have an increase in emissions, unit emissions were re-evaluated to reflect the reduced risk. On February 2, 2011 a revised request was submitted with a decrease in hours operation.

**II. Analysis**

Technical Services performed a prioritization using the District's HEARTs database. Emissions were calculated using "NG Internal Combustion - Turbine w/ Catalyst" emission factors. In accordance with the District's *Risk Management Policy for Permitting New and Modified Sources* (APR 1905, March 2, 2001), risks from the proposed unit's toxic emissions were prioritized using the procedure in the 1990 CAPCOA Facility Prioritization Guidelines and incorporated in the District's HEARTs database. The prioritization score for the facility was greater than 1.0 (see RMR Summary Table). Therefore, a refined analysis was required and performed. AERMOD was used, with the parameters outlined below and meteorological data for Bakersfield 2005 to 2009 to determine the maximum dispersion factor at the nearest residential and business receptors. These dispersion factors were input into the HARP model to calculate the chronic and acute hazard indices and the carcinogenic risk for the project.

The following parameters were used for the review:

Analysis Parameters Unit 14-1			
Source Type	Point	Location Type	Rural
Stack Height (m)	39.93	Closest Receptor (m)	1
Stack Diameter. (m)	6.93	Type of Receptor	1
Stack Exit Velocity (m/s)	38.4	Max Hours per Year	2825
Stack Exit Temp. (°K)	680.78	Fuel Type	Natural Gas
Burner Rating (MMBtu/hr)	1,791	Ammonia (lbs/hr)	24.1
Ammonia (lbs/yr)	84,400		

The applicant provided a full range of receptors for modeling. Although none of these were residential or business receptors, they were used for the modeling. Thus, the predicted risks are for the point of maximum impact rather than the maximum exposed individual.

Technical Services also performed modeling for criteria pollutants CO, NOx, SOx and PM<sub>10</sub>; as well as a RMR. The emission rates used for criteria pollutant modeling were

	NOx	Sox	CO	PM10
Lbs/hr	80	3.5	902	7.5
Lbs/yr	65,033	9,873	---	19,775

The engineer supplied the maximum fuel rate for the ~~IC~~ engine used during the analysis.

The results from the Criteria Pollutant Modeling are as follows:

**Criteria Pollutant Modeling Results\***  
Values are in  $\mu\text{g}/\text{m}^3$

Diesel ICE	1 Hour	3 Hours	8 Hours.	24 Hours	Annual
CO	Pass	X	Pass	X	X
NO <sub>x</sub>	Pass <sup>1</sup>	X	X	X	Pass
SO <sub>x</sub>	Pass <sup>2</sup>	Pass	X	Pass	Pass
PM <sub>10</sub>	X	X	X	Pass <sup>3</sup>	Pass <sup>3</sup>

\*Results were taken from the attached PSD spreadsheet.

<sup>1</sup>The project was compared to the 1-hour NO<sub>2</sub> National Ambient Air Quality Standard that became effective on April 12, 2010 using the District's approved procedures. The criteria pollutant 1-hour value passed using TIER I NO<sub>2</sub> NAAQS modeling

<sup>2</sup>The project was compared to the 1-hour SO<sub>2</sub> National Ambient Air Quality Standard that became effective on August 23, 2010 using the District's approved procedures.

<sup>3</sup>The maximum predicted concentration for emissions of these criteria pollutants from the proposed unit are below EPA's level of significance as found in 40 CFR Part 51.165 (b)(2).

### III. Conclusion

The acute and chronic indices are below 1.0 and the cancer risk factor associated with the gas-fired turbine is less than 1.0 in a million. **In accordance with the District's Risk Management Policy, the project is approved without Toxic Best Available Control Technology (T-BACT).**

To ensure that human health risks will not exceed District allowable levels; the permit conditions listed on page 1 of this report must be included for this proposed unit.

The emissions from the proposed equipment will not cause or contribute significantly to a violation of the State and National AAQS.

These conclusions are based on the data provided by the applicant and the project engineer. Therefore, this analysis is valid only as long as the proposed data and parameters do not change.

