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| **Docket Number:** | 99-AFC-07C |
| **Project Title:** | Pastoria Energy Facility Compliance |
| **TN #:** | 210637 |
| **Document Title:** | Application to the SJVAPCD for permit amendment |
| **Description:** | Application for modifications to the Permits to Operate and the Federal Operating Permit |
| **Filer:** | Nancy Matthews |
| **Organization:** | Sierra Research |
| **Submitter Role:** | Applicant Consultant |
| **Submission Date:** | 3/8/2016 8:35:24 AM |
| **Docketed Date:** | 3/8/2016 |

**CALPINE CORPORATION**

NYSE CPN

Michael Rinehart
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Pastoria Energy Facility
39789 Edmonston Pumping Plant Road
Lebec, CA 93243
661-282-4404

February 18, 2016

Arnaud Marjollet
Director of Permit Services
San Joaquin Valley Air Pollution Control
1990 E. Gettysburg Ave.
Fresno, CA 93726

Re: Pastoria Energy Facility
Facility Number: S-3636
Request for Permit Amendment

Dear Mr. Marjollet:

Pastoria Energy Facility L.L.C. is pleased to submit the attached application for modifications to the Permits to Operate and the Federal Operating Permit for the Pastoria Energy Facility (PEF). PEF is proposing to install two new natural gas-fired auxiliary boilers to provide steam to the heat recovery steam generators (HRSGs) and other systems to improve operating performance.

PEF is also requesting elimination of Condition 11 of S-3636-3-4, -4-4 and -5-4 of the facility Title V permit and Special Condition X.G.2 of PSD SJ-99-03 for the three GE 7FA gas turbines so that simultaneous startups of all three existing combustion turbines will be allowed. The attached application requests an amendment to each permit in order to eliminate the prohibition of simultaneous startups in the condition.

Finally, to improve thermal efficiency of the second power block (Unit S-3636-4), PEF is proposing to upgrade the unit with Advanced Gas Path (AGP) technology and General Electric's (GE's) latest gas turbine control system software.

We appreciate your consideration of this request. The required application forms are included as Appendix A, along with a check for the $475 filing fee, per SJVAPCD Rule 3010 (effective through June 30, 2016). If you have any questions regarding this request, please contact me at (661) 282-4404 or Nancy Matthews of Sierra Research at (916) 273-5124.

Sincerely,

MR

Michael Rinehart

Attachments:
cc: Nancy Matthews, Sierra Research

sierra research

# Application to the San Joaquin Valley Air Pollution Control District for a Permit Amendment for the Pastoria Energy Facility

prepared for:

**Pastoria Energy Facility, LLC**

February 2016


prepared by:

Sierra Research
1801 J Street
Sacramento, California 95811
(916) 444-6666

# Application to the San Joaquin Valley Air Pollution Control District
# for a
# Permit Amendment for the Pastoria Energy Facility

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# SUMMARY

Pastoria Energy Facility, L.L.C. (PEF), a wholly owned subsidiary of Calpine Corporation, is submitting a permit amendment application to request authorization to make the following modifications to the facility:

- Install two new natural gas-fired auxiliary boilers to provide steam to the heat recovery steam generators (HRSGs) and other systems to improve operating performance;

- Amend the conditions for Permit Units S-3636-2, -3, and -4 to allow simultaneous startups of the three existing GE Energy 7FA gas turbines; and

- Add Advanced Gas Path (AGP) technology and install General Electric's (GE's) latest gas turbine control system software on the third gas turbine to improve thermal efficiency of the second power block (Unit S-3636-4).[1]

PEF is also proposing other technological changes that do not impact air quality and do not require additional changes to the permit conditions.

[1] These changes were authorized by the District for Units 1 and 2 in a letter dated December 9, 2011.

Application to the San Joaquin Valley Air Pollution Control District
for a
Permit Amendment for the Pastoria Energy Facility

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# I. PROJECT DESCRIPTION

## A. Applicant's Name and Business Description

| | |
|---|---|
| Name of Applicant: | Pastoria Energy Facility, LLC |
| Mailing Address: | P.O. Box 866<br>Lebec, CA 93243-0866 |
| Facility Address: | Tejon Ranch 30 miles S of Bakersfield, 6.5 miles E of Grapevine, Rancho El Tejon |
| SIC Code: | 4911 |
| General Business: | Electric power generation |
| Submitting Officer: | Barbara McBride |
| Consultants: | Sierra Research, Inc.<br>1801 J Street<br>Sacramento, California 95811<br>(916) 444-6666 |
| SJVAPCD Permit No.:<br>PSD Permit No.: | S-3636-14<br>SJ-99-03 |
| Type of Use/Entitlement: | Electric power facility |
| Estimated Construction Date: | ASAP |

## B. Type of Application

Pastoria Energy Facility (PEF) is requesting approval for amendments to the Title V operating permit and the Prevention of Significant Deterioration (PSD) permit. The amendments would allow PEF to implement equipment and operational modifications at the facility that will improve the operating performance and efficiency of the project. The appropriate San Joaquin Valley Air Pollution Control District (SJVAPCD) application forms are included in Appendix A.

## C. Project Description

PEF is located in southeastern Kern County near the unincorporated communities of Grapevine and Lebec, about 30 miles south of Bakersfield. Refer to Figure 1-1 of the PTA for a regional overview. The existing facility is a 750 MW (nominal) combined-cycle natural gas-fired power plant sited on a 31-acre parcel owned by Tejon Ranch Company.

The project currently operates under a Title V Permit to Operate issued by the SJVAPCD and a federal Prevention of Significant Deterioration (PSD) permit issued by EPA.[1] The existing facility consists of the permitted equipment listed below.

- Two 168 MW (nominal) GE 7FA combustion turbines with unfired heat recovery steam generators and a 185 MW steam turbine in a two-by-one combined cycle configuration
- One 168 MW (nominal) GE 7FA combustion turbine with an unfired heat recovery steam generator and a 90 MW steam turbine
- One 8-cell wet cooling tower
- One 4-cell wet cooling tower
- One 814 bhp Caterpillar G3512 SC TA natural gas-fired emergency electric generator
- One 360 bhp John Deere JW6H-UF-60 diesel-fired fire water pump engine

The existing facility annual potential to emit (PTE) is summarized in Table 1.

**Table 1**
**Potential to Emit for Existing Pastoria Energy Facility Permit Units**

| Unit | NOx (lb/year) | $SO_2$ (lb/year) | CO (lb/year) | VOC (lb/year) | $PM_{10}/PM_{2.5}$ (lb/year) |
|---|---|---|---|---|---|
| Total, 3 gas turbines[a] | 344,484 | 84,780 | 1,220,166 | 227,619 | 224,343 |
| Emergency Diesel Fire Pump Engine[c] | 889 | 27 | 46 | 17 | 11 |
| Total, gas turbines and fire pump engine[b] | 344,485 | 84,510 | 1,140,000 | n/a | n/a |
| 8-cell cooling tower[c] | -- | -- | -- | -- | 8,059 |
| 4-cell cooling tower[c] | -- | -- | -- | -- | 4,059 |
| Natural gas-fired emergency engine[c] | 368 | 0 | 724 | 46 | 0 |
| Total[c] | 345,741 | 84,807 | 1,220,936 | 227,682 | 236,472 |
| Facility PTE[d] | 344,853 | 84,510 | 1,140,724 | 227,682 | 236,472 |

Notes:
a. Annual limits from District Permit to Operate S-3636.
b. Annual limits from PSD permit SJ-99-03 (December 23, 2004).
c. Potential to emit from October 2004 District engineering evaluation for diesel fire pump.
d. Reflects more stringent of District and/or PSD permit limit.

[1] Since the PSD permit was issued by EPA, SJVAPCD PSD Rule 2410 was approved into the SIP. As part of the SIP approval, authority for the PSD permits issued by EPA was transferred to the SJVAPCD. (77 FR 65305)

## D. Equipment and Permit Modifications

This amendment application requests authorization to make the following equipment and operational modifications to the project:

- Install two new natural gas-fired auxiliary boilers to provide steam to the HRSGs and other systems to improve operating performance;
- Allow for simultaneous startup of the three existing GE Energy 7FA gas turbines; and
- Add AGP technology and install GE Energy's (GE's) latest gas turbine control system software to improve thermal efficiency of the second power block.

A Petition to Amend (PTA) has also been submitted to the California Energy Commission (CEC) to modify the Conditions of Certification for the Pastoria Energy Facility (project or PEF) (99-AFC-7C) to accommodate these same modifications. The PTA to the CEC is included in Appendix B.

### 1. *Auxiliary Boilers*

The project owner proposes to install two auxiliary boilers for the purpose of reducing gas turbine startup times. During pre-start activities and during the initial phases of start-up, steam will be supplied from the new auxiliary boilers for sealing, warming the steam turbine (optional), heating/re-heating condensate (condenser sparging steam), and combustion turbine fuel gas heating.

The proposed new auxiliary boilers will be Rentech (or equivalent) watertube boilers, each with a steam generating capacity of 75,000 lb/hr at 300 psig. Each boiler will be equipped with low-NOx burners and selective catalytic reduction to minimize NOx emissions, and will be fueled with natural gas to minimize $SO_2$ and $PM_{10}/PM_{2.5}$ emissions. Specifications for the new auxiliary boilers are summarized in Table 2.

**Table 2**
**New Auxiliary Boiler Design Specifications**

| | |
|---|---|
| Manufacturer | Rentech (or equivalent) |
| Model | D-type |
| Fuel | Natural gas |
| Nominal Heat Input Rate | 91.4 MMBtu/hr @ HHV (each) |
| Nominal Exhaust Temperature | 300 ºF |
| Nominal Exhaust Flow Rate | 27,000 acfm |
| Nominal Exhaust $O_2$ Concentration, dry volume | 3% |
| Emission Controls | Low-NOx Burners and SCR (5.0 ppmv NOx @ 3% $O_2$) |

### 2. *Simultaneous Gas Turbine Startups*

The air permit conditions for Units S-3636-2, -3, and -4 at the PEF currently prohibit the operation of more than one gas turbine in startup mode at a time. This operating restriction results in more gas turbine operating hours than are necessary to meet dispatch requirements. In combination with the improved startup efficiency that will result from the addition of the auxiliary boilers, removing the startup restriction will eliminate extra operating hours and associated fuel use and emissions, and will improve overall plant efficiency.

### 3. *Gas Turbine Upgrades*

Two gas turbine upgrades are proposed to improve the efficiency of Unit 4 (S-3636-4). The proposed AGP upgrade will allow Calpine to replace the hot gas path components, such as turbine blades, nozzles, and associated structural elements, with parts that are designed to operate at slightly higher firing temperatures. These components will be functionally identical to the existing equipment except that they will be made from advanced materials that can withstand higher temperatures. This upgrade is designed to improve turbine fuel efficiency (heat rate) and will increase the output of Unit S-3636-4 by up to 5 percent. The software upgrade will also increase the thermal efficiency of Unit 4 (S-3636-4).

## E. Equipment Operation

The maximum hourly, daily, and annual heat inputs to the boilers, summarized in Table 3, were used as the basis for calculating emissions. Emission rates for the auxiliary boilers during normal operation are shown in Table 4.

**Table 3**
**Hourly, Daily and Annual Heat Input for the New Auxiliary Boilers**

| | **Heat Input (MMBtu, HHV)** | |
|---|---|---|
| | **Either Boiler** | **Two Boiler Total** |
| Hourly | 91.4 | 182.8 |
| Daily | 2,194 | 4,387 |
| Annual | 800,646 | 1,601,300 |

**Table 4**
**Emission Rates for the New Auxiliary Boilers**

| Pollutant | Emission Factors | | |
|---|---|---|---|
| | ppmvd @ 3% $O_2$ | lb/MMBtu | lb/hr (each boiler) |
| NOx (normal operation) | 5.0 | 0.006 | 0.55 |
| NOx (startup/shutdown/initial tuning) | 83 | 0.10 | 9.1 |
| SOx | 1.26[a] | 0.002 | 0.19 |
| CO | 50 | 0.036 | 3.3 |
| VOC | 10 | 0.004 | 0.38 |
| $PM_{10}/PM_{2.5}$ | -- | 0.007 | 0.64 |

## II. EMISSIONS ASSESSMENT

### A. Criteria Pollutants

#### 1. *New Equipment*

Detailed calculations and assumptions are shown in Appendix 3.1A of the PTA to the CEC (included in this permit amendment application as Appendix B). Hourly, daily, and annual emissions from the auxiliary boilers are shown in Table 5 below. Quarterly emissions increases are shown in Appendix B, Table 3.1F-2.

**Table 1**
**Emissions from the New Auxiliary Boilers**

| **Pollutant** | **Hourly Emissions (lb/hr)[a]** | **Daily Emissions (lb/day)[b]** | **Annual Emissions (tpy)[b]** |
|---|---|---|---|
| **Emissions from One Auxiliary Boiler** | | | |
| NOx | 9.1 | 38.9 | 7.1 |
| SOx | 0.19 | 4.6 | 0.8 |
| CO | 3.4 | 79.9 | 14.9 |
| VOC | 0.38 | 9.2 | 1.7 |
| $PM_{10}/PM_{2.5}$ | 0.64 | 15.4 | 2.8 |
| **Total Emissions from Two Auxiliary Boilers** | | | |
| NOx | 18.3 | 77.8 | 14.2 |
| SOx | 0.38 | 9.2 | 1.7 |
| CO | 6.8 | 159.8 | 29.8 |
| VOC | 0.76 | 18.3 | 3.3 |
| $PM_{10}/PM_{2.5}$ | 1.28 | 30.7 | 5.6 |

Notes:
a. Maximum hourly emissions based on rated heat input (Table 2) and guaranteed normal operation emission rates (Table 3). Maximum hourly NOx emissions occur during boiler startups.
b. Daily and annual emissions based on 24 hours per day, 8760 day/year operation.

#### 2. *Existing Equipment*

In addition to the two new auxiliary boilers, the proposed amendment includes a change in the method of operation of Unit 4. While this change will not affect the potential to emit for Unit 4, it may change the way the gas turbine is operated and thus the actual future emissions. The calculated change in actual future emissions from Unit 4 due to the proposed AGP and software upgrades must be assessed for PSD applicability and is shown in Table 6. Detailed calculations are provided in Attachment 3.1A of the PTA.

| Table 2<br>Gas Turbine Emissions Change Due to Proposed Upgrades to Unit 4 | | | |
|---|---|---|---|
| **Pollutant** | **Projected Actual Emissions[a] (tpy)** | **Baseline Actual Emissions (tpy)** | **Net Emissions Increases[b] (tpy)** |
| NOx | 44.7 | 34.9 | 9.9 |
| SOx | 3.7 | 3.6 | 0.2 |
| CO | 31.3 | 4.3 | 27.0 |
| VOC | 12.3 | 0.5 | 11.7 |
| $PM_{10}/PM_{2.5}$ | 12.9 | 9.1 | 3.9 |
| GHG | 651,706 | 702,431 | -50,725 |

Notes:
a. Maximum projected emissions from Unit 4 over the 10-year period following the proposed upgrade, based on modeled projections of gas turbine operation.
b. Projected emissions with the upgrade are lower for some pollutants than projected emissions without the upgrade because of a projected reduction in the frequency of gas turbine startups.

## B. Greenhouse Gas Emissions

Potential maximum annual GHG emissions for the new auxiliary boilers were calculated using the calculation methods and emission factors from the federal GHG Reporting Regulation. Table 7 presents the estimated GHG emissions due to project operations in carbon dioxide equivalent ($CO_2e$) metric tons and short tons per year. Emissions of methane and nitrous oxide have been converted to $CO_2$ equivalents using global warming potentials (GWPs) of 25 and 298, respectively. Details of the calculations are shown in Appendix 3.1A to the PTA. GHG emissions for the Unit 4 gas turbine upgrades are shown in Table 6 above.

| Table 3<br>Greenhouse Gas Emissions from the Auxiliary Boilers | | | | | |
|---|---|---|---|---|---|
| **Units** | **$CO_2$ (metric tons/year)** | **$CH_4$ (metric tons/year)** | **$N_2O$ (metric tons/year)** | **$CO_2eq$ (metric tons/yr)[a]** | **$CO_2e$ (tons/yr)[a]** |
| Auxiliary Boilers | 84,965 | 3.2 | 0.32 | 85,052 | 93,559 |

Notes:
a. Includes $CO_2$, $CH_4$, and $N_2O$.

## C. Project Emissions Increases for Prevention of Significant Deterioration Applicability

The determination of Prevention of Significant Deterioration (PSD) applicability is made for all of the emissions changes that will result from the proposed project. These changes, summarized in Table 8, include the emissions increases from the new auxiliary boilers (from Tables 5 and 7) as well as the emissions changes due to the proposed upgrades to Unit 4 (from Table 6). The calculations are discussed in detail in the PTA.

**Table 4**
**Emissions Changes for the Proposed Project for PSD Applicability**

| | **Emissions, tons per year** | | | | | |
|---|---|---|---|---|---|---|
| | **NOx** | **$SO_2$** | **CO** | **VOC** | **$PM_{10}/PM_{2.5}$** | **GHG** |
| New Auxiliary Boilers | 14.2 | 1.7 | 29.8 | 3.3 | 5.6 | 93,558 |
| Emissions Change from Upgrades to Unit 4 | 9.9 | 0.2 | 27.0 | 11.7 | 3.9 | -50,725 |
| Total | 24.1 | 1.9 | 56.8 | 15.0 | 9.5 | 42,832 |
| PSD Thresholds | 40 | 40 | 100 | 40 | 15/10 | 75,000 [a] |
| Exceed PSD Thresholds? | No | No | No | No | No | No |

Note:
a. Based on the Supreme Court's June 23, 2014 opinion on the GHG Tailoring Rule (Utility Air Regulatory Group v. EPA, No. 12-1146), the project would not be subject to PSD review regardless of its GHG emissions because the emissions increases of other criteria pollutants are below their respective significant emissions thresholds. However, the SJVAPCD's PSD rule (Rule 2410) cites the June 16, 2011 version of 40 CFR 52.21 and thus includes the 75,000 tpy $CO_2e$ threshold, so a comparison with that threshold is included here for completeness.

Because the total emissions increases that will result from the new auxiliary boilers and the changes to gas turbine Unit 4 are below all PSD thresholds, PSD program requirements are not applicable.

## D. Toxics Air Contaminant Emissions

Non-criteria pollutants emitted by the new auxiliary boilers are summarized in Table 9. Detailed calculations and emission factors are presented in Appendix 3.1A, Table 3.1A-3 of the PTA.

| Table 5<br>Non-Criteria Pollutant Emissions from the Auxiliary Boilers | | | |
|---|---|---|---|
| **Pollutant** | **Max. Hourly Emissions per Boiler (lbs/hr)** | **Annual Emissions per Boiler (tpy)** | **Total Annual Emissions, Two Boilers (tpy)** |
| Ammonia | 0.40 | 1.77 | 3.55 |
| Propylene | 0.05 | 0.21 | 0.41 |
| Hazardous Air Pollutants: | | | |
| Acetaldehyde | 2.76E-04 | 1.21E-03 | 2.42E-03 |
| Acrolein | 2.41E-04 | 1.05E-03 | 2.11E-03 |
| Benzene | 5.17E-04 | 2.27E-03 | 4.53E-03 |
| Ethylbenzene | 6.15E-04 | 2.69E-03 | 5.39E-03 |
| Formaldehyde | 1.10E-03 | 4.80E-03 | 9.61E-03 |
| Hexane | 4.10E-04 | 1.80E-03 | 3.59E-03 |
| Naphthalene | 2.67E-05 | 1.17E-04 | 2.34E-04 |
| PAHs (excluding naphthalene) | 3.57E-05 | 1.56E-04 | 3.12E-04 |
| Toluene | 2.36E-03 | 1.03E-02 | 2.07E-02 |
| Xylene | 1.76E-03 | 7.69E-03 | 1.54E-02 |
| **Total HAPs** | | | **0.06** |

# III. COMPLIANCE WITH APPLICABLE RULES AND REGULATIONS

The proposed changes to the project will constitute a minor modification to an existing major stationary source under District New Source Review regulations because net increases in all regulated pollutants, including GHGs, will be below regulatory thresholds.

Rule 2070 (Standards for Granting Applications) requires that an applicant demonstrate compliance with applicable SJVAPCD, state, and federal requirements before an Authority to Construct or Permit to Operate can be granted. Compliance with the federal and state requirements are discussed in details in Section 3.1.4 of the PTA to CEC. Compliance with SJVAPCD rules and regulations is discussed below and in more detail in the PTA.

- Rule 2201: New Source and Modified Stationary Source Review
- Rule 2410: Prevention of Significant Deterioration (PSD)
- Rule 3010/3020: Permit Fee/Permit Fee Schedules
- Rule 4101: Visible Emissions
- Rule 4102: Public Nuisance
- Rule 4201: Particulate Matter Emission Standards
- Rule 4301: Fuel Burning Equipment
- Rule 4320: Advanced Emission Reduction Options For Boilers, Steam Generators, And Process Heaters Greater Than 5.0 MMBtu/hr
- Rule 4801: Sulfur Compound Emissions
- Rule 8021: Fugitive $PM_{10}$ Prohibitions, Construction, Demolition, Excavation, Extraction and other Earthmoving Activities
- Risk Management Review Requirements for Air Toxics (Toxics New Source Review)

The SJVAPCD has been delegated responsibility for implementing local, state, and federal air quality regulations in the San Joaquin Valley Air Basin. The proposed project is subject to District regulations that apply to new stationary sources, to the prohibitory regulations that specify emission standards for individual equipment categories, and to the requirements for evaluation of impacts from non-criteria pollutants. The following sections include the evaluation of facility compliance with applicable District requirements.

## A. New Source and Modified Stationary Source Review

The SJVAPCD's New Source Review (NSR) rule (Regulation II, Rule 2201; New and Modified Stationary Source Review Rule) is applicable to the proposed project. There are three basic requirements within the NSR rules. First, Best Available Control Technology (BACT) and Lowest Achievable Emission Rate (LAER) requirements must be applied to any new emission unit with potential emissions above specified threshold quantities. Second, all potential emission increases of nonattainment pollutants or precursors from the proposed source that are above specified thresholds must be offset by real, quantifiable, surplus, permanent, and enforceable emission decreases in the form of emission reduction credits (ERCs). And third, an ambient air quality impact analysis must be conducted to confirm that the project does not cause or contribute to a violation of a national or California AAQS or jeopardize public health.