#### Attachments:

- A. RMR request from the project engineer
- B. Additional information from the applicant/project engineer
- C. Summary of highest cancer, chronic, and acute risks (PMI/MEI report from HARP)
- D. AAQA spreadsheet

## **ATTACHMENT G**

### ***NO<sub>x</sub> for PM<sub>10</sub> Interpollutant Offset Analysis***



## Results and Documentation

### SJVAPCD Interpollutant Ratio Results

**SOx for PM ratio: 1.000 ton of SOx per ton of PM**

**NOx for PM ratio: 2.629 tons of NOx per ton of PM**

**These ratios do not include adjustments for other regulatory requirements specified in provisions of District Rule 2201.**

The results of the modeling analysis developed an atmospheric interpollutant ratio for NOx to PM of 2.629 tons of NOx per ton of PM. This result was the most stringent ratio from the assessment industrial carbon emissions to secondary particulates at Kern County; with Fresno, Tulare and Kings counties having a lower ratio. The assessment of chemistry from the regional model required comparison of total carbon to secondary particulates and is therefore not directly useful to establish a ratio. However, the regional model does provide an ability to compare the general atmospheric similarity and compare changes in chemistry due to Plan reductions. Evaluation revealed that the atmospheric chemistry of San Joaquin, Stanislaus and Merced counties falls within the range of urban characteristics evaluated for the southern four counties; therefore the ratio established should be sufficiently protective of the northern four counties. Additionally, comparison of future year chemistry showed minimal change in pollutant ratio due to the projected changes in the emission inventory from implementation of the Plan. The SOx ratio as modeled indicates a value of less than one to one due to the increase in mass for conversion of SOx to a particulate by combination with other atmospheric compounds; however, the District has set guidelines that require at least one ton of an alternative pollutant for each required ton of reduction in accordance with District Rule 2201 Section 4.13.3. Therefore the SOx interpollutant ratio is established as 1.000 ton of SOx per ton of PM. These ratios do not include adjustments for other regulatory considerations, such as other provisions of District Rule 2201.

A guide to the key technical topics and the reference material relevant to that topic is found on the next page. References from the 2008 PM2.5 Plan may be obtained by requesting a copy of that document and its appendices or by downloading the document from [http://www.valleyair.org/Air\\_Quality\\_Plans/AQ\\_Final\\_Adopted\\_PM25\\_2008.htm](http://www.valleyair.org/Air_Quality_Plans/AQ_Final_Adopted_PM25_2008.htm). References in Italics are spreadsheets included in the interpollutant analysis file "09 Interpollutant Ratio Final 032909.xls" which includes 36 worksheets of receptor modeling information from the 2008 PM2.5 Plan, 11 modified and additional spreadsheets for this analysis and two spreadsheets of regional model daily output. This file is generally formatted for printing with the exception of the two spreadsheets containing the regional model output "*Model-Daily Annual*" and "*Model-Daily Q4*" which are over 300 pages of raw unformatted model output files. The remainder of the file is formatted to print at approximately 100 pages. This file will be made available on request but is not currently posted for download.

**ATTACHMENT H**  
***Compliance Certification***



# CALPINE CORPORATION

4160 DUBLIN BOULEVARD  
SUITE 100  
DUBLIN, CA 94568  
925.557.2280 (M)  
925.479.9560 (F)

November 4, 2010

David Warner  
Director of Permit Services  
San Joaquin Valley Air Pollution Control District  
1990 E. Gettysburg Avenue  
Fresno, CA 93726-0244

Received

NOV 09 2010

Permits Srvc  
SJVAPCD

RECEIVED

NOV 12 2010

SJVAPCD  
Southern Region

Subject: Response to August 23, 2010, Notice of Incomplete Application  
Project Number: S-1103990

Dear Mr. Warner:

In response to your August 23, 2010, request for additional information, we are submitting the enclosed revised application for the reissuance of an Authority to Construction for the Pastoria Energy Facility expansion project (PEFE) with reduced annual operating hours. The PEFE is a simple cycle peaking gas turbine engine-generator (Unit #4) that was approved by the District in 2005; the District approved an extension to the Authority to Construct in 2008.

This application package includes a proposed fuel use limit equivalent to 3650 full-load operating hours per year for the PEFE to keep annual emissions below PSD modification thresholds. The application also includes the following revisions to the original application:

- Proposed reduction of CO concentration to 2 ppmvd, consistent with the District's recent BACT determinations for large gas turbines with DLN combustors;
- Proposed reduction of hourly PM emissions to 7.5 lb/hr, based on recent source test data from similar units;
- Revised ambient air quality analysis using AERMOD and 2005–2009 meteorological data;
- Demonstration of project compliance with the new federal 1-hour NO<sub>2</sub> and SO<sub>2</sub> ambient air quality standards; and
- Revised screening health risk assessment.

Although the annual emissions from the project are significantly lower than those originally permitted, PEFE has not changed the offset package from that approved by the District in January 2006.

In accordance with Rule 2201, Section 4.15, "Additional Requirements for New Major Sources and Federal Major Modifications," PEFE is also providing this compliance statement regarding the PEFE.