1. *Best Available Control Technology*

A comparison of potential emissions with the BACT thresholds in SJVAPCD Rule 2201 is presented in Table 10. This table shows that the new auxiliary boilers are required to use BACT for NOx, CO, VOC, $SO_2$, and $PM_{10}$. There will be no increases in daily emissions from gas turbines as a result of the change in the startup permit conditions, so the gas turbines are not required to undergo a BACT review.

**Table 1**
**Applicability of BACT Requirements Under NSR**

| Pollutant | BACT Threshold, lb/day | Unit Potential to Emit, lb/day | BACT Required? |
|---|---|---|---|
| **Auxiliary Boilers, each** | | | |
| NOx | 2.0 | 38.9 | yes |
| $SO_2$ | 2.0 | 4.6 | yes |
| CO | 2.0 | 728.3 | Yes[a] |
| VOC | 2.0 | 9.2 | yes |
| $PM_{10}$ | 2.0 | 15.4 | yes |

Notes:
a. CO emissions would also be exempt from BACT requirements if the potential to emit of the facility was below 200,000 CO lb/yr. However, as shown in Table 1, CO PTE for the existing facility is already over this threshold.

A detailed BACT analysis was conducted to evaluate available control options for the proposed auxiliary boilers; the analysis is presented in Appendix 3.1E of the PTA. A summary of the proposed BACT is provided in Table 11.

| Table 2<br>Summary of Proposed of BACT | | |
|---|---|---|
| **Pollutant** | **Control Technology** | **Concentration** |
| NOx | Low-NOx burners and SCR | 5 ppmvd @ 3% $O_2$ |
| $SO_2$ | Pipeline natural gas | n/a |
| CO | Good combustion practices | 50 ppmvd @ 3% $O_2$ |
| VOC | Good combustion practices | 10 ppmvd @ 3% $O_2$ |
| $PM_{10}$ | Pipeline natural gas | n/a |

2. *Emissions Offsets*

SJVAPCD Rule 2201 requires that projects with post-project stationary source PTE above specified thresholds provide emission offsets for net emissions increases from the project. Based on emissions data presented in Table 1, annual emissions of all pollutants from the existing facility will exceed the emissions offset threshold levels. According to Section 4 of Rule 2201, offsets need to be provided for all increases in stationary source emissions of NOx or VOC, calculated as the difference between post-project PTE and the baseline emissions of all new and modified emissions units, and multiplied by 1.5 to reflect the distance offset ratio of 1.5: 1 for offsets occurring at sources that are located more than 15 miles away from the project, unless and until the District demonstrates that all major sources are equipped with BACT.

Offset and mitigation requirements for the project are summarized in Table 12 below. As discussed in Section II.A, there will be no change in the Potential to Emit for the gas turbines. The ERCs to be provided for the emissions increase due to the new auxiliary boilers are shown in detail in Appendix 3.1F of the PTA.

| Table 3<br>Offset Requirements for the Proposed Project | | | | |
|---|---|---|---|---|
| **Pollutant** | **Facility Potential to Emit, lb/yr**[a] | **Rule 2201 Offset Thresholds, lb/yr** | **Emissions from Proposed Project, lb/yr**[b] | **Offsets Required?** |
| NOx | 344,853 | 20,000 | 28,396 | yes |
| $SO_2$ | 84,510 | 54,750 | 3,351 | yes |
| CO | 1,140,724 | 200,000 | 59,568 | no [c] |
| VOC | 227,682 | 20,000 | 6,680 | yes |
| $PM_{10}$ | 236,472 | 29,200 | 11,213 | yes |

Notes:
a. PTE for the existing facility.
b. PTE for new boilers only.
c. CO emissions are not required to be offset as long as the applicant demonstrates that CO emissions from the project will not cause or contribute to a violation of the applicable air quality standards. The required demonstration was made in Table 3.1-27.

### 3. *Air Quality Impact Analysis*

Under the SJVACPD new source review regulations, an air quality impact analysis must be performed to confirm that the emission increases for a project will not interfere with the attainment or maintenance of an applicable ambient air quality standard or cause additional violations of a standard anywhere the standard is already exceeded. The air quality impact analysis is presented in Section 3.1.2.5 of the PTA. The modeling results presented in Table 3.1-31 and Table 3.1-33 of the PTA show that the proposed project will not interfere with the attainment or maintenance of the applicable air quality standards or cause additional violations of any standards.

### 4. *Public Notification and Publication Requirements*

Public notice is required because the project triggers public notice requirements under Sections 5.4 and 5.9 of District Rule 2201. The project expects the District Air Pollution Control Officer will provide the required notice in a timely manner.

## B. Prevention of Significant Deterioration (PSD)

The PSD requirements apply, on a pollutant-specific basis, to any project that is a new major stationary source or a major modification to an existing major stationary source. A major source is a listed facility (one of 28 PSD source categories listed in the federal Clean Air Act) that emits at least 100 TPY, or any other facility that emits at least 250 TPY. Although the facility is an existing major PSD source for NOx, CO, VOC, and $PM_{10}/PM_{2.5}$, Table 3.1-30 of the PTA shows that the emissions of all PSD pollutants from the proposed project will be below the PSD significant emission thresholds, and PSD review will not be required.

## C. Permit Fee/Permit Fee Schedules

The District requirements regarding permit fees are specified in Regulation III. This regulation establishes the filing and permit review fees for specific types of new and modified sources, as well as annual renewal fees and penalty fees for existing sources. The project will pay the applicable fees in accordance with these requirements.

## D. Visible Emissions

Any visible emissions from the project will not be darker than No. 2 when compared to a Ringlemann Chart for any period(s) aggregating 3 minutes in any hour. Because the new auxiliary boilers will burn clean fuels, the opacity standard of not greater than 20 percent for a period or periods aggregating 3 minutes in any hour and the particulate emission concentrations limit of 0.15 grains per standard cubic feet of exhaust gas volume will not be exceeded.

## E. Public Nuisance

The auxiliary boilers will not emit significant quantities of odorous or visible substances; therefore, the project will continue to comply with this regulation.

## F. Particulate Matter Emission Standards

The maximum grain loading for the auxiliary boilers (from Table 3.1A-2, Appendix 3.1A of the PTA) is 0.005 gr/dscf, well below the 0.1 gr/dscf limit of the rule.

## G. Fuel Burning Equipment

Because the auxiliary boilers will use only natural gas fuel, they will comply with the $SO_2$, NOx, and combustion contaminant limitations of the rule.

## H. Advanced Emission Reduction Options for Boilers, Steam Generators, and Process Heaters Greater Than 5.0 MMBtu/hr

The auxiliary boiler will comply with the requirements of this rule by limiting NOx emissions to not more than 5 ppmvd. The applicant will submit a proposal for Continuous Emission Monitoring Systems for NOx and CO emissions to the District for approval.

## I. Sulfur Compound Emissions

Because the auxiliary boilers will use only natural gas fuel, PEF will comply with Rule 4801 limits.

## J. Fugitive $PM_{10}$ Prohibitions, Construction, Demolition, Excavation, Extraction and other Earthmoving Activities

This rule requires the use of specified measures to control fugitive dust emissions during construction activities, and the submittal of a Dust Control Plan (DCP) prior commencing construction. The new auxiliary boilers will be installed in an area that has already been graded and paved, so there is very little likelihood of fugitive dust from construction of the project. However, the project owner will submit the required DCP and has committed to use dust control measures during construction to minimize fugitive dust emissions

## K. Risk Management Review Requirements for Air Toxics

The SJVAPCD's Risk Management Policy for Permitting New and Modified Sources describes the requirements, procedures, and standards for evaluating the potential impact of toxic air contaminants (TAC) from new sources and modifications to existing sources. A screening health risk assessment demonstrating compliance with the policy is provided in Section 3.8 of the PTA. Detailed calculations are provided in Appendix 3.1G of the PTA.

## IV. PROPOSED PERMIT CHANGES

This section presents revisions to the facility permit proposed by this amendment application. The proposed revisions to the District's permit conditions are based on the changes summarized below.

- New auxiliary boilers: It is expected that the District will impose permit conditions limiting emissions and fuel use from the auxiliary boilers and requiring compliance with specific monitoring, recordkeeping and reporting requirements. Those conditions will then be included in the project's CEC license as new air quality conditions of certification.

- Simultaneous startup of all three combustion turbines: This change will be implemented by eliminating permit Condition 11 of S-3636-3-4, -4-4 and -5-4; and Special Condition X.G.2. of PSD SJ-99-03, as shown below.

  ~~11 . Only one of GTEs S-3636-1 , '2 or '3 shall be in startup at any one time.~~

  X.G.~~2. The Permittee shall not operate more than one turbine in start-up mode at any time.~~

# Appendix A

# SJVAPCD Application Forms

# San Joaquin Valley Air Pollution Control District

www.valleyair.org

## Permit Application For:

[ ] AUTHORITY TO CONSTRUCT (ATC) - New Emission Unit
[X] AUTHORITY TO CONSTRUCT (ATC) - Modification Of Emission Unit With Valid PTO/Valid ATC
[ ] AUTHORITY TO CONSTRUCT (ATC) - Renewal of Valid Authority to Construct
[ ] PERMIT TO OPERATE (PTO) - Existing Emission Unit Now Requiring a Permit to Operate

**1.** PERMIT TO BE ISSUED TO: Pastoria Energy Facility, LLC

**2.** MAILING ADDRESS:
STREET/P.O. BOX: PO Box 866
CITY: Lebec STATE: CA 9-DIGIT ZIP CODE: 93243-0866

**3.** LOCATION WHERE THE EQUIPMENT WILL BE OPERATED:
STREET: Tejon Ranch 30 mi S of Bakersfield, 6.5 mi E of Grapevine CITY: Rancho El Tejon
¼ SECTION 7 TOWNSHIP 10N RANGE 18W

WITHIN 1,000 FT OF A SCHOOL? [ ] YES [X] NO

**4.** GENERAL NATURE OF BUSINESS: Electric power generation

S.I.C. CODE(S) OF FACILITY (*If known*): 4911

**5.** TITLE V PERMIT HOLDERS ONLY: Do you request a COC (EPA Review) prior to receiving your ATC
[X] YES *If yes, please complete and attach a Compliance Certification form (TVFORM-009)?*
[ ] NO

**6.** DESCRIPTION OF EQUIPMENT OR MODIFICATION FOR WHICH APPLICATION IS MADE
(*Please include Permit #'s if known, a Supplemental Application Form if available, and use additional sheets if necessary*)

Install 2 new natural gas-fired auxiliary boilers; revise conditions for Permit Units S-3636-2, '-3 and '-4 to allow simultaneous startups; and improve the thermal efficiency of the second power block (Unit S-3636-4) by altering the combustion turbine using Advanced Gas Path (AGP) technology and installing GE's latest gas turbine control system software.

EQUIPMENT INSTALLATION or MODIFICATION DATE: ASAP

**7.** PERMIT REVIEW PERIOD: Do you request a three- or ten-day period to review the draft Authority to Construct permit? *Please note that requesting a review period will delay issuance of your final permit by a corresponding number of working days. See instructions for more information on this review process.*
[X] 3-day review
[ ] 10-day review
[ ] No review requested

**8.** HAVE YOU EVER APPLIED FOR AN ATC OR PTO IN THE PAST?
[X] YES *If yes, ATC/PTO #: S-3636-14*
[ ] NO

**9.** IS THIS APPLICATION FOR THE CONSTRUCTION OF A NEW FACILITY?
[ ] YES *If "Yes", please complete the CEQA Information form.*
[X] NO *If "No", is the proposed equipment or project allowed:*
*- by the current Conditional Use Permit or other Land Use Permit?* [ ] YES [ ] NO
*- or by Right?* [ ] YES [ ] NO

**10.** IS THIS APPLICATION SUBMITTED AS THE RESULT OF EITHER A NOTICE OF VIOLATION OR A NOTICE TO COMPLY?
[ ] YES *If yes, NOV/NTC #:*
[X] NO

### Optional Section

**11.** DO YOU WANT TO RECEIVE INFORMATION ABOUT EITHER OF THE FOLLOWING VOLUNTARY PROGRAMS?
[ ] "HEALTHY AIR LIVING (HAL) BUSINESS PARTNER"
[ ] "INSPECT"

**12.** TYPE OR PRINT NAME OF APPLICANT: Michael Rinehart

TITLE OF APPLICANT: Plant Manager

**13.** SIGNATURE OF APPLICANT: MR

DATE: 2/18/16

PHONE #: (661) 282-4404
CELL PHONE #:
FAX #: (661) 978-1858
E-MAIL: mrinehart@calpine.com

FOR APCD USE ONLY:

| DATE STAMP: | FILING FEE RECEIVED: $ | CHECK #: |
|---|---|---|
| | DATE PAID: | |
| | PROJECT #: | FACILITY ID: |

**San Joaquin Valley Air Pollution Control District**
**Supplemental Application Form**

HEALTHY AIR LIVING

# Boilers, Steam Generators, Dryers, and Process Heaters

Please complete one form for each different piece of equipment. For streamlining, make note if one form covers identical equipment.

***This form must be accompanied by a completed Application for Authority to Construct and Permit to Operate form***

| |
|---|
| PERMIT TO BE ISSUED TO: Pastoria Energy Facility |
| LOCATION WHERE THE EQUIPMENT WILL BE OPERATED: El Tejon Historical Land Grant (Sec 7, T10N, R18W) |

## EQUIPMENT DESCRIPTION

| | | |
|---|---|---|
| **Equipment Details** | ☒ Boiler ☐ Steam Generator ☐ Dryer ☐ Process Heater ☐ Other: ______ | |
| | Number of Identical Units This Application Covers (if applicable): 2 | |
| | Check all that apply: ☐ Oilfield Steam Generator ☐ Refinery Unit ☐ Wastewater Treatment Facility ☐ Fired on < 50%, by volume, PUC quality gas | |
| | Manufacturer: Rentech (or equivalent) | |
| | Model: D-type | Serial Number: |
| | ☐ Indirect-Fired ☒ Direct-Fired | |
| | Flue Gas Recirculation: ☐ Forced FGR ☒ Induced FGR ☐ None | |
| | Is an $O_2$ Controller present? ☒ No ☐ Yes, Manufacturer: | |
| **Rule 4320 Type of Use and Emissions Monitoring Provisions** | ☒ Full Time<br>☐ Low Use - for units installed prior to January 1, 2009 and limited to less than 1.8 billion Btu/year, must have fuel use meter<br>☐ Tune the unit at least twice per calendar year in accordance with District Rule 4304<br>☐ Operate the unit in a manner that maintains exhaust $O_2$ concentration ≤ 3.00% by volume on a dry basis<br>☐ Pay Annual Fee - in leiu of complying with $NO_x$ and CO emission limits of the Rule, pay annual fee per §5.1.2 | |
| | Note: Low Use units must identify operational characteristics recommended by the manufacturer, which can be monitored on a monthly basis (please provide details in additional documentation). | |
| | Note: Full Time units must have either a Continuous Emission Monitoring System (CEMS) or one of the following alternate emissions monitoring plans<br>☒ CEMS, please specify all pollutants monitored: ☒ $NO_x$ ☒ CO ☒ $O_2$ ☐ Other: ______<br>☐ Monitoring of $NO_x$, CO, and $O_2$ concentrations<br>☐ Periodic determination of flue gas recirculation rate by temperature measurement<br>☐ Periodic determination of flue gas recirculation rate by $O_2$ measurement<br>☐ Monitoring of burner mechanical adjustments and $O_2$ concentration<br>☐ Monitoring of the flue gas recirculation valve(s) setting<br>☐ Other Alternate Monitoring Plan (approved on a case by case basis), attach details | |
| | Note: See District policy (SSP-1105) for additional details of pre-approved alternate emissions monitoring plans, at: http://www.valleyair.org/policies_per/Policies/SSP 1105.pdf | |
| **Fuel Use Meter** | ☒ Gaseous Fuel Meter ☐ Liquid Fuel Meter ☐ None | |
| **Primary Burner** | Manufacturer: TBD | Type: ☐ Standard ☒ Low $NO_x$ ☐ Ultra Low $NO_x$ |
| | Model: | Serial Number: |
| | Maximum Heat Input Rating: 91.38 MMBtu/hr | Annual Heat Input: 800,646 billion Btu/year |
| **Secondary Burner** (if more than one burner is present) | Manufacturer: N/A | Type: ☐ Standard ☐ Low $NO_x$ ☐ Ultra Low $NO_x$ |
| | Model: | Serial Number: |
| | Maximum Heat Input Rating: ______ MMBtu/hr | Annual Heat Input: ______ billion Btu/year |

## EMISSIONS DATA

Note: See District BACT and District Rule 4320 requirements for applicability to proposed unit at http://www.valleyair.org/busind/pto/bact/chapter1.pdf, and http://www.valleyair.org/rules/currntrules/r4320.pdf.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Primary Fuel** | Fuel Type: ☒ Natural Gas ☐ LPG/Propane ☐ Diesel ☐ Other: ______ | | | | | | |
| | Higher Heating Value: ______ Btu/gal or 1025 Btu/scf | | | Sulfur Content: ______ % by weight or ≤ 0.75 gr/100 scf | | | |
| **Primary Fuel Emissions Data** | Operational Mode | Steady State (ppmv) | Steady State (lb/MMBtu) | Start-up (ppmv) | Start-up (lb/hr) | Shutdown (ppmv) | Shutdown (lb/hr) |
| | Nitrogen Oxides | 5.0 | 0.006 | 83 | 9.1 | 83 | 9.1 |
| | Carbon Monoxide | 50 | 0.036 | 50 | 3.3 | 50 | 3.3 |
| | Volatile Organic Compounds | 10 | 0.004 | 10 | 0.38 | 10 | 0.38 |
| | Duration (please provide justification) | | | 3 hr/day | 1095 hr/yr | < 1 hr/day | <365 hr/yr |
| | % $O_2$, dry basis, if corrected to other than 3%: ______ % | | | | | | |
| **Secondary Fuel** | Fuel Type: ☐ Natural Gas ☐ LPG/Propane ☐ Diesel ☐ Other: ______ | | | | | | |
| | Higher Heating Value: ______ Btu/gal or ______ Btu/scf | | | Sulfur Content: ______ % by weight or ______ gr/scf | | | |
| | How will the secondary fuel be used? ☐ Secondary full-time fuel ☐ Backup for primary fuel ☐ Other: ______ | | | | | | |
| **Secondary Fuel Emissions Data** | Operational Mode | Steady State (ppmv) | Steady State (lb/MMBtu) | Start-up (ppmv) | Start-up (lb/hr) | Shutdown (ppmv) | Shutdown (lb/hr) |
| | Nitrogen Oxides | | | | | | |
| | Carbon Monoxide | | | | | | |
| | Volatile Organic Compounds | | | | | | |
| | Duration (please provide justification) | | | ____ hr/day | ____ hr/yr | ____ hr/day | ____ hr/yr |
| | % $O_2$, dry basis, if corrected to other than 3%: ______ % | | | | | | |
| **Source of Data** | ☒ Manufacturer's Specifications ☐ Emission Source Test ☐ Other ______ (please provide copies) | | | | | | |
| **Additional Emissions Control Equipment** | ☒ Selective Catalytic Reduction - Manufacturer: TBD Model: ______<br>☒ Ammonia ($NH_3$) ☐ Urea ☐ Other: ______ | | | | | | |
| | ☐ Non-Selective Catalytic Reduction - Manufacturer: ______ Model: ______<br>Control Efficiencies: $NO_x$ ______ %, $SO_x$ ______ %, $PM_{10}$ ______ %, CO ______ %, VOC ______ % | | | | | | |
| | ☐ Other (please specify): | | | | | | |

## HEALTH RISK ASSESSMENT DATA

Note: See Manufacturer's Specifications for Stack Parameters and Exhaust Data. All information is required.

| | | | |
|---|---|---|---|
| **Operating Hours** | Maximum Operating Schedule: 24 hours per day, and 8760 hours per year | | |
| **Receptor Data** | Distance to nearest Residence | 27,600 feet | Distance is measured from the proposed stack location to the nearest boundary of the nearest apartment, house, dormitory, etc. |
| | Direction to nearest Residence | NNE | Direction from the stack to the receptor, i.e. Northeast or South. |
| | Distance to nearest Business | 2000 feet | Distance is measured from the proposed stack location to the nearest boundary of the nearest office building, factory, store, etc. |
| | Direction to nearest Business | SE | Direction from the stack to the receptor, i.e. North or Southwest. |
| **Stack Parameters** | Release Height | 50 feet above grade | |
| | Stack Diameter | 38 inches at point of release | |
| | Rain Cap | ☐ Flapper-type ☐ Fixed-type ☒ None ☐ Other: ______ | |
| | Direction of Flow | ☒ Vertically Upward ☐ Horizontal ☐ Other: ____ ° from vert. or ____ ° from horiz. | |
| **Exhaust Data** | Flowrate: 28,453 acfm | Temperature: 300 °F | |
| **Facility Location** | ☐ Urban (area of dense population) ☒ Rural (area of sparse population) | | |
| | Include a facility plot plan showing the location of the stack. Please indicate North on the plot plan. For public notice projects, indicate on plot plan the facility boundaries or fence line and distance(s) from stack to boundaries. | | |

# San Joaquin Valley Air Pollution Control District

www.valleyair.org

HEALTHY AIR LIVING

## Permit Application For:

[ ] ADMINISTRATIVE AMENDMENT [ ] MINOR MODIFICATION [X] SIGNIFICANT MODIFICATION

1. PERMIT TO BE ISSUED TO: **Pastoria Energy Facility**

2. MAILING ADDRESS:

STREET/P.O. BOX: **P. O. Box 866**

CITY: **Lebec** STATE: **CA** 9-DIGIT ZIP CODE: **93243-0866**

3. LOCATION WHERE THE EQUIPMENT WILL BE OPERATED:

STREET: **Tejon Ranch 30 mi S of Bakersfield, 6.5 mi E of Grapevine** CITY: **Rancho El Tejon**

___ ¼ SECTION **7** TOWNSHIP **10N** RANGE **18W**

INSTALLATION DATE: ASAP

4. GENERAL NATURE OF BUSINESS:

5. DESCRIPTION OF EQUIPMENT OR MODIFICATION FOR WHICH APPLICATION IS MADE
(include Permit #'s if known, and use additional sheets if necessary)

Install 2 new natural gas-fired auxiliary boilers; revise conditions for Permit Units S-3636-2, '-3 and '-4 to allow simultaneous startups; and improve the thermal efficiency of the second power block (Unit S-3636-4) by altering the combustion turbine using Advanced Gas Path (AGP) technology and installing GE's latest gas turbine control system software.