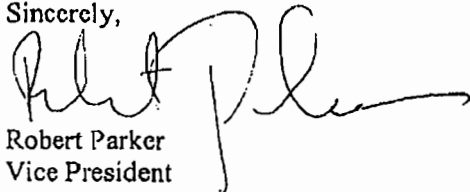
All major stationary sources in California owned or operated by Calpine, or by any entity controlling, controlled by, or under common control with Calpine, and which are subject to emission limitations, are in compliance or on a schedule for compliance with all applicable emission limitations and standards. These sources include one or more of the following facilities:

- Creed Energy Center, LLC
- Delta Energy Center, LLC
- Calpine Gilroy Cogen, L.P.
- Gilroy Energy Center, LLC for Feather River Energy Center
- Gilroy Energy Center, LLC for Gilroy Energy Center
- Gilroy Energy Center, LLC for King City Energy Center
- Gilroy Energy Center, LLC for Lambic Energy Center
- Gilroy Energy Center for Riverview Energy Center
- Gilroy Energy Center, LLC for Wolfskill Energy Center
- Gilroy Energy Center, LLC for Yuba City Energy Center
- Goose Haven Energy Center, LLC
- Calpine Greenleaf, Inc. for Greenleaf I
- Calpine Greenleaf, Inc. for Greenleaf II
- Calpine King City Cogen, LLC
- Los Esteros Critical Energy Facility, LLC
- Los Medanos Energy Center, LLC
- Metcalf Energy Center, LLC
- O.L.S. Energy Agnews, Inc.
- Otay Mesa Energy Center, LLC
- Calpine Construction Finance Company, L.P. for Sutter Energy Center

Based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate, and complete.

We appreciate your assistance in processing our application as quickly as possible. If you have any questions or need additional information to complete your analysis, please do not hesitate to call me or Nancy Matthews of Sierra Research at (916) 273-5124.

Sincerely,



Robert Parker  
Vice President  
Western Region Operations

Enclosures

**ATTACHMENT I**

***Title V Compliance Certification***

**San Joaquin Valley  
Unified Air Pollution Control District**

**TITLE V MODIFICATION - COMPLIANCE CERTIFICATION FORM**

**I. TYPE OF PERMIT ACTION (Check appropriate box)**

- SIGNIFICANT PERMIT MODIFICATION       ADMINISTRATIVE AMENDMENT  
 MINOR PERMIT MODIFICATION

COMPANY NAME: <b>Pastoria Energy Facility, LLC</b>	FACILITY ID: <b>S - 3636</b>
1. Type of Organization: <input checked="" type="checkbox"/> Corporation <input type="checkbox"/> Sole Ownership <input type="checkbox"/> Government <input type="checkbox"/> Partnership <input type="checkbox"/> Utility	
2. Owner's Name: <b>Calpine Corporation</b>	
3. Agent to the Owner:	

**II. COMPLIANCE CERTIFICATION (Read each statement carefully and initial all circles for confirmation):**

- Based on information and belief formed after reasonable inquiry, the equipment identified in this application will continue to comply with the applicable federal requirement(s).
- Based on information and belief formed after reasonable inquiry, the equipment identified in this application will comply with applicable federal requirement(s) that will become effective during the permit term, on a timely basis.
- Corrected information will be provided to the District when I become aware that incorrect or incomplete information has been submitted.
- Based on information and belief formed after reasonable inquiry, information and statements in the submitted application package, including all accompanying reports, and required certifications are true accurate and complete.

I declare, under penalty of perjury under the laws of the state of California, that the forgoing is correct and true:

  
 \_\_\_\_\_  
 Signature of Responsible Official

1 - 06 - 11  
 \_\_\_\_\_  
 Date

**Michael Rinehart**  
 \_\_\_\_\_  
 Name of Responsible Official (please print)

**Plant Manager**  
 \_\_\_\_\_  
 Title of Responsible Official (please print)

**ATTACHMENT J**  
*Supplemental Information*

**Maximum (full-time) Annual Emissions and ERC Calculations  
(previously approved in 2005)**



Table A-2

PEF Expansion Project

Detailed Calculations for Maximum Hourly, Daily, and Annual Criteria Pollutant Emissions for Expansion CTG

VOC Emission Rates Revised 5/05; Annual NOx Emissions Corrected 6/05

Equipment	Base Load			Startup			NOx		SOx (1)		CO		VOC		PM10	
	max. hour	hrs/day	hrs/yr	max. hour	hrs/day	hrs/yr	Base Load	Startup (2)	Base Load	Startup	Base Load	Startup (2)	Base Load	Startup (2)	Base Load	Startup
							lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr
Expansion CTG, baseload	0	22	8460	0	0	0	16.25	0.00	3.495	0.00	23.75	0.00	2.95	0.00	9.00	0.00
Expansion CTG, startups	0	0	0	1	2	300	0.00	80.00	0.00	3.495	0.00	902.00	0.00	16.00	0.00	9.00

Equipment	NOx			SOx			CO			VOC			PM10		
	Max	Max	Total	Max	Max	Total	Max	Max	Total	Max	Max	Total	Max	Max	Total
	lb/hr	lb/day	lb/yr	lb/hr	lb/day	lb/yr	lb/hr	lb/day	lb/yr	lb/hr	lb/day	lb/yr	lb/hr	lb/day	lb/yr
Expansion CTG, baseload	0.00	357.51	137,480	0.00	76.89	29,568	0.00	522.41	200,892	0.00	64.83	24,930	0.00	198.00	76,140
Expansion CTG, startups	80.00	92.49	24,000	3.50	6.99	1,049	902.00	1590.59	270,600	16.00	32.00	4,800	9.00	18.00	2,700
<b>Total</b>	<b>80.00</b>	<b>450.00</b>	<b>161,480</b>	<b>3.50</b>	<b>84.00</b>	<b>30,616</b>	<b>902.00</b>	<b>2113.00</b>	<b>471,492</b>	<b>16.00</b>	<b>96.83</b>	<b>29,730</b>	<b>9.00</b>	<b>216.00</b>	<b>78,840</b>
	lb/hr	lb/day	lb/yr	lb/hr	lb/day	lb/yr	lb/hr	lb/day	lb/yr	lb/hr	lb/day	lb/yr	lb/hr	lb/day	lb/yr

Notes:

1. Startup emission rates for the simple cycle turbine are identical to those for the previously permitted combined cycle turbines.
2. Hourly SOx emission rate for the simple cycle turbine is identical to the emission limit for the existing combined cycle turbines.

**Table F-1**

**PEF Expansion Project**

**Emission Reduction Credits**

**VOC Emission Rates Revised 5/05; Annual NOx Emissions Corrected 6/05**

	Q1 (lbs)	Q2 (lbs)	Q3 (lbs)	Q4 (lbs)	Annual, lbs	
<b>NOx</b>	90	91	92	92	365	Exclusion
Project Emissions	39,817	40,260	40,702	40,702	161,480	
Project Emissions Subject to Offset	39,817	40,260	40,702	40,702	161,480	
Required Offsets (1.5 ratio)	59,726	60,389	61,053	61,053	242,221	
ERC Cert S-1554-2 (Note a)	109,935	121,484	127,922	117,272	476,613	
ERC Cert S-1543-2	10,354	8,381	11,018	11,467	41,220	
Surplus NOx ERCs	60,563	69,476	77,887	67,686	275,612	
Additional NOx ERCs for PM10	52,877	53,464	54,052	54,052	214,445	
Net Surplus NOx ERCs	7,686	16,012	23,835	13,634	61,167	
<b>VOC</b>						
Project Emissions	7,331	7,412	7,494	7,494	29,730	
Project Emissions Subject to Offset	7,331	7,412	7,494	7,494	29,730	
Required Offsets (1.5 ratio)	10,996	11,118	11,241	11,241	44,596	
ERC Cert N-444-1 (Note b)	47,635	37,534	40,666	32,156	157,991	
ERC Cert S-1666-1	0	0	0	9	9	
Net Surplus VOC ERCs	36,639	26,416	29,425	20,924	113,404	
<b>SOx</b>						
Project Emissions	7,549	7,633	7,717	7,717	30,616	
Project Emissions Subject to Offset	7,549	7,633	7,717	7,717	30,616	
Required Offsets (1.5 ratio)	11,324	11,450	11,575	11,575	45,924	
ERC Cert S-1344-5	25,521	30,054	14,242	12,127	81,944	
Net Surplus SOx ERCs	14,197	18,604	2,667	552	36,020	
<b>PM10</b>						Ratio w/ dist  2.72
Project Emissions	19,440	19,656	19,872	19,872	78,840	
Project Emissions Subject to Offset	19,440	19,656	19,872	19,872	78,840	
Required Offsets (1.5 ratio)	29,160	29,484	29,808	29,808	118,260	
PM10 from NOx ERCs (2.72 ratio) (Note c)	52,877	53,464	54,052	54,052	214,445	
Surplus NOx ERCs Used for PM10	52,877	53,464	54,052	54,052	214,445	
Net Surplus PM10 ERCs	0	0	0	0	0	

**Notes:**

- a. These ERCs are surplus to those previously allocated for Pastoria and SJVEC.
- b. These ERCs are surplus to those allocated for SJVEC (formerly Cert N-303-1).
- c. The District has previously approved a NOx:PM10 ratio for Pastoria of 2.72 to 1, including the offset ratio.