6. TYPE OR PRINT NAME OF APPLICANT: Michael Rinehart

TITLE OF APPLICANT: Plant Manager

7. SIGNATURE OF APPLICANT: MR

DATE: 2/18/16

PHONE: (661) 282-4404
FAX: (661) 978-1858
EMAIL: mrinehart@calpine.com

***For APCD Use Only:***

| DATE STAMP | FILING FEE RECEIVED: $ | CHECK#: |
|---|---|---|
| | DATE PAID: | |
| | PROJECT NO: | FACILITY ID: |

# 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
☐ MINOR PERMIT MODIFICATION
☐ ADMINISTRATIVE AMENDMENT

| | |
|---|---|
| COMPANY NAME: Pastoria Energy Facility, LLC | FACILITY ID: S - 3636 |
| 1. Type of Organization ☑ Corporation ☐ Sole Ownership ☐ Government ☐ Partnership ☐ Utility | |
| 2. Owner's Name: Calpine Corporation | |
| 3. Agent to the Owner: | |

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

(e) 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:

MR — 2/18/16

Signature of Responsible Official — Date

Michael Rinehart

Name of Responsible Official (please print)

Plant Manager

Title of Responsible Official (please print)

# Appendix B

**Petition to Amend (PTA), Amendment No. 11,**
**Pastoria Energy Facility (99-AFC-7C)**
**submitted to California Energy Commission (CEC)**
**February 2016**

CH2M
2485 Natomas Park
Suite 600
Sacramento, CA 95834
916.920.0300
www.ch2m.com

February 23, 2016

Ms. Mary Dyas
Compliance Project Manager
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814

**Subject: Pastoria Energy Facility (99-AFC-07C)**
**Petition to Amend No. 11**

Dear Ms. Dyas:

Pastoria Energy Facility, L.L.C., a wholly owned subsidiary of Calpine Corporation, petitions the California Energy Commission to modify the certification of the Pastoria Energy Facility (99-AFC-7C), as amended. This Petition to Amend requests authorization to install two new natural gas-fired auxiliary boilers, amend operating conditions to allow for simultaneous startup of the three existing GE Energy 7FA gas turbines, and other technological changes to improve efficiency and performance.

Please do not hesitate to contact Barbara McBride (925) 570-0849 or me at (916) 286-0278 if you have any questions regarding this matter. Thank you very much.

Sincerely,

CH2M HILL Engineers, Inc.

Douglas M. Davy, Ph.D.
Project Manager

c: Barbara McBride/Calpine

*Petition to Amend*

# Amendment No. 11

## CEC License for the

# Pastoria Energy Facility

**Lebec, California**

**(99-AFC-7C)**

Submitted to:

**California Energy Commission**

Submitted by:

**Calpine Corporation**

With12Technical Assistance from:

February 2016

# Contents

## Appendixes



## Tables

**Figures**

# Acronyms and Abbreviations

| | |
|---|---|
| AAQS | Ambient Air Quality Standards |
| ACC | air-cooled condenser |
| acfm | actual cubic feet per minute |
| ADT | average daily trip |
| AFC | Application for Certification |
| AGP | Advanced Gas Path |
| ANSI/ASME | American National Standards Institute/American Society for Mechanical Engineers |
| APLIC | Avian Power Line Interaction Committee |
| ARM | ambient ratio method |
| ASOS | Automated Surface Observational Site |
| BAAQMD | Bay Area Air Quality Management District |
| BACT | Best Available Control Technology |
| BMP | best management practice |
| CAA | Clean Air Act |
| CAAQS | California Ambient Air Quality Standards |
| CAISO | California Independent System Operator |
| CalARP | California Accidental Release Program |
| CAPCOA | California Air Pollution Control Officer's Association |
| CARB | California Air Resources Board |
| CASAC | Clean Air Scientific Advisory Committee |
| CCAR | California Climate Action Registry |
| CCR | California Code of Regulations |
| CDFW | California Department of Fish and Wildlife |
| CEC | California Energy Commission |
| CEDD | California Employment Development Department |
| CEIDARS | California Emission Inventory Development and Reporting System |
| CEMS | Continuous Emissions Monitoring System |
| CEQA | California Environmental Quality Act |
| CFR | Code of Federal Regulations |
| CGP | Construction General Permit |
| CHRIS | California Historical Resources Information System |
| CHSC | California Health and Safety Code |
| CNDDB | California Natural Diversity Data Base |
| CNPS | California Native Plant Society |
| CO | carbon monoxide |
| $CO_2e$ | carbon dioxide equivalent |
| CT | combustion turbine generator |
| DTSC | Department of Toxic Substances Control |
| ECP | Erosion Control Plan |

| | |
|---|---|
| EMF | electro-magnetic field |
| FGR | Flue Gas Recirculation |
| GCPs | Good Combustion Practices |
| GE | General Electric |
| GHG | greenhouse gas |
| HAP | hazardous air pollutant |
| HARP | Hotspots Analysis and Reporting Program |
| HHV | higher heating value |
| HRA | Health Risk Assessment |
| HRSG | heat recovery steam generator |
| KOP | key observation point |
| kV | kilovolt |
| LAER | Lowest Achievable Emission Rate |
| LNB | Low $NO_x$ Burner |
| LORS | laws, ordinances, regulations, and standards |
| LOS | levels of service |
| MCR | maximum continuous rating |
| MEIR | Maximally Exposed Individual Receptor |
| MEIW | Maximally Exposed Individual Worker |
| MICR | Maximum Incremental Cancer Risk |
| MMBtu/hr | million Btu per hour |
| MSA | Metropolitan Statistical Area |
| MUTCD | Manual of Uniform Traffic Control Devices |
| NAAQS | National Ambient Air Quality Standards |
| NAHC | Native American Heritage Commission |
| NCCP/HCP | Natural Community Conservation Plan/Habitat Conservation Plan |
| NED | National Elevation Database |
| NEIC | Northeastern Information Center |
| NFPA | National Fire Prevention Association |
| NHRP | National Register of Historic Places |
| NRCS | Natural Resources Conservation Service |
| NSR | New Source Review |
| OEHHA | Office of Environmental Health Hazard Assessment |
| PAH | Polycyclic Aromatic Hydrocarbons |
| PCE | passenger car equivalent |
| Petition | Petition to Amend |
| PM2.5 | particulate matter less than 2.5 microns in equivalent diameter |
| PM10 | particulate matter less than 10 microns in equivalent diameter |
| PMI | point of maximum impacts |
| PSD | Prevention of Significant Deterioration |
| PTE | Potential to Emit |
| PTO | Permit to Operate |

| | |
|---|---|
| PWL | MW-to-sound power level |
| REL | Reference Exposure Level |
| ROG | reactive organic gas |
| RCRA | Resource Conservation and Recovery Act of 1976 |
| RMP | Risk Management Plan |
| SCR | selective catalytic reduction |
| PEF | Pastoria Energy Facility |
| SER | Significant Emissions Rate |
| SIL | Significant Impact Level |
| SR | state route |
| STG | steam turbine generator |
| SWPPP | Stormwater Pollution Prevention Plan |
| SJVAPCD | San Joaquin Valley Air Pollution Control District |
| T-BACT | Toxics Best Available Control Technology |
| TCP | Traffic Control Plan |
| Tpy | tons per year |
| TSDF | treatment, storage, and disposal facility |
| TSP | total suspended particulates |
| UCMP | University of California Museum of Paleontology |
| USACE | U.S. Army Corps of Engineers |
| USEPA | U.S. Environmental Protection Agency |
| USFWS | U.S. Fish and Wildlife Service |
| USGS | U.S. Geological Survey |
| UTM | Universal Transverse Mercator |
| VOC | volatile organic compounds |
| WMP | Waste Management Plan |

# Executive Summary

Pastoria Energy Facility, L.L.C. (project owner), a wholly owned subsidiary of Calpine Corporation, petitions the California Energy Commission (CEC) to modify the certification of the Pastoria Energy Facility (project or PEF) (99-AFC-7C), as amended. This Petition to Amend (Petition) requests authorization to make the following modifications to the project:

- Installation of two new natural gas-fired auxiliary boilers to provide steam to the heat recovery steam generators (HRSGs) and other systems to improve operating performance;
- Amendment of the CEC license and air permit operating conditions to allow for simultaneous startup of the three existing GE Energy 7FA gas turbines; and
- Alteration of the combustion turbine using Advanced Gas Path (AGP) technology and installing General Electric's (GE's) latest gas turbine control system software to improve thermal efficiency of the second power block (Unit 4).

The project owner is also proposing other technological changes that do not impact air quality and do not require changes to any condition of certification.

The purpose of these modifications is to improve operating performance and efficiency of the project, while reducing overall air emissions and maintaining the current environmental and safety standards.

SECTION 1.0

# Introduction

## 1.1 Existing Facility Overview

Pastoria Energy Facility (PEF) is located in southeastern Kern County near the unincorporated communities of Grapevine and Lebec about 30 miles south of Bakersfield. Refer to Figure 1-1 for a regional overview. The existing facility is a 750 MW (nominal) combined-cycle natural gas-fired power plant sited on a 31-acre parcel owned by Tejon Ranch Company. Associated facilities include a 1.38-mile, 230 kilovolt (kV) electric overhead transmission line that interconnects to Southern California Edison's Pastoria Substation; an 11.65-mile natural gas fuel supply line that connects with the Kern-Mojave Pipeline; and a 0.15-mile water supply pipeline that connects to the Wheeler-Ridge-Maricopa Water Storage District's pipeline network. Access to the facility is via a 0.85-mile road that connect with Edmonston Pump Plant Road. The project site is relatively flat, with a gentle slope running from the southeast to the northwest, and the site elevation is approximately 1,070 feet. Figure 1-2 shows the location of all plant components, and Figure 1-3 shows the location of the proposed plant modifications.

The AFC for this project was filed in November 1999 (Pastoria Energy Facility, L.L.C., 1999) and received CEC certification on December 21, 2000 (CEC, 2000). The existing project consists of two power blocks:

- **Power Block 1 (Units 1 and 2):** Two nominal 168 megawatt (MW) combustion turbines (CTs), two heat-recovery steam generators (HRSGs), and a 185 MW steam turbine (2-by-1 configuration)
- **Power Block 2 (Unit 4):** One nominal 168 MW CT, one HRSG, and one 90 MW steam turbine (1-by-1 configuration)

## 1.2 Overview of Proposed Modifications

This Petition requests authorization to make the following equipment and operational modifications to the project:

- Installation of two new natural gas-fired auxiliary boilers to provide steam to the HRSGs and other systems to improve operating performance;
- Amendment of the CEC license and air permit operation conditions to allow for simultaneous startup of the three existing GE Energy 7FA gas turbines; and
- Alteration of the combustion turbine using AGP technology and installing GE Energy's (GE's) latest gas turbine control system software to improve thermal efficiency of the second power block (Unit 4).

### 1.2.1 Equipment Modifications

The project owner plans to install two auxiliary boilers, each providing up to 75,000 pounds of steam per hour to the plant HRSGs using about 91.38 MMBtu per hour of natural gas (at a heating value of 23,235 Btu/lb, for a fuel flow of 4185 lb/hr).

The purpose of these proposed modifications is to install and operate the auxiliary boilers for more flexible operation while maintaining safety and environmental conditions. This request to amend the existing CEC License (99-AFC-7C) is also a request to allow for simultaneous startup of the three existing GE 7FA gas turbines to improve operations and dispatch to alter the AGP system to improve the thermal efficiency of the second power block (Unit 4). A request is also being made to the SJVAPCD to modify the facility air permit to accommodate these same modifications.

**Auxiliary Boilers**. The addition of two natural-gas-fired auxiliary boilers will allow the plant to keep certain operating systems sufficiently warm in order to reduce startup times. The auxiliary boilers will provide steam during plant start-up to allow quicker starts. During pre-start activities and during the initial phases of start-up, steam for sealing, warming the steam turbine (optional), heating/re-heating condensate (condenser sparging steam), and combustion turbine fuel gas heating will be supplied from the new auxiliary boilers. As shown on Figure 2-1, the boilers will be installed within the existing fenceline between existing GE 7FA gas turbine Units 1 and 4, north of the main electrical equipment building. This area has been previously disturbed and is covered with gravel and paving as it was anticipated to accommodate future equipment under the original CEC certification (99-AFC-7). The boilers will be installed on existing equipment pads, requiring no excavation, and therefore will not change stormwater drainage patterns. Figure 2-2 depicts an example of an installed boiler system. Each boiler is 53 feet long by 28 feet wide and 13 feet tall, and includes a 60 foot tall exhaust stack. In comparison, the existing facilities exhaust through 150-foot-tall stacks, so the new 60-foot-tall boiler exhaust stacks are much shorter than the existing gas turbine exhaust stacks. Makeup water for the boilers will come from the existing project water supply and treatment system.

**Simultaneous Start.** The Conditions of Certification for the PEF currently prohibit the operation of more than one gas turbine in startup mode at a time. This operating restriction results in more gas turbine operating hours than are necessary to meet dispatch requirements.

### 1.2.2 Gas Turbine Upgrades

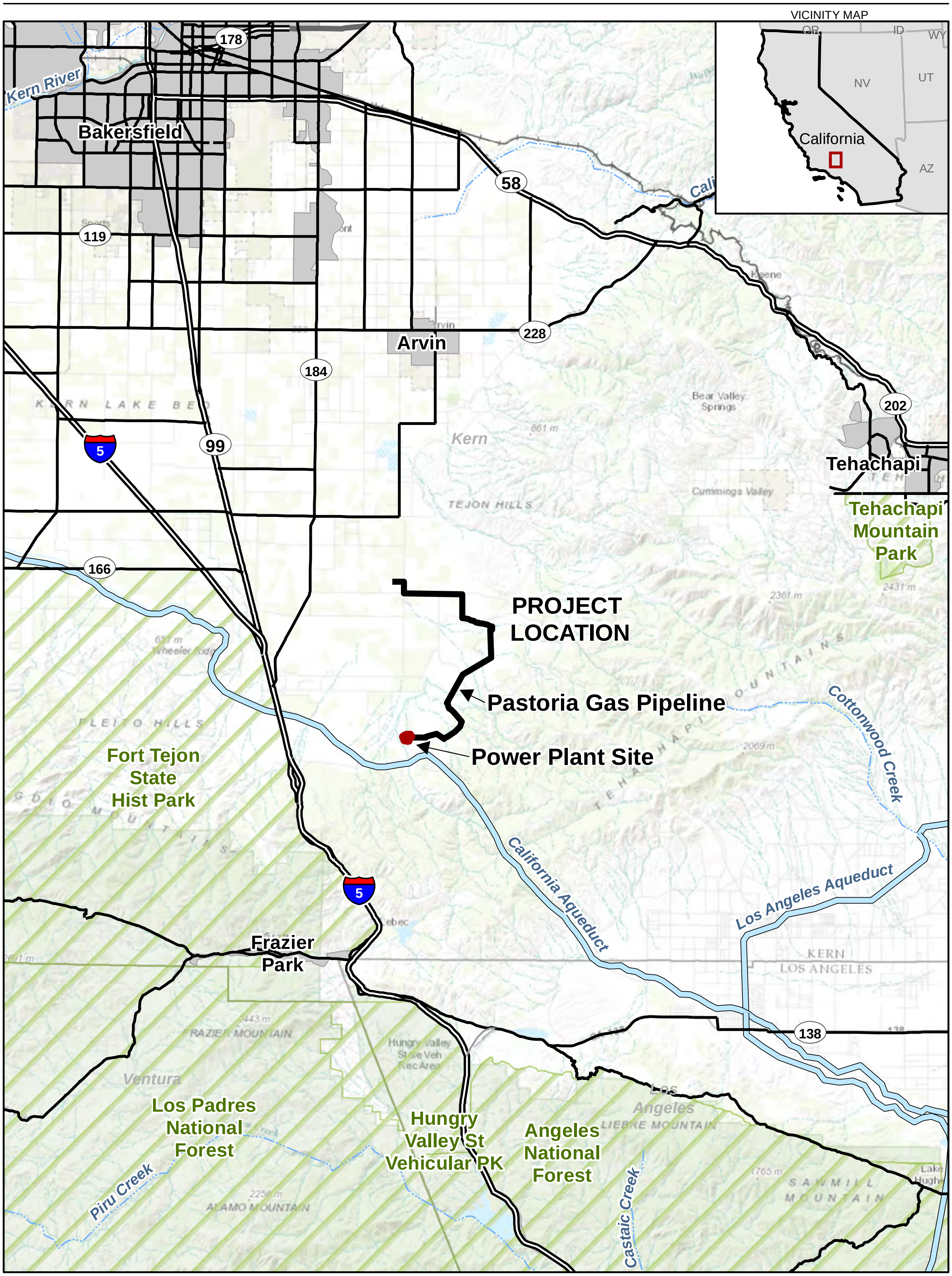
Two gas turbine upgrades are proposed to improve the efficiency of Unit 4. The proposed Advanced Gas Path (AGP) upgrade will allow Calpine to replace the hot gas path components, such as turbine blades, nozzles, and associated structural elements, with parts that are designed to operate at slightly higher firing temperatures. These components will be functionally identical to the existing equipment except that they will be made from advanced materials that can withstand higher temperatures. This upgrade, which was implemented on Units 1 and 2 in 2012, is designed to improve turbine fuel efficiency (heat rate) and will increase the output of Unit 4 by up to 5 percent. The .04 software upgrade will also increase the thermal efficiency of Unit 4.

## 1.3 Information Requirements for the Post-Certification Amendment

This Petition contains all of the information that is required pursuant to the CEC's Siting Regulations (California Code of Regulations [CCR] Title 20, Section 1769, Post Certification Amendments and Changes). The information necessary to fulfill the requirements of Section 1769 is contained in Sections 1.0 through 6.0, as summarized in Table 1-1.

## 1.4 Licensing History

On November 30, 1999, the project owner filed an AFC with the CEC to construct and operate a 750 MW power facility at the Pastoria site (99-AFC-7). The facility CEC license was approved on December 20, 2000. Construction of the 750 MW PEF began in May 2001 and commercial operations started in summer 2005. In February 2001, the project owner filed an AFC to construct and operate an additional 250 MW unit at the project site. This AFC process was suspended in January 2002. In April 2005, project owner filed another AFC to construct and operate an additional 160 MW within the existing 31 acre project site. This CEC license was approved in December 2006 and subsequently expired.




LEGEND

Pastoria Gas Pipeline

0 3 6

Miles

N

**Figure 1-1**
**Regional Overview**
Pastoria Energy Facility
*Lebec, California*

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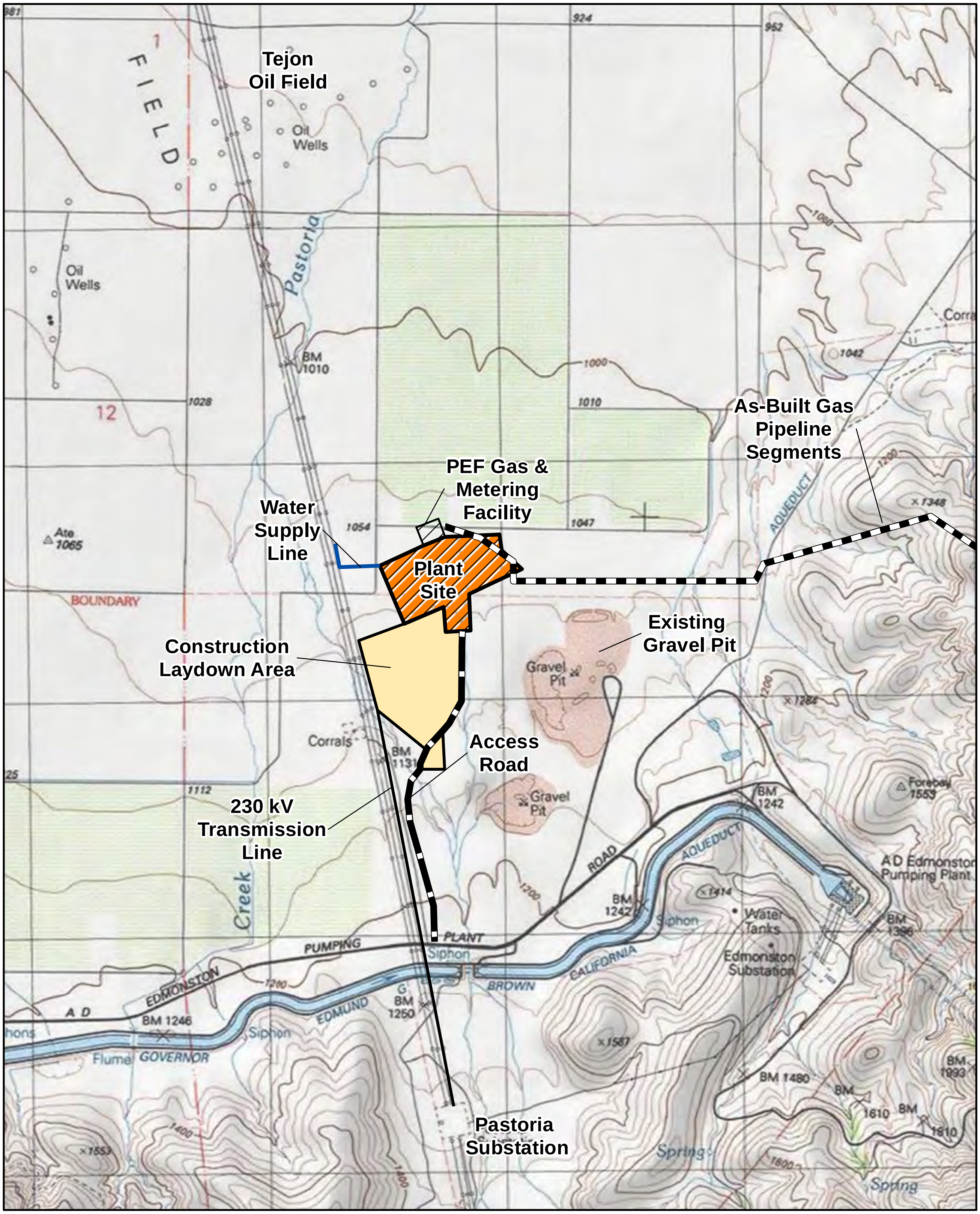


LEGEND

- 230 kV Transmission Line
- Access Road
- As-Built Gas Pipeline Segments
- Water Supply Line
- Plant Site
- Construction Laydown Area
- PEF Gas & Metering Facility

0 1,000 2,000
Feet

N

**Figure 1-2**
**Project Features**
Pastoria Energy Facility
*Lebec, California*

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Aerial Photo Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community (NAIP 2014)

LEGEND

Calpine Pastoria Energy Facility

Auxiliary Boilers

N

0 100 200

Feet

**FIGURE 1-3**
**Site Modifications**
Calpine Pastoria Energy Facility
*Lebec, California*

SAC \\SACFPP02\SACGIS\PROJ\CALPINE\PASTORIA\MAPFILES\FIGURE1-3_PLANTSITEMODIFICATIONS.MXD SSCOPES 8/17/2015 10:09:36 AM

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**TABLE 1.0-1**
Informational Requirements for Post-Certification Modifications

| Section 1769 Requirement | Section of Petition Fulfilling Requirement |
|---|---|
| (A) A complete description of the proposed modifications, including new language for any conditions that will be affected. | Section 2.0—Proposed modifications<br>Sections 3.1 to 3.15—Proposed changes to Conditions of Certification, if necessary, are located at the end of the technical section. |
| (B) A discussion of the necessity for the proposed modifications. | Section 1.2 |
| (C) If the modification is based on information that was known by the petitioner during the certification proceeding, an explanation why the issue was not raised at that time. | Section 1.5 |
| (D) If the modification is based on new information that changes or undermines the assumptions, rationale, findings, or other bases of the final decision, an explanation of why the change should be permitted. | Sections 1.5, 1.6, 3.0 |
| (E) An analysis of the impacts the modification may have on the environment and proposed measures to mitigate any significant adverse impacts. | Section 3.0 |
| (F) A discussion of the impact of the modification on the facility's ability to comply with applicable laws, ordinances, regulations, and standards. | Section 3.15 |
| (G) A discussion of how the modification affects the public. | Section 4.0 |
| (H) A list of property owners potentially affected by the modification. | Section 5.0 |
| (I) A discussion of the potential effect on nearby property owners, the public and the parties in the application proceedings. | Section 6.0 |

# 1.5 Necessity of Proposed Changes

The Siting Regulations require a discussion of the necessity for the proposed revision and whether the modification is based on information known by the petitioner during the certification proceeding (Title 20, CCR, Sections 1769 [a][1][B] and [C]). This Petition to Amend requests approval to implement equipment modifications and to add auxiliary boilers that will allow the facility to operate more efficiently. The technology for this operating flexibility was not commercially available during the CEC proceedings for 99-AFC-7.

# 1.6 Consistency of Changes with Certification

The Siting Regulations also require a discussion of the consistency of the proposed revision with applicable laws, ordinances, regulations, and standards (LORS) and whether the modifications are based on new information that changes or undermines the assumptions, rationale, findings, or other basis of the CEC Final Commission Decision (Commission (Title 20, CCR Section 1769 [a][1][D]). If the project is no longer consistent with the certification, the Petition must provide an explanation why the modification should be permitted.

The installation of the auxiliary boilers and the other proposed modifications are consistent with the purpose of the project and applicable LORS as described in the Final Decision (99-AFC-7C), as amended. This Petition is not based on new information that changes or undermines any basis supporting the Final Decision. The purpose of these modifications is to improve operating performance, resulting in more efficient generation of electricity while maintaining safety and environmental conditions. The requested modifications to the existing CEC License (99-AFC-7C) would also allow for simultaneous startup of the three existing GE 7FA gas turbines to improve operations and dispatch, and alteration of the AGP system to improve the thermal efficiency of the second power block (Unit 4). An application is also being filed with the SJVAPCD to implement the proposed modifications.

The addition of two natural-gas-fired auxiliary boilers will allow the plant to keep certain operating systems sufficiently warm in order to reduce startup times. The auxiliary steam boilers will provide steam during plant startup and shutdown to allow startups and shutdowns of existing gas turbine units 1, 2, and 4 to be accomplished more quickly. During pre-start activities and during the initial phases of start-up, steam for sealing, warming the steam turbines (optional), heating/re-heating condensate (condenser sparging steam), and heating the combustion turbine fuel gas will be supplied from the new auxiliary boilers. As shown on Figure 2-1, the boilers will be installed within the existing fenceline between two of the existing GE 7FA turbines (Unit 4 and Unit 1) and adjacent to the main electrical equipment building. This area has been previously disturbed and is covered with gravel and paving as it was anticipated to accommodate future equipment under the original CEC certification (99-AFC-7). The boilers will be installed on existing equipment pads, requiring no excavation, and therefore will not change stormwater drainage patterns. Figure 2-2 depicts an installed boiler system. Each boiler is 53 feet long by 28 feet wide and 13 feet tall and includes a 60-foot-tall stack. In comparison, the existing facilities use 150-foot-tall stacks as compared to the 60-foot-tall stack required for the new boilers. Makeup water for the boilers is minimal compared with plant-wide water use and can be accommodated by the existing project water supply and treatment system.

# 1.7 Summary of Environmental Impacts

The CEC Siting Regulations require that an analysis be conducted to address the potential impacts the proposed modifications may have on the environment, and proposed measures to mitigate any potentially significant adverse impacts (Title 20, CCR, Section 1769 [a][1][E]). The regulations also require a discussion of the impact of the modification on the facility's ability to comply with applicable LORS (Section 1769 [1][a][F]). Section 3.0 of this Petition includes a discussion of the potential environmental impacts associated with the modifications, as well as a discussion of the consistency of the modification with LORS. Section 3.0 also includes updated environmental baseline information if changes have occurred since the project was licensed that would have a bearing on the environmental analysis of the Petition. Section 3.0 of this Petition concludes that there will be no significant environmental impacts associated with installation of the auxiliary boilers and the other proposed modifications and that the project as modified will comply with all applicable LORS.

# 1.8 Conditions of Certification

This Petition requests modification of the air quality Conditions of Certification (COCs) to address changes in air emissions and operating conditions. The proposed COC amendments are provided in Section 3.1 of this Petition.

# 1.9 References

California Energy Commission (CEC). 2000. *Energy Commission Decision, Application for Certification for the Pastoria Energy Facility, Docket Number 99-AFC-7*. California Energy Commission, Sacramento, California. December.

California Energy Commission (CEC). 2006. *Energy Commission Decision, Application for Certification for the Pastoria Energy Facility Expansion Project, Docket Number 05-AFC-1*. California Energy Commission, Sacramento, California. December.

Pastoria Energy Facility, L.L.C. 1999. *Application for Certification for the Pastoria Energy Facility*. Submitted to California Energy Commission, Sacramento, California. November.

Pastoria Energy Facility, L.L.C. 2005. *Application for Certification for the Pastoria Energy Facility Expansion Project*. Submitted to California Energy Commission, Sacramento, California. April.

SECTION 2.0

# Description of Project Modifications

Consistent with CEC Siting Regulations (Title 20, CCR, Section 1769 [a][1][A]), this section includes a description of the proposed project modifications.

## 2.1 Equipment Modifications

The proposed equipment modifications are described below. The location of the equipment modifications is shown in Figure 2-1, General Arrangement. These modifications will be made on site, within the existing project fenceline.

### 2.1.1 Auxiliary Boiler

Addition of two natural-gas-fired auxiliary boilers will allow the plant to keep certain operating systems sufficiently warm to reduce startup times. A conceptual drawing of the boiler is shown below in Figure 2-2. Steam from the auxiliary boilers will be used for steam seals, HRSG sparging, and hotwell heating. The auxiliary boilers will allow the project to maintain condenser vacuum overnight or to pre-establish condenser vacuum prior to starting the combustion turbines. They will also allow the project, when starting, to ramp up combustion turbine operation without holds by enabling turbine bypass valve operation immediately upon HRSG steam production. The auxiliary boilers will also provide a source of steam to start the fuel gas heater, and for high-pressure drum pre-warming on cold starts.

The boilers are rated at 83.7 percent system efficiency (high heating value), using about 91.38 million Btu (MMBtu) per hour of natural gas (at a heating value of 23,235 Btu/lb, for a fuel flow of 4185 lb/hr). Each boiler will provide 75,000 pounds of steam per hour. The boilers will use selective catalytic reduction (SCR) technology to achieve oxides of nitrogen (NOx) emissions of 0.006 lbs/MMBtu (5 ppm). Each boiler will include a 60-foot-tall exhaust stack, which will be significantly shorter than the existing 150-foot-tall HRSG stacks. The boilers emit carbon monoxide (CO) at a maximum of 0.037 lb/MMBtu (50 ppm), particulate matter (PM-10 and PM-2.5) at 0.007 lbs/MMBtu, volatile organic compounds (VOC) at 0.004 lbs/MMBtu (10 ppm), and sulfur oxides at 0.003 lbs/MMBtu.

Makeup water requirements for the new boilers will be minimal and can be accommodated by the existing project water supply and treatment system. The existing project's zero liquid discharge wastewater treatment system will be used for the disposal of the relatively small quantities of blowdown from the new boilers, as well as the small quantities of additional wastewater generated in the production of demineralized water for boiler makeup. The boilers will be installed on existing equipment pads, requiring no excavation, and therefore will not change stormwater drainage patterns or amounts. The existing project's oil-water separator will be utilized as needed to process runoff from equipment locations. Stormwater from the new equipment, as well as any new plant equipment drains, will discharge to the existing storm water detention pond. Stormwater that does not infiltrate into the soils or evaporate is discharged to Pastoria Creek in accordance with CEC license, applicable regulations and in coordination with Tejon Ranch.

### 2.1.2 Advanced Gas Path Upgrade

The proposed modifications also include altering the hot gas path and installing updated gas turbine control software to improve the thermal efficiency of the second power block (Unit 4). The proposed Advanced Gas Path (AGP) upgrade will allow Calpine to replace the hot gas path components in Unit 4, such as turbine blades, nozzles, and associated structural elements, with parts that are designed to operate at higher firing temperatures. These components will be functionally identical to the existing equipment except that they will be made from advanced materials that can withstand higher temperatures. Based on Calpine's experience with the AGP upgrades in Units 1 and 2 that were completed in 2012, these replaced components will improve the turbine heat rate, increasing output by up to 5 percent while also improving fuel efficiency by up to 1 percent. To support the higher operational temperatures, additional temperature sensors, instrumentation, controls, and piping will be added to the turbine package. The project will not affect the operation of the low NOx combustors or the selective catalytic reduction emissions control systems.

## 2.2 Operational Changes – Simultaneous Startup

The proposed modifications also include allowing simultaneous startup of the three existing GE 7FA gas turbines to improve operations and dispatch.

The Conditions of Certification for the Pastoria Energy Facility currently prohibit the operation of more than one gas turbine in startup mode at a time. This operating restriction results in more gas turbine operating hours than are necessary to meet dispatch requirements. For example, assume that all three gas turbines have been shut down overnight and each gas turbine requires about an hour to be brought to the minimum load at which it complies with its permitted emissions limits (approximately 60 percent of maximum rated load).[1] If all three gas turbines are required by the California Independent System Operator (CAISO) to be available at 80 percent load at 8 a.m., the first gas turbine must be started around 4:30 a.m. Once the first gas turbine reaches 60 percent load around 5:30 a.m., the second gas turbine can be started up; however, the first gas turbine would continue to operate at its minimum compliant load since it is not needed by the CAISO until 8 a.m. Similarly, the second gas turbine would achieve minimum compliant load at about 6:30 a.m., at which time it will continue to operate at that load while the Unit 4 is started up. All three gas turbines would be operational at their minimum compliant load at about 7:30 a.m. and could then be ramped up to 80 percent load to be available to the CAISO at 8 a.m. Under this scenario, the first gas turbine has been operated for up to 2 more hours than needed, while the second gas turbine has been operated an hour longer than needed. If the gas turbines were able to start up simultaneously, all could be started between 6:30 and 7:30 a.m., eliminating the extra operating hours and associated fuel use and emissions and improving overall plant efficiency.

[1] This is an example involving hot starts, where the gas turbines have been shut down for 8 hours or less. Warm or cold starts, where the gas turbines have been shut down longer, take longer to achieve minimum compliant load.

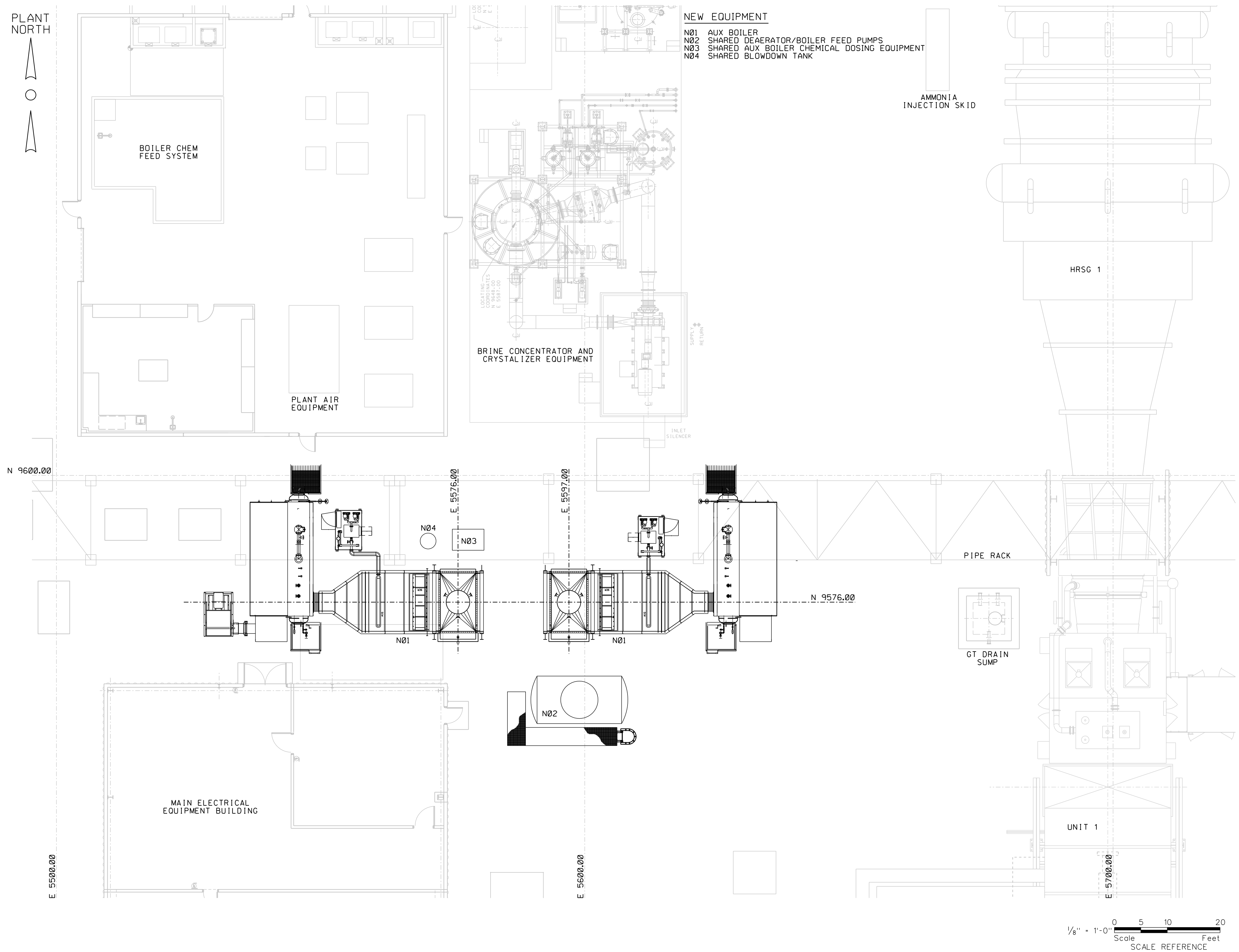


**FIGURE 2-1**
**General Arrangement**
Pastoria Energy Facility Petition to Amend No. 11
Lebec, California

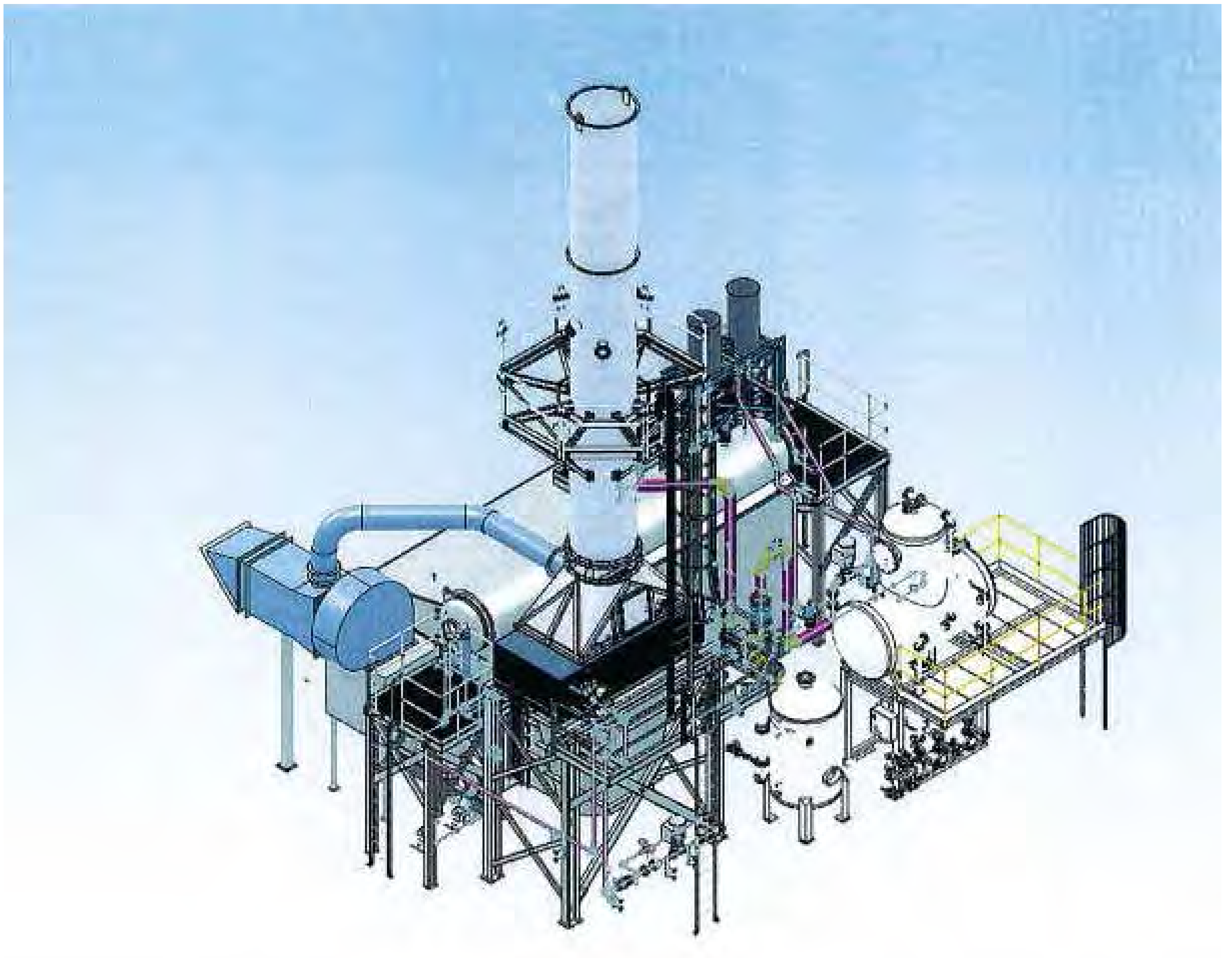

FIGURE 2-2
**Typical Auxiliary Boiler**
Source: Rentech Boiler Systems

SECTION 3.0

# Environmental Analysis of Proposed Project Modifications

The following sections provide environmental analyses for each of 14 different discipline areas that address:

- Significant changes to the project area environmental baseline if these changes have taken place since the certification was granted and have a bearing on the environmental impact analyses for the amended facility; and
- Significant changes to environmental impacts of the facility that are a result of the equipment modifications.

Each section includes an environmental analysis, followed by a list of any changes to the existing CEC Conditions of Certification (COCs) from the Final Decision, 99-AFC-7C, as amended that are necessary because of the proposed project modifications, provided as a text mark-up.

The environmental disciplines are addressed in alphabetical order, as follows:

3.1 Air Quality
3.2 Biological Resources
3.3 Cultural Resources
3.4 Geology and Paleontology
3.5 Hazardous Materials Management
3.6 Land Use
3.7 Noise and Vibration
3.8 Public Health
3.9 Socioeconomics
3.10 Soil and Water Resources
3.11 Traffic and Transportation
3.12 Visual Resources
3.13 Waste Management
3.14 Worker Safety and Fire Protection

These sections address the following project modifications, where applicable:

- Installation of two new natural gas-fired auxiliary boilers to provide steam to the HRSGs and other systems to improve operating performance;
- Amendment of the CEC license and air permit operation conditions to allow for simultaneous startup of the three existing GE 7FA gas turbines; and
- Alteration of the combustion turbine using AGP technology and installing General Electric's (GE's) latest gas turbine control system software to improve thermal efficiency of the second power block (Unit 4).

The addition of the auxiliary boilers is addressed under all 14 environmental disciplines. Because the simultaneous startups of the three CTs and the proposed AGP upgrade to Unit 4 have the potential to affect only air quality and public health, this modification is discussed only under those sections. The technological changes are minor changes that will have no possible significant impact, and therefore these changes are not addressed under each environmental discipline.

Table 3.0-1 identifies the proposed modifications, indicating which will require discussion of potential effects under the various disciplines discussed in the licensing proceeding. For ease of readability, those items not identified as impacting a discipline will not be addressed in each of the individual disciplines.

TABLE 3.0-1
**Proposed Project Changes and Affected Environmental Disciplines (C=Construction, O=Operation)**

| | **Requested Modifications** |
|---|---|
| 3.1 Air Quality | C/O |
| 3.2 Biological Resources | — |
| 3.3 Cultural Resources | — |
| 3.4 Geology and Paleontology | — |
| 3.5 Hazardous Materials Management | — |
| 3.6 Land Use | — |
| 3.7 Noise and Vibration | -- |
| 3.8 Public Health | C/O |
| 3.9 Socioeconomics | C/O |
| 3.10 Soil and Water Resources | C |
| 3.11 Traffic and Transportation | C |
| 3.12 Visual Resources | O |
| 3.13 Waste Management | C |
| 3.14 Worker Safety and Fire Protection | C/O |

# 3.1 Air Quality

This section of the Petition describes existing air quality conditions, maximum potential impacts from the project, compliance with applicable LORS, and mitigation measures that keep project impacts below applicable thresholds of significance. The methodology and results of the air quality analysis used to assess potential impacts are also presented. The analysis has been conducted according to the CEC Power Plant Siting Requirements and also addresses San Joaquin Valley Air Pollution Control District (SJVAPCD, or District) air permitting requirements.

Details of the air quality assessment of the project are contained in several subsections, as outlined below.

- Section 3.1.1, Environmental Baseline, describes the local environment surrounding the existing project, including topography, climate, and existing air quality. Representative meteorological data—including wind speed and direction, temperature, relative humidity, and precipitation, and representative, recent ambient concentration measurements for criteria air pollutants—are summarized. This section also describes the existing project equipment and permitted emission limits.
- Section 3.1.2, Environmental Consequences, evaluates the maximum potential air quality impacts due to the project's emissions of NOx, CO, sulfur oxides (SOx), VOCs, $PM_{10}$, and $PM_{2.5}$. Emission estimates for these pollutants are presented for the construction phase of the project, as well as for operation of the new auxiliary boilers. While the proposed change in gas turbine startup conditions will not affect daily, quarterly, or annual emissions, it will affect maximum hourly emissions. A dispersion modeling analysis for nitrogen dioxide ($NO_2$), CO, sulfur dioxide ($SO_2$), $PM_{10}$, and $PM_{2.5}$ is presented; the results show that the project will not cause or significantly contribute to exceedances of the California Ambient Air Quality Standards (CAAQS) or National Ambient Air Quality Standards (NAAQS). Emissions of greenhouse gases (GHGs) from the project are also described.
- Section 3.1.3, Cumulative Air Quality Impacts, addresses the cumulative impacts of the project emissions with other potential new sources of air pollution in the area around the project.
- Section 3.1.4, Consistency with LORS, describes how the project will comply with pertinent air quality LORS aspects of the project. This section also provides an analysis of best available control technology (BACT) for the new equipment.
- Section 3.1.5, Involved Agencies and Agency Contacts, lists the agency personnel contacted during preparation of the air quality assessment.
- Section 3.1.6, Mitigation Measures, describes the project emission offsets strategy, including emission reduction credits (ERCs) that are proposed to offset project emissions increases.
- Section 3.1.7, Required Permits and Permit Schedule, lists the air quality permits required for the project and provides a permit schedule for the project.
- Section 3.1.8, Conditions of Certification, provides proposed revised conditions of certification reflecting the proposed amendment.
- Section 3.1.9, References, lists the references used to conduct the air quality assessment.

Some air quality data are presented in other sections of this Petition, including an evaluation of toxic air pollutants (see Section 3.8, Public Health) and information relating to the construction phase of the project (see Section 3.9, Socioeconomics, and Section 3.11, Traffic and Transportation).

The District has provided meteorological data for the period 2009 through 2013 for the purposes of this analysis and has provided the data in files used to conduct the modeling. To the extent possible, background ambient data represent the same period.[2] All analyses in this section are based on the most recent available and representative background data. The proposed project will involve the following modifications:

- Adding two new auxiliary boilers to reduce startup times for the combined-cycle gas turbines;
- Changing permit conditions to allow for simultaneous startup of the three existing GE 7FA combined-cycle gas turbines;
- Installing Advanced Gas Path components and upgrading the third existing GE 7FA Series turbine (Unit 4) with GE .04 software for improved efficiency; and
- Making additional technological modifications at the site that do not affect air quality and do not require any changes to air quality conditions of certification.

The proposed changes to the project will constitute a minor modification to an existing major stationary source under District New Source Review regulations because net increases in all regulated pollutants, including GHGs, will be below regulatory thresholds.

## 3.1.1 Environmental Baseline

This section describes the regional climate and meteorological conditions that influence the transport and dispersion of air pollutants, as well as the existing air quality within the project region. The data presented in this section are representative of the project site.

### 3.1.1.1 Geography and Topography

The project is located on a 31-acre parcel leased from Tejon Ranchcorp located 30 miles south of Bakersfield and 6.5 miles east of Interstate 5 at the base of the Tehachapi Mountains. The project site is at an elevation of approximately 1070 feet above mean sea level. The project site is relatively flat, with a gentle slope running from the southeast to the northwest.

### 3.1.1.2 Meteorology and Climate

The climate of the San Joaquin Valley is characterized by hot summers, mild winters, and small amounts of precipitation. The major climatic controls in the Valley are the mountains on three sides and the semi-permanent Pacific High pressure system over the eastern Pacific Ocean. The Great Basin High pressure system to the east also affects the Valley, primarily during the winter months. These synoptic scale influences result in distinct seasonal weather characteristics, as discussed below.

The Pacific High is a semi-permanent subtropical high pressure system located off the Pacific Coast. It is centered between the 140°W and 150°W meridians, and oscillates in a north-south direction seasonally. During the summer, it moves northward and dominates the regional climate, producing persistent temperature inversions and a predominantly southwesterly wind field. Clear skies, high temperatures, and low humidity characterize this season. Very little precipitation occurs during summer months because migrating storm systems are blocked by the Pacific High. Occasionally, however, tropical air moves into the area and thunderstorms may occur over the adjacent mountains.

In the fall, the Pacific High weakens and shifts southwestward toward Hawaii, and its dominance is diminished in the San Joaquin Valley. During the transition period, the storm belt and zone of strong westerly winds also moves southward into California. The prevailing weather patterns during this time of year include storm periods with rain and gusty winds, clear weather that can occur after a storm or because of the Great Basin High pressure area, or persistent fog caused by temperature inversion. The annual

[2] $SO_2$ data for the project area are available only through 2011, while CO data are available only through 2010.

rainfall in the Bakersfield area is only 5.7 inches. Between storms, high pressure from the Great Basin High can block storms and result in persistent tule fog caused by temperature inversions. Daily maximums during the December-January months are a relatively mild 57°F, with lows averaging 38°F.

Temperature, wind speed, and direction data have been recorded at a meteorological monitoring station at the Bakersfield – California Avenue monitoring station. The average July temperature is over 98°F; winter temperatures average 47°F in January. The annual average temperature is 65°F.[3]

Air quality is determined primarily by the type and amount of pollutants emitted into the atmosphere, the topography of the air basin, and local meteorological conditions. In the Project area, stable atmospheric conditions and light winds can provide conditions for pollutants to accumulate in the air basin when emissions are produced. Winds in California generally are light and easterly in the winter, but strong and westerly in the spring, summer, and fall.

Wind patterns at the project site can be seen in Appendix 3.1B, which shows quarterly and annual wind roses for meteorological data collected at the Bakersfield meteorological station during the period 2009-2013. These wind roses show that the winds are persistent (only about 4% calm conditions) and, on an annual basis, predominantly from the west-northwest through the north-northwest. Winds are predominantly from the northwest and southeast during the winter months.

A marine climate influences mixing heights. Often, the base of the inversion is found at the top of a layer of marine air, because of the cooler nature of the marine environment. Inland areas, however, where the marine influence is absent, often experience strong ground-based inversions that inhibit mixing and can result in high pollutant concentrations. Smith, et al, (1984) reported that at Bakersfield, the nearest upper-level meteorological station (located approximately 10 miles east-southeast of the project site), 50th percentile morning mixing heights for the period 1979–80 were on the order of 400 feet (115 meters) in fall, 500 to 600 feet (150 to 175 meters) in summer and winter, and 750 feet (230 meters) in spring. Such low mixing heights trap pollutants. The 50th percentile afternoon mixing heights ranged from 2100 feet (630 meters) in winter to over 3900 feet (over 1200 meters) in spring, summer and fall. These higher mixing heights provide generally favorable conditions for the dispersion of pollutants.

### 3.1.1.3 Overview of Air Quality Standards

The U.S. Environmental Protection Agency (EPA) has established national ambient air quality standards (NAAQS) for ozone, $NO_2$, CO, $SO_2$, $PM_{10}$, $PM_{2.5}$, and airborne lead. Areas with ambient levels above these standards are designated by EPA as “nonattainment areas” subject to planning and pollution control requirements that are more stringent than the requirements that apply to areas with ambient levels below these standards, which are designated by EPA as “attainment areas.”

The California Air Resources Board (CARB) has established California ambient air quality standards (CAAQS) for ozone, CO, $NO_2$, $SO_2$, sulfates, $PM_{10}$, $PM_{2.5}$, airborne lead, hydrogen sulfide, and vinyl chloride at levels designed to protect the most sensitive members of the population, particularly children, the elderly, and people who suffer from lung or heart diseases.

Both state and national air quality standards consist of two parts: an allowable concentration of a pollutant, and an averaging time over which the concentration is to be measured. Allowable concentrations are based on the results of studies of the effects of the pollutants on human health and welfare (for establishing NAAQS) and on health, aesthetics, and the economy (for establishing CAAQS). The averaging times are based on whether the damage caused by the pollutant is more likely to occur during exposures to a high concentration for a short time (one hour, for instance), or to a relatively lower average concentration over a longer period (8 hours, 24 hours, or 1 year). For some pollutants there is more than one air quality

[3] Greater Bakersfield Chamber of Commerce website, http://www.bakersfieldchamber.org/statistics.asp.

standard, reflecting both short-term and long-term allowable pollutant concentrations. Table 3.1-1 presents the NAAQS and California ambient air quality standards for selected pollutants. The California standards are generally set at concentrations lower than the federal standards and, in some cases, have shorter averaging periods.

### 3.1.1.4 Existing Air Quality

All ambient air quality data presented in this section were published by CARB on the ADAM website and/or by U.S. EPA on the AIRS data website. The project is in the southernmost end of the San Joaquin Valley. The monitoring stations closest to the project site with long-term records of criteria pollutant concentrations are shown in Table 3.1-2, along with their distance from the project site.

These stations were used because they are believed to provide data that are most representative of conditions at the project site. A comparison of each monitoring site to the District's criteria for representativeness is presented below.

In general, each monitoring site was selected because of its proximity to the project site and because it records area-wide ambient conditions rather than the localized impacts of any particular facility, as discussed further in the following sections. All ambient air quality data presented in this section were taken from CARB and EPA publications and data sources.

TABLE 3.1-1
**Ambient Air Quality Standards**

| | | California Standards | Federal Standards | |
|---|---|---|---|---|
| **Pollutant** | **Averaging Time** | **Concentration** | **Primary** | **Secondary** |
| Ozone | 1 Hour | 0.09 ppm (180 μg/m$^3$) | -- | Same as Primary Standard |
| | 8 Hour | 0.07 ppm (137 μg/m$^3$) | 0.075 ppm (147 μg/m$^3$) | |
| Respirable Particulate Matter ($PM_{10}$) | 24 Hour | 50 μg/m$^3$ | 150 μg/m$^3$ | Same as Primary Standard |
| | Annual Arithmetic Mean | 20 μg/m$^3$ | -- | |
| Fine Particulate Matter ($PM_{2.5}$) | 24 Hour | No Separate State Standard | 35 μg/m$^3$ [a] | Same as Primary Standard |
| | Annual Arithmetic Mean | 12 μg/m$^3$ | 12.0 μg/m$^3$ | 15.0 μg/m$^3$ |
| Carbon Monoxide (CO) | 1 Hour | 20 ppm (23 mg/m$^3$) | 35 ppm (40 mg/m$^3$) | None |
| | 8 Hour | 9.0 ppm (10 mg/m$^3$) | 9 ppm (10 mg/m$^3$) | |
| Nitrogen Dioxide ($NO_2$) | 1 hour | 0.18 ppm (339 μg/m$^3$) | 100 ppb[b] (188 μg/m$^3$) | Same as Primary Standard |
| | Annual Arithmetic Mean | 0.030 ppm (57 μg/m$^3$) | 0.053 ppm (100 μg/m$^3$) | None |
| Sulfur Dioxide ($SO_2$) | 1 Hour | 0.25 ppm (655 μg/m$^3$) | 75 ppb[c] (196 μg/m$^3$) | -- |
| | 3 Hour | -- | -- | 0.5 ppm |

TABLE 3.1-1
**Ambient Air Quality Standards**

| Pollutant | Averaging Time | California Standards Concentration | Federal Standards Primary | Federal Standards Secondary |
|---|---|---|---|---|
| | | | | (1300 μg/m³) |
| | 24 Hour | 0.04 ppm (105 μg/m³) | -- | -- |
| Lead | 30 Day Average | 1.5 μg/m³ | -- | -- |
| | Calendar Quarter | -- | 1.5 μg/m³ | Same as Primary Standard |
| | Rolling 3-Month Average | -- | 0.15 μg/m³ | |

Notes:
[a] To attain this standard, the 3-year average of the 98th percentile of the daily concentrations must not exceed 35 μg/m³.
[b] To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average must not exceed 100 ppb.
[c] To attain this standard, the 3-year average of the 99th percentiles of the daily maximum 1-hour average must not exceed 75 ppb.
Source: California Air Resources Board (6/7/12)

TABLE 3.1-2
**Representative Background Ambient Air Quality Monitoring Stations**

| Pollutant(s) | Monitoring Station | Distance to Project Site |
|---|---|---|
| Ozone, $NO_2$ | Johnson Farm, Edison | 43 km |
| CO | Bakersfield Golden State Highway | 50 km |
| $PM_{10}$, $SO_2$ | Bakersfield California Avenue | 49 km |
| $PM_{2.5}$ | Bakersfield Planz Road | 43 km |

**Ozone ($O_3$).** Ozone is generated by a complex series of chemical reactions between VOC and NOx in the presence of ultraviolet radiation. Ambient ozone concentrations follow a seasonal pattern: higher in the summertime and lower in the wintertime. At certain times, the San Joaquin Valley Air Basin can provide ideal conditions for the formation of ozone due to the persistent temperature inversions, clear skies, mountain ranges that trap the air mass, and exhaust emissions from millions of vehicles and stationary sources. Based upon ambient air measurements at stations throughout the area, the San Joaquin Valley Air Basin is classified as a severe nonattainment area for the state 1-hour ozone standard and an extreme nonattainment area for the 8-hour federal ozone standard.

During the 2006-2010 monitoring period, the Arvin ozone monitoring station was located in a populated area at the southern end of the San Joaquin Valley; it was relocated at the end of 2010. The Arvin site is the closest representative monitoring site to the project location and is similarly situated at the base of the Tehachapi Mountains. Maximum ozone concentrations at the Arvin station are usually recorded during the summer months. Table 3.1-3 shows the annual maximum hourly ozone levels recorded at Arvin during the period 2006-2013, as well as the number of days in which the state and federal standards were exceeded.

TABLE 3.1-3
**Ozone Levels in Kern County 2006-2013 (ppm)**

| | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 |
|---|---|---|---|---|---|---|---|---|
| **Arvin Bear Mountain Blvd Monitoring Station[a]** | | | | | | | | |
| Highest 1-Hour Average | 0.135 | 0.129 | 0.150 | 0.135 | 0.140 | 0.113 | 0.122 | 0.109 |
| Highest 8-Hour Average | 0.120 | 0.110 | 0.122 | 0.110 | 0.108 | 0.097 | 0.101 | 0.095 |
| Number of Days Exceeding: | | | | | | | | |
| State Standard (0.09 ppm, 1-hour) | 66 | 51 | 67 | 54 | 36 | 21 | 31 | 14 |
| State Standard (0.070 ppm, 8-hour) | 125 | 120 | 128 | 104 | 90 | 50 | 85 | 68 |
| Federal Standard (0.075 ppm, 8-hour) | 99 | 89 | 102 | 80 | 66 | 36 | 53 | 34 |
| **Edison Monitoring Station** | | | | | | | | |
| Highest 1-Hour Average | 0.141 | 0.138 | 0.137 | 0.135 | 0.125 | 0.118 | 0.113 | 0.101 |
| Highest 8-Hour Average | 0.121 | 0.104 | 0.107 | 0.105 | 0.102 | 0.097 | 0.094 | 0.086 |
| Number of Days Exceeding: | | | | | | | | |
| State Standard (0.09 ppm, 1-hour) | 51 | 29 | 55 | 33 | 39 | 25 | 22 | 2 |
| State Standard (0.070 ppm, 8-hour) | 90 | 71 | 105 | 78 | 74 | 74 | 79 | 21 |
| Federal Standard (0.075 ppm, 8-hour) | 68 | 44 | 56 | 60 | 47 | 47 | 42 | 8 |

Note:
[a] The Arvin Bear Mountain Blvd monitor was relocated to DiGiorgio during the fourth quarter of 2010.

Ozone readings are also available from the Edison monitoring station, located nine miles east of the Bakersfield. Table 3.1-3 also shows annual maximum hourly ozone levels at Edison during the period 2008-2013, as well as the number of days in which the standards were exceeded. Peak hourly ozone readings at Edison are generally similar to peak readings at Arvin, but Edison experiences fewer violations of the standards. To maintain consistency between the ozone and $NO_2$ background data, data collected at Edison were recommended by the air district staff for use in providing background ozone conditions for the proposed project.

The federal 8-hour ozone NAAQS requires that the 3-year average of the fourth-highest values for individual years be maintained at or below 0.075 ppm. Therefore, the number of days in each year with maximum 8-hour concentrations above the standard in Table 3.1-3 does not equate to the number of violations.

**Nitrogen Dioxide ($NO_2$).** $NO_2$ is formed primarily from reactions in the atmosphere between NO (nitric oxide) and oxygen ($O_2$) or ozone. NO is formed during high-temperature combustion processes, when the nitrogen and oxygen in the combustion air combine. Although NO is much less harmful than $NO_2$, it can be converted to $NO_2$ in the atmosphere within a matter of hours, or even minutes, under certain conditions. The control of NO and $NO_2$ emissions is also important because of the role of both compounds in the atmospheric formation of ozone.

For purposes of state and federal air quality planning, the SJVAPCD is in attainment for $NO_2$.

Although the Arvin site is closer to the project location, $NO_2$ monitoring terminated at the Arvin station in 2010. The Edison monitoring station is located at the southern end of the valley, nine miles east of the Bakersfield metropolitan area. This monitor has the most recent available $NO_2$ ambient data and has been recommended by the air district staff for use in providing background $NO_2$ data for the proposed project.

TABLE 3.1-4
**Nitrogen Dioxide Levels in Kern County, 2008-2013 (ppm)**

| | 2008 | 2009 | 2010[a] | 2011 | 2012 | 2013 |
|---|---|---|---|---|---|---|
| **Edison Monitoring Station** | | | | | | |
| Highest 1-Hour Average | 0.098 | 0.070 | 0.048 | 0.042 | 0.047 | 0.047 |
| 98th Percentile 1-Hour Average | 0.041 | 0.037 | 0.031 | 0.035 | 0.036 | 0.034 |
| Annual Average (NAAQS = 0.053 ppm) | 0.008 | 0.008 | 0.006 | 0.006 | 0.007 | 0.006 |
| Number of Days Exceeding: | | | | | | |
| State Standard (0.18 ppm, 1-hour) | 0 | 0 | 0 | 0 | 0 | 0 |
| Federal Standard (100 ppb, 1-hour) | 0 | 0 | 0 | 0 | 0 | 0 |
| State Standard (0.030 ppm, Annual) | 0 | 0 | 0 | 0 | 0 | 0 |
| Federal Standard[2] (0.053 ppm, Annual) | 0 | 0 | 0 | 0 | 0 | 0 |
| **Arvin Bear Mountain Blvd Monitoring Station** | | | | | | |
| Highest 1-Hour Average | 0.033 | 0.051 | 0.032 | n/a | n/a | n/a |
| 98th Percentile 1-Hour Average | 0.027 | 0.034 | 0.028 | n/a | n/a | n/a |
| Annual Average (NAAQS = 0.053 ppm) | 0.006 | 0.005 | 0.005 | n/a | n/a | n/a |
| Number of Days Exceeding: | | | | | | |
| State Standard (0.18 ppm, 1-hour) | 0 | 0 | 0 | n/a | n/a | n/a |
| Federal Standard[b] (100 ppb, 1-hour) | 0 | 0 | 0 | n/a | n/a | n/a |
| State Standard (0.030 ppm, Annual) | 0 | 0 | 0 | n/a | n/a | n/a |
| Federal Standard (0.053 ppm, Annual) | 0 | 0 | 0 | n/a | n/a | n/a |

Notes:
[a] The federal 1-hour average $NO_2$ standard of 0.100 ppm was announced by EPA on February 9, 2010, and became effective April 12, 2010. To attain this standard, the 3-year average of the 98$^{th}$ percentile of the daily maximum 1-hour average values at each monitor must not exceed 100 ppb.
[b] The Arvin Bear Mountain Blvd monitor was relocated during the fourth quarter of 2010.
ppm = parts per million

As recommended by CAPCOA in the guidance document for modeling compliance with the 1-hour $NO_2$ standard,[4] provided below is a discussion of how the Edison $NO_2$ monitor meets the criteria for representativeness.

- **Proximity to the sources being modeled.** The Edison monitoring station is located approximately 43 km (27 miles) from the project site. In general, the nearest monitoring station is preferable. However, although the Arvin monitoring station is closer to the project location than the Edison station, there is not a current, continuous 5-year $NO_2$ dataset available for the Arvin monitor. The Arvin $NO_2$ monitor was relocated in late 2010, so the most recent continuous, complete 5-year $NO_2$ dataset from Arvin terminates in 2009. The Edison monitor is still operational, so a continuous, complete, and current 5-year $NO_2$ dataset is available from that station. The Edison station meets the criteria for proximity and is preferable to the Arvin station because it is more current.
- **Similarity of surrounding sources.** The Edison monitoring station, like the project site, is located at the southern end of the valley, with mountains to the east, west, and south. Both locations are downwind of and similarly affected by locally emitted pollutants from the Bakersfield urban area.

[4] CAPCOA, "Modeling Compliance of the Federal 1-Hour $NO_2$ NAAQS," Appendix A, Section 7. October 27, 2011.

- **Conservativeness of the background concentrations.** The project site is in an unincorporated area and is surrounded by grazing land and agricultural uses with little or no nearby industrial development. The Edison monitor is also located in near agricultural activities, but is closer to the Bakersfield urban area. As shown in Table 3.1-4 above, peak $NO_2$ concentrations monitored at the Edison station are generally higher than those monitored at Arvin. Therefore, the background concentrations at Edison are believed to conservatively overestimate conditions at the project site.
- **Contribution by sources in the vicinity of the background monitor to concentrations at the monitor.** Because of the remote location of the project site, there are no sources in the project area that would contribute to concentrations there. As discussed previously, the Edison monitoring data are believed to conservatively overestimate $NO_2$ concentrations at the project site and no additional background sources need to be considered.
- **Documentation of the factors considered in selecting the background monitoring station should be documented.** The preceding discussion documents the selection process.

**Carbon Monoxide (CO)**. Carbon monoxide is a product of incomplete combustion and is emitted principally from automobiles and other mobile sources of pollution. It is also a product of combustion from stationary sources (both industrial and residential) burning fuels. Peak CO levels typically occur during winter months due to a combination of higher emission rates and stagnant weather conditions.

The Bakersfield Golden State Highway monitoring station was located along Highway 99 with exposure to vehicle traffic and associated CO emissions. Concentrations measured there are believed to be representative of conditions at the project site, which is located approximately 5 miles from Interstate 5. Table 3.1-5 shows the available data on maximum 1-hour and 8-hour average CO levels recorded at the Golden State Highway site during the period from 2006 to 2010; the station was shut down in January of 2010. As indicated by this table, the maximum measured 1-hour average CO levels comply with the NAAQS and CAAQS (35.0 ppm and 20.0 ppm, respectively) and the maximum 8-hour values comply with the NAAQS and CAAQS of 9.0 ppm. For purposes of both state and federal air quality planning, the San Joaquin Valley Air Basin is in attainment with regard to CO.

TABLE 3.1-5
**Carbon Monoxide Levels in Kern County, Bakersfield Golden State Hwy Monitoring Station, 2006-2010 (ppm)**

| | 2006 | 2007 | 2008 | 2009 | 2010[a] |
|---|---|---|---|---|---|
| Highest 1-Hour Average | 3.3 | 2.8 | 3.5 | 2.2 | 2.1 |
| Highest 8-Hour Average | 2.19 | 1.97 | 2.17 | 1.51 | 1.46 |
| Number of Days Exceeding: | | | | | |
| State Standard (20 ppm, 1-hour) | 0 | 0 | 0 | 0 | 0 |
| Federal Standard (35 ppm, 1-hour) | 0 | 0 | 0 | 0 | 0 |
| State Standard (9.0 ppm, 8-hour) | 0 | 0 | 0 | 0 | 0 |
| Federal Standard (9 ppm, 8-hour) | 0 | 0 | 0 | 0 | 0 |

Note:
[a] CO monitoring ended in early January.

**Sulfur Dioxide ($SO_2$)**. $SO_2$ is produced by the combustion of any sulfur-containing fuel. It is also emitted by chemical plants that treat or refine sulfur or sulfur-containing chemicals. Natural gas contains nearly negligible sulfur, whereas fuel oils may contain much larger amounts. Because of the complexity of the chemical reactions that convert $SO_2$ to other compounds (such as sulfates), peak concentrations of $SO_2$ occur at different times of the year in different parts of California, depending on local fuel characteristics, weather, and topography. The San Joaquin Valley Air Basin is considered to be in attainment for $SO_2$ for purposes of state and federal air quality planning.

There is currently only one $SO_2$ monitoring station in the San Joaquin Valley Air Basin, located in Fresno. Monitored concentrations from this station are used by the District to represent $SO_2$ concentrations throughout the Valley and therefore are believed to be representative of concentrations at the project site. Table 3.1-6 shows the available data on maximum 1-hour, 24-hour, and annual average $SO_2$ levels recorded at the Fresno 1st Street monitoring station during the period from 2007 to 2011. As indicated by this table, the maximum measured 1-hour average $SO_2$ levels comply with the NAAQS (75 ppb) and CAAQS (0.25 ppm), and the maximum 24-hour values comply with the CAAQS of 0.04 ppm. The 24-hour and annual NAAQS for $SO_2$ were superseded by the 1-hour NAAQS, which became effective on August 23, 2010.

TABLE 3.1-6
**Sulfur Dioxide Levels in SJVAPCD, Fresno 1st Street, 2008-2011 (ppm)**

| | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|
| Highest 1-Hour Average | 0.024 | 0.012 | 0.013 | 0.015 | 0.016 |
| 98th Percentile 1-Hour Average | 0.012 | 0.006 | 0.008 | 0.007 | 0.009 |
| 3-Hour Average | 0.021 | 0.0056 | 0.010 | 0.007 | 0.008 |
| Highest 24-Hour Average | 0.007 | 0.003 | 0.005 | 0.003 | 0.004 |
| Number of Days Exceeding: | | | | | |
| State Standard (0.25 ppm, 1-hour) | 0 | 0 | 0 | 0 | 0 |
| Federal Standard (75 ppb, 1-hour) | 0 | 0 | 0 | 0 | 0 |
| Federal Standard (0.5 ppm, 3-hour) | 0 | 0 | 0 | 0 | 0 |
| State Standard (0.04 ppm, 24-hour) | 0 | 0 | 0 | 0 | 0 |

**Respirable Particulate Matter ($PM_{10}$).** Particulates in the air are caused by a combination of wind-blown fugitive dust; particles emitted from combustion sources and manufacturing processes; and organic, sulfate, and nitrate aerosols formed in the air from emitted hydrocarbons, sulfur oxides, and nitrogen oxides. Particulates with a diameter less than or equal to 10 microns are referred to as $PM_{10}$ and are regulated because they can be inhaled, leading to health effects. Fine particulates, referred to as $PM_{2.5}$ and having a diameter equal to or less than 2.5 microns, are a subset of $PM_{10}$ that are also regulated. $PM_{2.5}$ standards are discussed later in this section.

The Bakersfield California Avenue monitoring station is the nearest $PM_{10}$ monitoring station to the project site. Its location in a populated area provides conservatively high background $PM_{10}$ concentrations compared to the more remote and rural conditions at the project site. Table 3.1-7 shows the maximum $PM_{10}$ levels recorded at the Bakersfield California Avenue monitoring station during the period from 2008 through 2013 and the arithmetic annual average concentrations for the same period. (The arithmetic annual average is simply the arithmetic mean of the daily observations.) $PM_{10}$ is monitored according to different protocols for evaluating compliance with the state and federal standards for this pollutant. Specifically, California uses a gravimetric or beta attenuation method, whereas compliance with federal standards is evaluated based on an inertial separation and gravimetric analysis. This accounts for the different 24-hour concentrations listed in Table 3.1-7 that represent data obtained by means of the state and federal samplers.

At the Bakersfield station, the maximum 24-hour $PM_{10}$ levels exceed the CAAQS state standard of 50 micrograms per cubic meter ($\mu g/m^3$) many times per year. The maximum daily concentration recorded during the analysis period was 264 $\mu g/m^3$ in 2008. The annual arithmetic mean concentrations recorded each year of the analysis period were above the state standard of 20 $\mu g/m^3$. The federal annual $PM_{10}$

standard was revoked by the EPA in 2006 due to a lack of evidence linking health problems to long-term exposure to coarse particle pollution. The San Joaquin Valley Air Basin was redesignated a federal $PM_{10}$ attainment area in 2008, but its status for the state $PM_{10}$ standards is nonattainment.

TABLE 3.1-7
**$PM_{10}$ Levels in Kern County, Bakersfield California Avenue Monitoring Station, 2008-2013 (μg/m³)**

| | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 |
|---|---|---|---|---|---|---|
| Highest 24-Hour Average (federal)[a] | 262.0 | 94.5 | 86.0 | 97.4 | 99.6 | 120.7 |
| Highest 24-Hour Average (state) | 264.0 | 99.0 | 238.0 | 154.0 | 126 | 116.9 |
| Annual Average | 55.3 | 41.2 | 32.6 | 44.2 | 41.4 | n/a |
| Est. Number of Days Exceeding: | | | | | | |
| State Standard (50 μg/m3, 24-hour) | 169.5 | 83.6 | 47.1 | 116.4 | 89.4 | n/a |
| Federal Standard (150 μg/m3, 24-hour) | 3.3 | 0.0 | 0.0 | 0.0 | 0.0 | n/a |

Notes:
[a] On December 17, 2006, the annual $PM_{10}$ federal standard (50 μg/m³) was revoked.
μg/m³ = micrograms per cubic meter
$PM_{10}$ =particulate matter less than 10 microns in diameter

**Fine Particulates ($PM_{2.5}$).** Fine particulates with a diameter equal to or less than 2.5 microns ($PM_{2.5}$) result from fuel combustion in motor vehicles and industrial processes, residential and agricultural burning, and atmospheric reactions involving NOx, SOx, and organics. In 1997, EPA established annual and 24-hour NAAQS for $PM_{2.5}$ for the first time. In 2006, EPA lowered the 24-hour $PM_{2.5}$ NAAQS to 35 μg/m³ (3-year average of the 98th percentile). EPA recently lowered the annual $PM_{2.5}$ standard to 12 μg/m³, effective March 18, 2013.

The Bakersfield Planz Road monitoring station is the nearest $PM_{2.5}$ monitoring station to the project site. Its location in a populated area provides conservatively high background $PM_{2.5}$ concentrations compared to conditions at the project site. The $PM_{2.5}$ data in Table 3.1-8 show that the national 24-hour average NAAQS of 35 μg/m³ was exceeded frequently during the analysis period. The annual average $PM_{2.5}$ concentrations also exceed both the national and California standard of 12 μg/m³. The San Joaquin Valley air basin is a nonattainment area for both state and federal $PM_{2.5}$ standards.

TABLE 3.1-8
**$PM_{2.5}$ Levels in Kern County, Bakersfield Planz Road Monitoring Station, 2008-2013 (μg/m³)**

| | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 |
|---|---|---|---|---|---|---|
| Highest 24-Hour Average | 100.3 | 167.7 | 87.3 | 45.9 | 52.5 | 167.3 |
| 98th Percentile 24-Hour Average | 72.3 | 65.5 | 47.0 | 43.2 | 41.0 | 96.7 |
| Annual Average | 23.4 | 22.4 | 16.5 | 14.5 | 14.7 | 22.7 |
| Est. Number of Days Exceeding: | | | | | | |
| Federal Standard (35 μg/m³, 24-hour) | n/a | 50.5 | n/a | 22.1 | 21.8 | 49.4 |

Notes:
μg/m³ = micrograms per cubic meter
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter

**Airborne Lead (Pb).** Lead pollution has historically been emitted predominantly from the combustion of fuels. However, legislation in the early 1970s required a gradual reduction of the lead content of gasoline. Beginning with the introduction of unleaded gasoline in 1975, lead levels have been dramatically reduced throughout the U.S., and violations of the ambient standards for this pollutant have been virtually eliminated.

On November 12, 2008, EPA revised the NAAQS for lead, lowering it from 1.5 μg/$m^3$ to 0.15 μg/$m^3$ for both the primary and the secondary standard. EPA determined that numerous health studies demonstrate health effects at much lower levels of lead than previously thought. This is the first time that the federal lead standard has been revised since it was first issued in 1978.

In addition to revising the level of the standard, EPA changed the averaging time from a quarterly average to a rolling three-month average. The level of the standard is "not to be exceeded" and is evaluated over a three-year period. Lead levels are measured as lead in total suspended particulate (TSP). The revised lead standard also includes new monitoring requirements.

As lead concentrations dropped dramatically and all areas of California attained the previous standard, most lead monitors were shut down by the early 1990s and resources deployed to other pollutants. As a result, insufficient monitoring data exist to determine designations, and most areas of the state are unclassifiable for the revised standard.

**Summary of District Attainment Status**

The current attainment status of the SJVAPCD for state and federal ambient air quality standards is summarized in Table 3.1-9.

TABLE 3.1-9
**Current San Joaquin Valley Air Basin Criteria Pollutant Attainment Status**

| Pollutant | Federal Status | State Status |
|---|---|---|
| $NO_2$ | Attainment/unclassified | Attainment |
| CO | Attainment/unclassified | Attainment/unclassified |
| $SO_2$ | Unclassified/attainment | Attainment |
| Ozone | Extreme non-attainment (8-hour) | Severe non-attainment (1-hour) |
| $PM_{10}$ | Attainment | Non-attainment |
| $PM_{2.5}$ | Moderate non-attainment (24-hour and annual) | Non-attainment |
| Lead | Unclassified | Attainment |

### 3.1.1.5 Current Facility Potential to Emit and Operational Limitations

The project currently operates under a Title V Permit to Operate issued by the SJVAPCD and a federal Prevention of Significant Deterioration (PSD) permit issued by EPA. The existing facility consists of the permitted equipment listed below.

- Two 168 MW (nominal) GE 7FA combustion turbines with unfired heat recovery steam generators and a 185 MW steam turbine in a two-by-one combined cycle configuration
- One 168 MW (nominal) GE 7FA combustion turbines with unfired heat recovery steam generator and a 90 MW steam turbine
- One 8-cell wet cooling tower
- One 4-cell wet cooling tower
- One 814 bhp Caterpillar G3512 SC TA natural gas-fired emergency electric generator
- One 360 bhp John Deere JW6H-UF-60 diesel-fired fire water pump engine

The existing facility annual potential to emit (PTE) is summarized in Table 3.1-10. The PSD permit contains more stringent annual NOx, SOx, and CO limits than does the District Title V permit, so the actual allowable facility PTE for those pollutants is lower than the limits shown in the District permit.

TABLE 3.1-10
**Potential to Emit for Existing Pastoria Energy Facility Permit Units**

| | Emissions, pounds per year | | | | |
|---|---|---|---|---|---|
| **Unit** | **NOx** | **$SO_2$** | **CO** | **VOC** | **$PM_{10}/PM_{2.5}$** |
| Total, 3 gas turbines[a] | 344,484 | 84,780 | 1,220,166 | 227,619 | 224,343 |
| Emergency Diesel Fire Pump Engine[c] | 889 | 27 | 46 | 17 | 11 |
| Total, gas turbines and fire pump engine[b] | 344,485 | 84,510 | 1,140,000 | n/a | n/a |
| 8-cell cooling tower[c] | -- | -- | -- | -- | 8,059 |
| 4-cell cooling tower[c] | -- | -- | -- | -- | 4,059 |
| Natural gas-fired emergency engine[c] | 368 | 0 | 724 | 46 | 0 |
| Total[c] | 345,741 | 84,807 | 1,220,936 | 227,682 | 236,472 |
| Facility PTE[d] | 344,853 | 84,510 | 1,140,724 | 227,682 | 236,472 |

Notes:
[a] Annual limits from District Permit to Operate S-3636
[b] Annual limits from PSD permit SJ-99-03 (December 23, 2004).
[c] Potential to emit from October 2004 District engineering evaluation for diesel fire pump.
[d] Reflects more stringent of District and/or PSD permit limit.

The PSD and District Title V permits include hourly, daily, and quarterly limits, as well as limits on annual PTE. These limits are used in calculating offset requirements and in developing emission rates for the ambient air quality impacts analysis. The permits also include a condition that allows only one of the existing gas turbines to be in startup at any one time.[5]

## 3.1.2 Environmental Consequences

This section evaluates the potential air quality impacts of the project. Project impacts would be considered significant if emissions from the project cause or contribute to a violation of an ambient air quality standard. A project causes or contributes to a violation of an ambient air quality standard if it has a non-trivial impact at a time and location where a violation of an ambient air quality standard occurs. Project operating emissions of nonattainment pollutants and their precursors will be offset to ensure that the project will result in no net regional increases in emissions of nonattainment pollutants.

Emissions estimates for all aspects of both construction and operation of the project are presented in this subsection. Dispersion modeling was conducted to determine project impacts on ambient air quality, and those results are also presented in this section, along with a discussion of dispersion model selection and the selection of model input data (i.e., emissions scenarios and release parameters, building wake effects, meteorological data, and receptor locations). Documentation that the project will comply with applicable local, state, and federal air quality regulatory requirements is also provided.

[5] Condition 11 of S-3636-3-4, -4-4 and -5-4; Special Condition X.G.2. of PSD SJ-99-03.

### 3.1.2.1 Air Quality-Related Elements

As described in Section 2.0 (Project Description), the proposed modifications will consist of the following elements:

- Installation of two new natural gas-fired auxiliary boilers to provide steam to the HRSGs and other systems to improve operating performance
- Amendment of the CEC license and air permit operating conditions to allow for simultaneous startup of the three existing GE Energy 7FA gas turbines
- Alteration of the combustion turbine using Advanced Gas Path (AGP) technology and installing GE's latest gas turbine control system software to improve thermal efficiency of the second power block (Unit 4)

The project owner also plans additional project changes that do not require changes to air permit conditions or CEC license conditions.  These changes include installation of terminal attemperators to increase startup flexibility by decoupling the bottoming cycle; changes to the fuel gas heating system to eliminate the need to delay starting up the gas turbines until the fuel gas heats, thereby allowing faster starts; changes to the gas turbine control system logic and fuel gas systems to allow purges to occur at shut down rather than start up and thereby allowing for a faster start-time in the subsequent start-up; installation of electric heaters on HRSG drums and the STG to retain heat and allow them to heat more quickly to reduce hold times during startup; and optimization of outlet temperature correction settings for the gas and steam turbines to improve startup times. Because these changes will not have any effect on air quality and do not require any changes to CEC air quality conditions of certification or to District permit conditions, they are not addressed further in this analysis.

The PEF altered the AGP components on two of the three existing combustion turbines in early 2012, pursuant to approval by the SJVAPCD and the CEC staff. The AGP alterations for the third combustion turbine (Unit 4) will be identical to those performed for the other two gas turbines and will consist of replacing the existing hot gas path components—such as turbine blades, nozzles, and associated structural elements—with functionally identical components that are made from advanced materials that can withstand higher temperatures. To support the higher operating temperatures, additional temperature sensors, instrumentation, controls, and piping will be added to the second power block. The SJVAPCD determined that these changes at the first power block could be considered routine maintenance and were therefore exempt from District permitting requirements.[6] The component replacement project was approved by the CEC staff in a letter dated February 24, 2012.

### 3.1.2.2 Construction Activities

Emissions during the construction phase of the project, including emissions from vehicle and equipment exhaust and the fugitive dust generated from vehicle movement and material handling, have been evaluated. The primary emission sources during construction will include exhaust from heavy construction equipment and vehicles and limited fugitive dust generated in areas disturbed by construction activities. The projected construction schedule duration is 7 months and will occur within only a small portion of the existing site on an existing concrete pad constructed to accommodate future generation.

Construction equipment and vehicle exhaust emissions have been estimated using equipment lists and construction scheduling information presented in Section 2.0, Description of Facility Modifications, and Appendix 3.1C (see also Table 3.1-11). The California Emissions Estimator Model (CalEEMod; version 2013.2.2), which incorporates EMFAC2013, has been used to generate equipment-specific emission factors

[6] Letter from David Warner, SJVAPCD Director of Permit Services, to Barbara McBride, dated December 9, 2011.

for all criteria pollutants for diesel-fueled construction equipment and for on-road vehicles, respectively. Assumptions used in calculating project construction emissions included a 7-month construction period; 5 construction days per week; and a single-shift, 10-hour workday. The list of fueled equipment needed during each month of the construction effort (see Table 3.1-11) served as the basis for estimating pollutant emissions throughout the term of construction and helped to identify the periods of probable maximum short-term emissions.

The short-term maximum emissions were calculated using equipment loadings and activity levels for Months 1 and 2. Annual emissions were based on the total emissions during the 7-month project.

Maximum daily construction emissions are shown in Table 3.1-12. Maximum annual criteria pollutant emissions during construction are shown in Table 3.1-13. Greenhouse gas emissions during construction are shown in Table 3.1-14.

TABLE 3.1-12
**Maximum Daily Construction Emissions, Pounds per Day**

| | NOx | SOx | CO | VOC | $PM_{10}$ | $PM_{2.5}$ |
|---|---|---|---|---|---|---|
| Onsite: | | | | | | |
| Construction Equipment | 23.0 | 0.1 | 47.5 | 1.3 | 0.14 | 0.14 |
| Fugitive Dust | -- | -- | -- | -- | <0.01 | <0.01 |
| Offsite: | | | | | | |
| Worker Travel, Truck Deliveries | 14.3 | 0.1 | 55.0 | 2.4 | 7.8 | 2.3 |
| Total | 37.3 | 0.2 | 102.5 | 3.8 | 8.0 | 2.4 |

TABLE 3.1-13
**Total Emissions During the Construction Period, Tons**

| | NOx | SOx | CO | VOC | $PM_{10}$ | $PM_{2.5}$ |
|---|---|---|---|---|---|---|
| Onsite: | | | | | | |
| Construction Equipment | 1.0 | <0.1 | 2.4 | 0.06 | 0.01 | 0.01 |
| Fugitive Dust | -- | -- | -- | -- | <0.01 | <0.01 |
| Offsite: | | | | | | |
| Worker Travel, Truck Deliveries | 0.9 | <0.1 | 2.2 | 0.12 | 0.35 | 0.11 |
| Total: | 1.9 | <0.1 | 4.6 | 0.17 | 0.36 | 0.12 |

TABLE 3.1-11
**Estimated Construction Equipment/Vehicle Use**

| Equipment/Vehicles | Horsepower (approx.) | Month of Construction (Unit: # per day) 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|
| Off-Road Equipment | | | | | | | | |
| Air Compressor, Ingersoll-Rand | 23.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Asphalt Paver, Cat | 174 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| Backhoe, Cat, | 97 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Excavator, Cat | 325 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Compactor, Cat | 410 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| Crane, 150-Ton, Manitowoc | 347 | 1 | 0 | 0 | 0 | 2 | 2 | 0 |
| Crane, 40-Ton, Grove | 173 | 0 | 2 | 2 | 2 | 0 | 0 | 0 |
| Knuckle Boom 120’ Manlift | 75 | 2 | 4 | 4 | 8 | 8 | 8 | 4 |
| Scissor Lift | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 30,000 lb Forklift | 150 | 0 | 2 | 2 | 2 | 2 | 2 | 0 |
| Welder, Multiquip, BLW-300SS | 19.5 | 0 | 2 | 4 | 4 | 4 | 4 | 4 |
| Welder, Multiquip, GA 3800 | 19.5 | 0 | 4 | 4 | 4 | 4 | 4 | 0 |
| On-Road Vehicles | | | | | | | | |
| Fuel/Lube trucks | n/a | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Dump trucks | n/a | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Water trucks | n/a | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| Welding trucks | n/a | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cement trucks | n/a | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Flatbed trucks | n/a | 1 | 1 | 1 | 1 | 1 | 0 | 0 |
| Delivery Trucks | n/a | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Construction workers | n/a | 13 | 25 | 77 | 130 | 143 | 119 | 76 |

Notes:
Construction schedule provided by Applicant. Construction activity assumed to occur 10 hours per day; 5 days per week; 22 days per month.
Round-trip travel distance is 70 miles with construction workers assumed to commute to the project site from the Bakersfield area. Assume no carpooling because of short construction period.
Emissions from on-road delivery trucks and worker commute trips were estimated using trip generation information presented in Table 3.9-1 in Section 3.9 and emission factors provided by CalEEMod.[7]

7 CalEEMod version 2013.2.2 incorporates the latest version of CARB’s EMFAC model, EMFAC2011.

TABLE 3.1-14
**Greenhouse Gas Emissions During the Construction Period**

| Activity | $CO_2$, metric tons/year | $CH_4$, metric tons/year | $N_2O$, metric tons/year | $CO_2$eq, metric tons/yr[a] |
|---|---|---|---|---|
| Off Road Equipment | 388 | 0.11 | <0.01 | 391 |
| Worker Travel | 300 | 0.02 | <0.01 | 300 |
| Truck Deliveries | 151 | <0.01 | <0.01 | 151 |
| Total | 839 | 0.13 | <0.01 | 842 |

Note:
[a] $CO_2$-equivalent GHG emissions calculated as sum of $CO_2$, $CH_4$, and $N_2O$ emissions weighted by global warming potential (GWP).

A dispersion modeling analysis has been conducted based on the criteria pollutant emissions shown in Tables 3.1-12 and 3.1-13. A detailed analysis of the construction emissions and associated ambient impacts is included in Appendix 3.1C. The results of the analysis indicate that the maximum construction impacts will be below the state and federal standards for all the criteria pollutants emitted. The best available emission control techniques will be used for controlling emissions during construction. The project construction impacts are not unusual in comparison to most construction sites; construction sites that use good dust suppression techniques and low-emitting vehicles typically do not cause violations of air quality standards.

### 3.1.2.3 Operational Impacts

The proposed modifications constitute a modification to an existing major source. This section of the application presents calculated emissions from the new equipment as well as emissions from the existing permitted equipment for the purpose of demonstrating rule compliance.

This section also presents calculated TAC emissions from the proposed new auxiliary boilers. Tables containing the detailed calculations for both criteria and noncriteria emissions are included in Appendix 3.1A.

**New Equipment**

The proposed new auxiliary boilers will be Rentech (or equivalent) watertube boilers with a steam generating capacity of 75,000 lb/hr at 300 psig. The boilers will be equipped with low-NOx burners and selective catalytic reduction to minimize NOx emissions, and will be fueled with natural gas to minimize $SO_2$ and $PM_{10}/PM_{2.5}$ emissions.

Specifications for the new auxiliary boilers are summarized in Table 3.1-15. A typical fuel analysis is summarized in Table 3.1-16.

The auxiliary steam boilers will provide steam during plant start-up and shut-down to allow startups and shutdowns to be accomplished more quickly. During pre-start activities and during the initial phases of start-up, steam for sealing, warming the steam turbine (optional), heating/re-heating condensate (condenser sparging steam), and heating the combustion turbine fuel gas will be supplied from the new auxiliary boilers. Although the auxiliary boilers will be used mainly to support turbine startup activities, quarterly and annual boiler emissions for all pollutants are calculated based on 8,760 hours per year of operation.

TABLE 3.1-15
**New Auxiliary Boiler Design Specifications**

| | |
|---|---|
| Manufacturer | Rentech (or equivalent) |
| Model | D-type |
| Fuel | Natural gas |
| Nominal Heat Input Rate | 91.4 MMBtu/hr @ HHV (each) |
| Nominal Exhaust Temperature | 300 °F |
| Nominal Exhaust Flow Rate | 27,000 acfm |
| Nominal Exhaust $O_2$ Concentration, dry volume | 3% |
| Emission Controls | Low-$NO_x$ Burners and SCR (5.0 ppmv $NO_x$ @ 3% $O_2$) |

TABLE 3.1-16
**Nominal Fuel Properties – Natural Gas[a]**

| **Component Analysis** | | **Chemical Analysis** | |
|---|---|---|---|
| **Component** | **Average Concentration, Volume** | **Constituent** | **Percent by Weight** |
| $CH_4$ | 96.03% | C | 73.51 % |
| $C_2H_6$ | 2.17% | H | 24.09 % |
| $C_3H_8$ | 0.35 % | N | 0.97 % |
| $C_4H_{10}$ | 0.11 % | O | 1.44 % |
| $C_5H_{12}$ | 0.03 % | S | <0.75 gr/100 scf |
| $C_6H_{14}$ | 0.02 % | Higher Heating Value | 1025 Btu/scf<br>23,171 Btu/lb |
| $N_2$ | 0.58 % | | |
| $CO_2$ | 0.73 % | | |
| S | <0.00% | | |

Note:
[a] Based on gas samples collected at the project between 2009 and 2012.

Emission rates for the auxiliary boilers during normal operation are shown in Table 3.1-17. The maximum hourly, daily, and annual heat inputs to the boilers, summarized in Table 3.1-18, were used as the basis for calculating hourly, daily, quarterly, and annual emissions as shown in Table 3.1-19. Maximum hourly NOx emissions reflect both boilers in startup during the same hour.

TABLE 3.1-17
**Emission Rates for the New Auxiliary Boilers**

| | **Emissions** | | |
|---|---|---|---|
| **Pollutant** | **ppmvd @ 3% $O_2$** | **lb/MMBtu** | **lb/hr (each boiler)** |
| NOx (normal operation) | 5.0 | 0.006 | 0.55 |
| NOx (startup/shutdown/initial tuning) | 83 | 0.10 | 9.1 |
| SOx | 1.26[a] | 0.002 | 0.19 |
| CO | 50 | 0.036 | 3.3 |
| VOC | 10 | 0.004 | 0.38 |
| $PM_{10}/PM_{2.5}$ | -- | 0.007 | 0.64 |

Note:
[a] Based on maximum fuel sulfur content of 0.75 grains per 100 scf.

TABLE 3.1-18
**Hourly, Daily and Annual Heat Input for the New Auxiliary Boilers**

| | Heat Input, MMBtu (HHV) | |
|---|---|---|
| **Interval** | **Either Boiler** | **Total, Two Boilers** |
| Hourly | 91.4 | 182.8 |
| Daily | 2,194 | 4,387 |
| Annual | 800,646 | 1,601,300 |

### *Startup and Shutdown*

During normal operation, and as a worst case, each auxiliary boiler is expected to undergo one startup/shutdown event each day. Each auxiliary boiler is expected to take up to 3 hours to come into compliance with the proposed NOx limit of 5.0 ppmvd because the boiler exhaust temperature must be high enough for the SCR control system to be effective in reducing NOx exhaust concentrations from the uncontrolled level of about 83 ppmvd. During shutdown, each boiler may have NOx emissions in excess of 5 ppmvd for up to about 15 minutes. The two auxiliary boilers may have a total of up to 6 hours total per day of elevated NOx emissions due to startup and shutdown activities.

### *Commissioning*

The boilers will need to operate for up to 200 hours during an initial commissioning period to allow for initial operation and tuning without the SCR systems in place. During the commissioning period, uncontrolled NOx emissions may be up to 83 ppmvd, or 0.10 lb/MMBtu. Until the boilers are tuned, CO emissions may be up to 100 ppmvd, or 0.072 lb/MMBtu.

TABLE 3.1-19
**Criteria Pollutant Emissions, New Auxiliary Boilers**

| Equipment | NOx | | | SOx | | | CO | | | VOC | | | $PM_{10}/PM_{2.5}$ | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Max lb/hr | Max lb/day | Total TPY | Max lb/hr | Max lb/day | Total TPY | Max lb/hr | Max lb/day | Total TPY | Max lb/hr | Max lb/day | Total TPY | Max lb/hr | Max lb/day | Total TPY |
| Auxiliary Boiler 1 | 9.1 | 38.9 | 7.1 | 0.19 | 4.6 | 0.8 | 3.4 | 79.9 | 14.9 | 0.38 | 9.2 | 1.7 | 0.64 | 15.4 | 2.8 |
| Auxiliary Boiler 2 | 9.1 | 38.9 | 3.4 | 0.19 | 4.6 | 0.8 | 3.4 | 79.9 | 14.9 | 0.38 | 9.2 | 1.7 | 0.64 | 15.4 | 2.8 |
| **Total** | 18.3 | 77.8 | 14.2 | 0.38 | 9.2 | 1.7 | 6.8 | 159.8 | 29.8 | 0.76 | 18.3 | 3.3 | 1.28 | 30.7 | 5.6 |

Notes:
Maximum hourly emissions based on rated heat input (Table 3.1-18) and guaranteed normal operation emission rates (Table 3.1-17). Maximum hourly NOx emissions occur during boiler startups.
Daily and annual emissions based on 24 hours per day, 8760 day/year operation.

### *Greenhouse Gas Emissions*

Potential maximum annual GHG emissions for the new auxiliary boilers were calculated using the calculation methods and emission factors from the federal GHG Reporting Regulation.[8] Table 3.1-20 presents the estimated GHG emissions due to project operations in carbon dioxide equivalent ($CO_2e$) metric tons and short tons per year. Emissions of methane and nitrous oxide have been converted to $CO_2$ equivalents using global warming potentials (GWPs) of 25, 298, and 23,900, respectively. (EPA, 2013) There are no new circuit breakers or other sources of sulfur hexafluoride leakage associated with the proposed project.

Appendix 3.1A presents supporting technical information and details used to calculate the greenhouse gas emissions.

TABLE 3.1-20
**Greenhouse Gas Emissions from the Auxiliary Boilers**

| Units | $CO_2$, metric tons/year | $CH_4$, metric tons/year | $N_2O$, metric tons/year | $CO_2$eq, metric tons/yr[a] | $CO_2$e, tons/yr[a] |
|---|---|---|---|---|---|
| Auxiliary Boilers | 84,965 | 3.2 | 0.32 | 85,052 | 93,558 |

Note:
[a] Includes $CO_2$, $CH_4$, and $N_2O$.

### Existing Units

In addition to the two new auxiliary boilers, the proposed project includes a change in the method of operation of the existing gas turbines by reducing gas turbine startup time and allowing the gas turbines to start up simultaneously. A change in the method of operation may trigger a requirement for PSD review if it meets the definition of "major modification." Under the federal PSD regulations (40 CFR 52.21, incorporated by reference in the SJVAPCD's Rule 2410, Prevention of Significant Deterioration):

> **52.21(b)(2)(i)** ***Major modification*** means any physical change in or change in the method of operation of a major stationary source that would result in: a significant emissions Increase (as defined in paragraph (b)(40) of this section) of a regulated NSR pollutant (as defined in paragraph (b)(50) of this section); and a significant net emissions increase of that pollutant from the major stationary source.

Therefore, the proposed change must be evaluated to determine whether it will result in a significant emissions increase, as defined in §52.21 (b)(40).

In accordance with §52.21 (a)(2)(iv)(f), a "[h]ybrid test" must be used to determine emissions increases "for projects that involve multiple types of emissions units." The "actual-to-projected-actual applicability test" [§52.21 (a)(2)(iv)(c)] is used to evaluate potential emissions increases for the existing gas turbines. Under this procedure, the emissions increases for modifications to existing units are calculated as the difference between <u>projected actual emissions</u> and <u>baseline actual emissions</u>.

Projected actual emissions are calculated from

> "(1) The hourly emissions rate, which is based on the emissions unit's operational capabilities following the change(s), taking into account legally enforceable restrictions that could affect the hourly emissions rate following the change(s); and (2) the projected level of utilization, which is based on both the emissions unit's historical annual utilization rate and available information regarding the

8 40 CFR 98, *Mandatory Reporting of Greenhouse Gases*

> emissions unit's likely post-change capacity utilization…From the initial calculation, you may then make the appropriate adjustment to subtract out any portion of the emissions increase that could have been accommodated during the unit's 24-month baseline period and is unrelated to the change." [67 FR 80186, p. 80196, emphasis added]

"Baseline actual emissions" for an existing electric utility steam generating unit are defined in §52.21(b)(48)(i) as:

> "… the average rate, in tons per year, at which the emissions unit actually emitted the pollutant during any consecutive 24-month period selected by the owner or operator within the 5-year period immediately preceding either the date the owner or operator begins actual construction of the project, or the date a complete permit application is received by the Administrator for a permit required under this section…."

"Baseline actual emissions" are the highest actual emissions for each pollutant of any two-year period during the previous 5 years.

Per 40 CFR §52.21(b)(41)(ii)(c), the calculated emissions increase:

> "Shall exclude, in calculating any increase in emissions that results from the particular project, that portion of the unit's emissions following the project that an existing unit could have accommodated during the consecutive 24-month period used to establish the baseline actual emissions under subparagraph (2)(aa) of this rule and that are not resulting from the particular project, including any increased utilization due to product demand growth…" [emphasis added]

This provision is commonly called the "demand growth exclusion." Calpine has chosen not to use the demand growth exclusion to exclude any of the calculated emissions increases in this calculation of emissions increases that will result from the proposed project.

The results of the emissions calculations for the emissions changes due to the proposed AGP and software upgrades are shown in Table 3.1-21. Details of the calculations are shown in Attachment 3.1A.

TABLE 3.1-21
**Gas Turbine Emissions Changes Due to Proposed Upgrades to Gas Turbine Unit 4**

| | Emissions, tons per year | | | | | |
|---|---|---|---|---|---|---|
| | **NOx** | **SO2** | **CO** | **VOC** | **PM10/PM2.5** | **GHG** |
| Projected Actual Emissions[a] | 44.7 | 3.7 | 31.3 | 12.3 | 12.9 | 651,706 |
| Baseline Actual Emissions | 34.9 | 3.6 | 4.3 | 0.5 | 9,.1 | 702,431 |
| Net Emissions Increase[b] | 9.9 | 0.2 | 27.0 | 11.7 | 3.9 | -50,725 |

Notes:
[a] Maximum projected emissions over the 10-year period following the proposed upgrade, based on modeled projections of gas turbine operation.
[b] Projected emissions with the upgrade are lower for some pollutants than projected emissions without the upgrade because of a projected reduction in the frequency of gas turbine startups.

### Project Emissions Increase for PSD Applicability

The determination of PSD applicability is made for all of the emissions changes that will result from the proposed project. These changes, summarized in Table 3.1-22, include the emissions increases from the new auxiliary boilers (from Table 3.1-19) as well as the emissions changes due to the proposed upgrades to Unit 4 (from Table 3.1-21).

TABLE 3.1-22
**Emissions Changes for the Proposed Project for PSD Applicability**

| | Emissions, tons per year | | | | | |
|---|---|---|---|---|---|---|
| | **NOx** | **SO2** | **CO** | **VOC** | **$PM_{10}/PM_{2.5}$** | **GHG** |
| New Auxiliary Boilers | 14.2 | 1.7 | 29.8 | 3.3 | 5.6 | 93,558 |
| Emissions Change from Upgrades to Unit 4 | 9.9 | 0.2 | 27.0 | 11.7 | 3.9 | -50,725 |
| Total | 24.1 | 1.9 | 56.8 | 15.0 | 9.5 | 42,832 |
| PSD Thresholds | 40 | 40 | 100 | 40 | 15/10 | 75,000[a] |
| Exceed PSD Thresholds? | No | No | No | No | No | No |

Note:
[a] Based on the Supreme Court's June 23, 2014 opinion on the GHG Tailoring Rule (Utility Air Regulatory Group v. EPA, No. 12-1146), the project would not be subject to PSD review regardless of its GHG emissions because the emissions increases of other criteria pollutants are below their respective significant emissions thresholds. However, the SJVAPCD's PSD rule (Rule 2410) cites the June 16, 2011 version of 40 CFR 52.21 and thus includes the 75,000 tpy $CO_2e$ threshold, so a comparison with that threshold is included here for completeness.

Because the total emissions increases that will result from the new auxiliary boilers and the changes to gas turbine Unit 4 are below all PSD thresholds, PSD program requirements are not applicable.

### 3.1.2.4 Non-Criteria Pollutant Emissions

Non-criteria pollutants emitted by the new auxiliary boilers are summarized in Table 3.1-23. Detailed calculations and emission factors are presented in Appendix 3.1A, Table 3.1A-3.

TABLE 3.1-23
**Non-Criteria Pollutant Emissions from the Auxiliary Boilers**

| Pollutant | Max. Hourly Emissions per unit, lbs/hr | Annual Emissions per Boiler, tpy | Total Annual Emissions, Two Boilers, tpy |
|---|---|---|---|
| Ammonia | 0.40 | 1.77 | 3.55 |
| Propylene | 0.05 | 0.21 | 0.41 |
| Hazardous Air Pollutants: | | | |
| Acetaldehyde | 2.76E-04 | 1.21E-03 | 2.42E-03 |
| Acrolein | 2.41E-04 | 1.05E-03 | 2.11E-03 |
| Benzene | 5.17E-04 | 2.27E-03 | 4.53E-03 |
| Ethylbenzene | 6.15E-04 | 2.69E-03 | 5.39E-03 |
| Formaldehyde | 1.10E-03 | 4.80E-03 | 9.61E-03 |
| Hexane | 4.10E-04 | 1.80E-03 | 3.59E-03 |
| Naphthalene | 2.67E-05 | 1.17E-04 | 2.34E-04 |
| PAHs (excluding naphthalene) | 3.57E-05 | 1.56E-04 | 3.12E-04 |
| Toluene | 2.36E-03 | 1.03E-02 | 2.07E-02 |
| Xylene | 1.76E-03 | 7.69E-03 | 1.54E-02 |
| Total HAPs | | | 0.06 |

### 3.1.2.5 Air Dispersion Modeling

An assessment of impacts from the proposed project on ambient air quality has been conducted using EPA-approved air quality dispersion models, following standard modeling procedures used for similar projects in the San Joaquin Valley and discussed with the SJVAPCD modeling staff. These models are based on various mathematical descriptions of atmospheric diffusion and dispersion processes in which a pollutant source impact can be calculated over a given area.

The impact analysis was used to determine the worst-case ground-level impacts of the project. The results were compared with established state and federal ambient air quality standards and PSD significance levels. If the standards are not exceeded under worst-case conditions then it is inferred that, in the operation of the facility, no exceedances are expected under any conditions. In accordance with the air quality impact analysis guidelines developed by EPA (40 CFR Part 51, Appendix W: Guideline on Air Quality Models) and CARB (Reference Document for California Statewide Modeling Guideline, April 1989), the ground-level impact analysis includes the following assessments:

- Impacts in simple, intermediate, and complex terrain; and
- Aerodynamic effects (downwash) due to nearby building(s) and structures.

Simple, intermediate, and complex terrain impacts were assessed for all meteorological conditions that would limit the amount of final plume rise. Plume impaction on elevated terrain, such as on the slope of a nearby hill, can cause high ground-level concentrations, especially under stable atmospheric conditions. Another dispersion condition that can cause high ground-level pollutant concentrations is building downwash. Building downwash can occur when wind speeds are high and a building or structure is in close proximity to the emission stack. This can result in building wake effects where the plume is drawn down toward the ground by the lower pressure region that exists on the lee side (downwind) of the building or structure.

The basic model equation used in this analysis assumes that the concentrations of emissions within a plume can be characterized by a Gaussian distribution about the centerline of the plume. Concentrations at any location downwind of a point source such as a stack can be determined from the following equation:

$$C(x,y,z,H) = \left(\frac{Q}{2\pi\sigma_y\sigma_z u}\right) * \left(e^{-1/2(y/\sigma y)^2}\right) * \left(\left[e^{-1/2(z-H/\sigma_z)^2}\right] + \left\lfloor e^{-1/2(z+H/\sigma_z)^2}\right\rfloor\right)$$

Where:

*C* = the concentration in the air of the substance or pollutant in question

*Q* = the pollutant emission rate

$\sigma_y,\sigma_z$ = the horizontal and vertical dispersion coefficients, respectively, at downwind distance x

*u* = the wind speed at the height of the plume center

*x,y,z* = the variables that define the 3-dimensional Cartesian coordinate system used; the downwind, crosswind, and vertical distances from the base of the stack

*H* = the height of the plume above the stack base (the sum of the height of the stack and the vertical distance that the plume rises due to the momentum and/or buoyancy of the plume)

Gaussian dispersion models are approved by EPA for regulatory use and are based on conservative assumptions (i.e., the models tend to overpredict actual impacts by assuming steady-state conditions, no pollutant loss through conservation of mass, no chemical reactions, etc.). The EPA models were used to determine if ambient air quality standards would be exceeded, and whether a more accurate and sophisticated modeling procedure would be warranted to make the impact determination. The following sections describe:

- Air quality impact analyses;
- Existing ambient pollutant concentrations;
- Results of the ambient air quality modeling analyses; and
- Significance of the modeled impacts.

**Model Selection**

The air quality impact analyses were performed using the American Meteorological Society/EPA Regulatory Model Improvement Committee (AERMIC) model, also known as AERMOD (current version 14134).

The AERMOD model is a steady-state, multiple-source, Gaussian dispersion model designed for use with stack emission sources situated in terrain where ground elevations can exceed the stack heights of the emission sources (i.e., complex terrain). The model is capable of estimating concentrations for a wide range of averaging times (from 1 hour to 1 year). Inputs required by the AERMOD model include the following:

- Model options;
- Meteorological data;
- Source data; and
- Receptor data.

Model options refer to user selections that account for conditions specific to the area being modeled or to the emissions source that needs to be examined. Examples of model options include the use of site-specific vertical profiles of wind speed and temperature; consideration of stack and building wake effects; and time-dependent exponential decay of pollutants. The model supplies recommended default options for the user for some of these parameters.

AERMOD uses hourly meteorological data to characterize plume dispersion. The representativeness of the data is dependent on the proximity of the meteorological monitoring site to the area under consideration, the complexity of the terrain, the exposure of the meteorological monitoring site, and the period of time during which the data are collected.

The District provided a meteorological dataset already processed by AERMET to generate AERMOD-compatible meteorological data for air dispersion modeling. The data were processed using the ADJ_U* option, and the AERMOD model used the "beta" option to be compatible with the processed meteorological data.[9] The surface meteorological data were recorded at the District's Bakersfield monitoring station during the five-year period 2009 through 2013, and the upper air data were recorded at the Oakland International Airport, approximately 430 km north-northwest of the project site. EPA's modeling guidance requires the use of "on-site data" to represent surface meteorological conditions. This term is defined to mean data that would be representative of atmospheric dispersion conditions at the source and at locations where the source may have a significant impact on air quality. Representativeness

9 According to the discussion at the following link, the default AERMET u* formulation underpredicts surface friction velocity (u*) at low wind speeds by approximately a factor of 2:
http://www.cleanairinfo.com/regionalstatelocalmodelingworkshop/archive/2013/Files/Presentations/Tuesday/105-Review_of_AERMOD_Low_Wind_Speed_Options_Paine.pdf
The beta "ADJ_U*" option in AERMET adjusts the u* at low wind speeds based on the following methodology: Qian and Venkatram, "Performance of Steady-State Dispersion Models Under Low Wind-Speed Conditions," Boundary-Layer Meteorology (2011) 138:475–491.

has been defined in the PSD Monitoring Guideline as data that characterize the air quality for the general area in which the proposed project would be constructed and operated. The meteorological data requirement originates in the Clean Air Act at Section 165(e)(1), which requires an analysis "of the ambient air quality at the proposed site and in areas which may be affected by emissions from such facility for each pollutant subject to regulation under [the Act] which will be emitted from such facility."

This requirement and EPA's guidance on the use of on-site monitoring data are also outlined in the *On-Site Meteorological Program Guidance for Regulatory Modeling Applications*.[10] The representativeness of the data depends on (a) the proximity of the meteorological monitoring site to the area under consideration, (b) the complexity of the topography of the area, (c) the exposure of the meteorological sensors, and (d) the period of time during which the data are collected. The District has determined, and the applicant concurs, that the District's Bakersfield meteorological data are representative of conditions at the project site.

Representativeness has also been defined in "The Workshop on the Representativeness of Meteorological Observations" (Nappo et. al., 1982) as "the extent to which a set of measurements taken in a space-time domain reflects the actual conditions in the same or different space-time domain taken on a scale appropriate for a specific application." Representativeness is best evaluated when sites are climatologically similar, as are the project site and the Bakersfield meteorological monitoring station. Representativeness has additionally been defined in the PSD Monitoring Guideline (USEPA, 1987b) as data that characterize the air quality for the general area in which the proposed project would be constructed and operated. Because of the proximity of the Bakersfield meteorological data site to the proposed project site (distance between the two locations is approximately 56 km), and because the maximum ambient air quality impacts of the project are expected to be near the project site, the same large-scale topographic features that influence the meteorological data monitoring station also influence the proposed project site in the same manner.

**Good Engineering Practice Stack Height Analysis**

For the purposes of modeling, a stack height beyond what is required by Good Engineering Practices (GEP) is not allowed (40 CFR §51.164). However, this requirement does not place a limit on the actual constructed height of a stack. GEP as used in modeling analyses is the height necessary to ensure that emissions from the stack do not result in excessive concentrations of any air pollutant in the immediate vicinity of the source as a result of atmospheric downwash, eddies, or wakes that may be created by the source itself, nearby structures, or nearby terrain obstacles. In addition, the GEP stack height modeling restriction assures that any required regulatory control measure is not compromised by the effect of that portion of the stack that exceeds the GEP height. The EPA guidance ("Guideline for Determination of Good Engineering Practice Stack Height," Revised 6/85) for determining GEP stack height indicates that GEP is the greater of 65 meters or $H_g$, where $H_g$ is calculated as follows:

$$H_g = H + 1.5L$$

Where:

$H_g$ = GEP stack height, measured from the ground-level elevation at the base of the stack

H = height of nearby structure(s) measured from the ground-level elevation at the base of the stack

L = lesser dimension, height or maximum projected width, of nearby structure(s)

The auxiliary boiler stack heights, at 60 feet, are less than the GEP limit of 65 meters (213 feet). Stack heights therefore do not need to be adjusted for GEP.

10 EPA, *Supplement A to the Guideline on Air Quality Models (Revised)*, 1987.

**Receptor Grid Selection and Coverage**

Receptor and source base elevations were determined from USGS National Elevation Dataset (NED) data in the GeoTIFF format at a horizontal resolution of 1 arc-second (approximately 30 meters). All coordinates were referenced to UTM North American Datum 1983 (NAD83), Zone 11. The AERMOD receptor elevations were interpolated among the DEM nodes according to standard AERMAP procedure. For determining concentrations in elevated terrain, the AERMAP terrain preprocessor receptor-output (ROU) file option was chosen; hills were not imported into AERMOD for CTDM-like processing.

Cartesian coordinate receptor grids were used to provide adequate spatial coverage surrounding the project area for assessing ground-level pollution concentrations, to identify the extent of significant impacts, and to identify maximum impact locations. A 250-meter resolution coarse receptor grid was developed and extended outwards at least 10 km (or more as necessary to calculate the significant impact area). For the full impact analyses, a nested grid was developed to fully represent the maximum impact area(s). This grid has 25-meter resolution along the facility fence-line in a single tier of receptors composed of four segments extending out to 100 meters from the fenceline, 100-meter resolution from 100 meters to 1,000 meters from the fenceline, and 250-meter spacing out to at least 10 km from the most distant source modeled, not to exceed 50 km from the project site. Additional refined receptor grids with 25-meter resolution were placed around the maximum first-high and maximum second-high coarse grid impacts and extended out 1,000 meters in all directions. Concentrations within the facility fenceline were not calculated.

The regions imported in Geographical Coordinates for the USGS National Elevation Dataset (NED) data are bounded as follows:

- South West corner: UTM Zone 11 (NAD 83) 321,500.0m, 3,859,700.0m; and
- North East corner: UTM Zone 11 (NAD 83) 341,600.0m, 3,879,800.0m.

### 3.1.2.6 Ambient Background Data Selection

Background ambient air quality data for the project area from the monitoring site most representative of the conditions that exist at the proposed project site were used to represent regional background concentrations. Table 3.1-2 above shows the monitoring stations used to provide representative ambient air quality background data.

For annual $NO_2$ and all $SO_2$, $PM_{10}$, and CO averaging periods, the highest values monitored during the most recent three-year period for which data were available were used to represent ambient background concentrations in the project area. For analyses of federal 24-hour $PM_{2.5}$ impacts, the three-year average of the 98th percentile 24-hour monitored levels for the period between 2009 and 2013 was used to represent project background because these values correspond to the method used for determining compliance with the federal $PM_{2.5}$ standards.[11] The one-hour average $NO_2$ analyses were performed as described in Appendix 3.1B.

Table 3.1-24 summarizes the most recent three years of background data at each monitoring station described above. The highest monitored concentrations, which were used in the summaries described below, are shown in ***bold italic***. More detailed discussions of why the data collected at these stations are representative of ambient concentrations in the vicinity of the project are provided in the previous section.

[11] *See* EPA, Draft Guidance for $PM_{2.5}$ Permit Modeling, Public Review Draft dated March 4, 2013; available at: http://www.epa.gov/ttn/scram/guidance/guide/Draft_Guidance_for_PM25_Permit_Modeling.pdf, at 46-52. While EPA's Draft Guidance for $PM_{2.5}$ Permit Modeling is intended for use in air quality impacts analyses required to satisfy the requirements of the PSD program, application of the guidance for these principles may be appropriate in these circumstances as well.

TABLE 3.1-24
**Background Air Quality in the Project Area**

| Pollutant /Averaging Period | Monitored Concentration, µg/m³ | | |
|---|---|---|---|
| | | Edison | |
| $NO_2$ | 2011 | 2012 | 2013 |
| Max 1-hr | 79.0 | ***88.5*** | 88.5 |
| 98th pctl[a] | 65.8 | ***67.7*** | 59.8 |
| Annual | 11.3 | ***13.2*** | 11.3 |
| | | Fresno, 1st Street | |
| $SO_2$ | 2009 | 2010 | 2011 |
| 1-hr | 34.1 | 39.3 | ***41.9*** |
| 99th ptl 1 hr | ***21.0*** | 18.3 | 19.2 |
| 3-hr | ***26.0*** | 18.3 | 20.8 |
| 24-hr | ***13.1*** | 7.9 | 10.5 |
| | | Bakersfield Golden State Hwy | |
| CO | 2008 | 2009 | 2010 |
| 1-hr | ***4,375*** | 2,750 | 2,625 |
| 8-hr | ***2,411*** | 1,678 | 1,622 |
| | | Bakersfield California Avenue | |
| $PM_{10}$ | 2011 | 2012 | 2013 |
| Highest 24-Hour Average (federal)[b] | 97.4 | 99.6 | ***120*** |
| Highest 24-Hour Average (state) | ***154*** | 126 | 116.9 |
| Annual Average | ***44.2*** | 41.4 | n/a |
| | | Bakersfield Planz Road | |
| $PM_{2.5}$ | 2011 | 2012 | 2013 |
| Highest 24-Hour Average | 45.9 | 52.5 | ***167.3*** |
| 98th Percentile 24-Hour Average | 43.2 | 41.0 | ***96.7*** |
| Annual Average | 14.5 | 14.7 | ***22.7*** |

Notes:
[a] 1-hour $NO_2$ design value is 75.47 µg/m³. (Source: SJVAPCD website, http://www.valleyair.org/busind/pto/Tox_Resources/AirQualityMonitoring.htm#no2_data)
[b] Readings based on federal rather than state measurement methods. Federal data also excludes data determined to be influenced by exceptional events.

## 3.1.2.7 Construction Impacts

Calculation of emissions from construction activities was described above in Section 3.1.2.3. Ambient air quality modeling was conducted for short-term averaging times using all combustion emissions from all construction activities during the month with maximum emissions (varies by pollutant; see Table 3.1-18). Total emissions from Table 3.1-19 were used to evaluate annual impacts. Based on the construction equipment loading and activity estimates in Table 3.1-11 and the emission estimates in Appendix 3.1C, the highest air pollutant emissions are expected to occur during the first three months of construction. All construction activities were assumed to occur during a 10-hour work day. The modeling was performed with no downwash. The emission sources for the construction site were grouped into two categories: exhaust emissions and construction dust emissions. The exhaust emissions were modeled as two volume sources with a vertical dimension of 6 meters. The fugitive dust emissions generated by construction equipment operation/vehicle travel were modeled with the same two volume sources, but with a vertical dimension of 3 meters. Based on the width of the construction area, the horizontal dimension for the two volume sources at the facility site was set to 16.52 meters, with sigma-y = 3.84 meters.

The OLM option of AERMOD was used to account for the role of ambient ozone levels on the atmospheric conversion rate of NOx emissions (initially mostly in the form of nitric oxide) to $NO_2$ (the pollutant addressed by ambient standards). Hourly ozone measurements at the Edison monitoring station during the same five years of the meteorological input data set were used to support the OLM calculations. An $NO_2$: NOx ratio of 11% was used for the construction equipment, based on the default ratio provided for heavy-duty diesel trucks in Appendix C of the CAPCOA modeling guidance.

Table 3.1-25 shows that worst-case background concentrations of $PM_{10}$ and $PM_{2.5}$ are already above state and federal standards. The project's modeled annual $PM_{10}$ and $PM_{2.5}$ impacts are small relative to the background.

TABLE 3.1-25
**Modeled Maximum Impacts During Construction**

| Pollutant | Averaging Period | Maximum Onsite Construction Impact (µg/m³) | Maximum Background Concentration (µg/m³) | Total Concentration (µg/m³) | NAAQS (µg/m³) | CAAQS (µg/m³) |
|---|---|---|---|---|---|---|
| $NO_2$ | 1-hr | 156.1 | 68.2 | 192.2[a] | -- | 339 |
| | 98th pctl | -- [b] | 68.2 | -- [b] | 188 | -- |
| | Annual | 1.2[c] | 13.2 | 14.4 | 100 | 57 |
| $SO_2$ | 1-hr | 1.7 | 41.9 | 43.6 | 196 | 655 |
| | 3-hr | 1.0 | 26 | 27 | 1300 | -- |
| | 24-hr | 0.17 | 13.1 | 13.3 | -- | 105 |
| CO | 1-hr | 931 | 4,375 | 5,306 | 40,000 | 23,000 |
| | 8-hr | 202 | 2,411 | 2,613 | 10,000 | 20.000 |
| $PM_{10}$ | 24-hr (state) | 0.3 | 120 | 120.3 | 150 | -- |
| | 24-hr (federal) | 0.3 | 154 | 154.3 | -- | 50 |
| | Annual | 0.01 | 44.2 | 44.2 | -- | 20 |
| $PM_{2.5}$ | 24-hr | 0.3 | 96.7 | 97.0 | 35 | -- |
| | Annual | 0.01 | 22.7 | 22.7 | 15.0 | 12 |

Notes:
[a] Monthly hour-of-day method used to calculate total concentration for each hour, so maximum total concentration is not equal to maximum predicted concentration plus maximum background concentration because conditions do not occur simultaneously. See Appendix 3.1B.
[b] Compliance with the federal 1-hour $NO_2$ standard is not evaluated for construction activities because the standard is based on a three-year averaging period and construction will last for only 7 months.
[c] Annual $NO_2$ calculated from modeled annual NOx using default ARM conversion of 75%.

Mitigation measures to be used to minimize emissions during construction are described in detail in Appendix 3.1C. As discussed in Section 3.1.6, emission offsets will be provided prior to the commencement of construction that will fully mitigate potential construction impacts.

Table 3.1-25 shows that construction emissions will not cause new exceedances of any state or federal air quality standards.

### 3.1.2.8 Impacts During Operation

This ambient air quality impact analysis demonstrates that neither the operation of the new auxiliary boilers nor the simultaneous startup of all three combustion turbines will cause or contribute to any violations of ambient air quality standards. Because the auxiliary boilers will be used to assist in starting up the gas turbines, it is very unlikely that the auxiliary boilers will be starting up while the gas turbines are in operation. Nevertheless, since NOx emissions from the auxiliary boilers may be elevated above normal emission rates during boiler startups, the ambient air quality modeling assessment evaluated potential 1-hour $NO_2$ impacts during an hour when both boilers start up and all three gas turbines are in operation.

Except as described in the preceding paragraph, the auxiliary boilers will not operate during the periods when one or more CTs are operational. However, they may operate during the initial phases of turbine startup, so to be conservative, the auxiliary boiler emissions were included in startup impact evaluations as well as during normal operations.

Gas turbine startup impacts are evaluated explicitly only for pollutants for which emissions are elevated above normal levels. Turbine exhaust parameters for 50% load operation were used to characterize CT exhaust during startup. The applicant is proposing to remove the restriction that prohibits more than one gas turbine from being in startup at one time. The emission rates and stack parameters used in the startup modeling analysis are shown in Appendix 3.1B.

Initial $NO_2$/NOx ratios of 10% and 20% were used for the auxiliary boilers and the emergency engines, respectively, based on the ratios shown for this equipment in CAPCOA guidance.[12] For the combustion turbines, initial $NO_2$/NOx ratios of 24% and 13% were used during startup and normal operation, respectively, based on the ratios accepted by the SDAPCD for permitting of the Apex Pio Pico and NRG Carlsbad Energy Center projects.[13]

The following operating assumptions were used in developing the emission rates for each emissions unit and averaging period during normal operations.

***1-hour and 3-hour averages***

- Auxiliary boilers and CTs in normal operation; emergency equipment in operation

***8-hour averages***

- CTGs in startup for three hours and in normal operation for five hours; auxiliary boilers in operation for three hours; emergency equipment in operation

***24-hour and annual averages***

- CTGs, auxiliary boilers, cooling towers and emergency equipment in operation

Emission rates and stack parameters used for the ambient air quality impact assessment are shown in Appendix 3.1B, Table 3.1B-2. The results of the analysis are summarized in Table 3.1-26. The highest modeled short-term $NO_2$ and CO impacts are expected to occur under startup conditions; the highest impacts for other pollutants and averaging periods occur under normal operating conditions. Table 3.1-26 shows that project impacts exceed the significance level only for the federal $NO_2$ and $PM_{2.5}$ standards. All other project impacts are too low to have the potential to cause or contribute significantly to a violation of an ambient air quality standard.

12 CAPCOA, "Modeling Compliance of The Federal 1-Hour NO2 NAAQS." October 27, 2011. Available at http://www.valleyair.org/busind/pto/Tox_Resources/CAPCOANO2GuidanceDocument10-27-11.pdf. Accessed September 2014.

13 December 23, 2010, email message from Dr. Steven Moore, SDAPCD, to Steve Hill, Sierra Research, regarding NO2:NOx in-stack ratio for Pio Pico Energy Center.

TABLE 3.1-26
**Summary of Modeling Results**

| Pollutant | Averaging Period | Modeled Concentration ($\mu g/m^3$) | | | PSD Significant Impact Level ($\mu g/m^3$) |
|---|---|---|---|---|---|
| | | Normal Operation | Boiler Startup[a] | Gas Turbine Startup[b] | |
| $NO_2$ | 1-hr[c] | 156[e] | 131 | 193 | n/a |
| | 98th pctl[c] | 144[e] | 107 | 162 | 7.5[f] |
| | Annual[d] | 0.9 | -- | -- | 1.0 |
| $SO_2$ | 1-hr | 9.1 | -- | -- | 7.8[f] |
| | 3-hr | 5.2 | -- | -- | 25 |
| | 24-hr | 1.0 | -- | -- | 5 |
| CO | 1-hr | 123 | 70 | 4,819 | 2000 |
| | 8-hr | 486 | 32 | --[g] | 500 |
| $PM_{10}$ | 24-hr | 2.9 | -- | -- | 5 |
| | Annual | 0.9 | -- | -- | 1 |
| $PM_{2.5}$ | 24-hr | 2.3[h] | -- | -- | 1.2[i] |
| | Annual | 0.9 | | | 0.3[i] |

Notes:
[a] Both auxiliary boilers in startup; all three gas turbines in normal operation.
[b] All three gas turbines in startup; both auxiliary boilers in normal operation.
[c] One-hour $NO_2$ concentrations calculated using OLM. Normal operation and boiler startup impacts based on monthly hour of day; gas turbine startup impacts based on paired sum. Maximum total concentration is not equal to maximum predicted concentration plus maximum background concentration because conditions do not occur simultaneously. See Appendix 3.1B.
[d] Annual $NO_2$ calculated from modeled annual NOx using default ARM conversion of 75%.
[e] The majority of these impacts are due to the emergency equipment. The maximum hourly impact due to the boilers alone is 4.6 $\mu g/m^3$; the 98th percentile impact is 4.2 $\mu g/m^3$.
[f] These are interim SILs and have not been formally adopted by EPA.
[g] Included in 8-hour CO impacts under normal operations.
[h] 98th percentile value in accordance with the form of the standard.
[i] In January 2013, EPA sought and the U.S. Court of Appeals for the District of Columbia Circuit granted remand and vacatur of these SILs as they apply for purposes of avoiding a cumulative impacts analysis under federal PSD requirements (40 CFR § 51.166(k)(2) and § 52.21(k)(2)). However, EPA has retained these SILs for purposes of demonstrating whether a source locating in an attainment/unclassifiable area will be deemed to cause or contribute to a violation in a downwind nonattainment area. See Sierra Club v. EPA, No. 10-1413 (D.C. Cir. 2013), slip op. 9. Accordingly, application of these SILs for purposes of satisfying the District’s requirement to assure that a new or modified facility does not interfere with the attainment or maintenance of an ambient air quality standard may be appropriate.

### 3.1.2.9 Demonstration of Compliance

To determine air quality impacts during project operation, the modeled concentrations for all pollutants and averaging periods are combined with the highest reported background ambient air concentrations and compared to the applicable ambient air quality standards as shown in Table 3.1-27 below.

TABLE 3.1-27
**Modeled Maximum Impacts During Operations**

| Pollutant | Averaging Period | Maximum Predicted Impact (µg/m³) | Maximum Background Concentration (µg/m³) | Total Concentration (µg/m³) | NAAQS (µg/m³) | CAAQS (µg/m³) |
|---|---|---|---|---|---|---|
| $NO_2$ | 1-hr | 193[a] | 86.1 | 216[a] | -- | 339 |
| | 98th pctl | 162[a] | 65.0 | 180[a] | 188 | -- |
| | Annual[b] | 0.9 | 13.2 | 14.1 | 100 | 57 |
| $SO_2$ | 1-hr | 9.1 | 41.9 | 51 | 196 | 655 |
| | 3-hr | 5.2 | 26 | 31 | 1300 | -- |
| | 24-hr | 0.2 | 13.1 | 13 | -- | 105 |
| CO | 1-hr | 4,819 | 4,375 | 9,193 | 40,000 | 23,000 |
| | 8-hr | 486 | 2,411 | 2,897 | 10,000 | 10.000 |
| $PM_{10}$ | 24-hr (state) | 2.9 | 120 | 123 | 150 | -- |
| | 24-hr (federal) | 2.9 | 154 | 157 | -- | 50 |
| | Annual | 0.9 | 44.2 | 45 | -- | 20 |
| $PM_{2.5}$ | 24-hr[c] | 2.3 | 96.7 | 99 | 35 | -- |
| | Annual | 0.9 | 22.7 | 23.6 | 12.0 | 12 |

Notes:

[a] One-hour $NO_2$ concentrations calculated using OLM and paired sum method. Maximum total concentration is not equal to maximum predicted concentration plus maximum background concentration because conditions do not occur simultaneously. See Appendix 3.1B.

[b] Annual $NO_2$ calculated from modeled annual NOx using default ARM conversion of 75%.

[c] 24-hour $PM_{2.5}$ value shown is 98th percentile, in accordance with the form of the federal standard.

The federal 1-hour $NO_2$ and 24-hour $PM_{2.5}$ standards are statistically based. Unlike most of the other standards, which are generally not to be exceeded, compliance with these two standards is determined by averaging, for three consecutive years, the 98th percentile value of the annual values. For a full set of data, the 98th percentile equals the 8th highest (out of 365) $PM_{2.5}$ 24-hour average, and the 8th highest (out of 365) $NO_2$ daily 1-hour maximum.

### 3.1.2.10 Auxiliary Boiler Commissioning

As discussed above, CO and NOx emissions from the auxiliary boilers may be elevated above normal levels during the initial commissioning period. A separate air quality impact analysis was performed to evaluate the combined short-term CO and $NO_2$ ambient impacts from the boilers in commissioning and the gas turbines in startup, which is the potential operating scenario that would be expected to result in the highest impacts. The NOx and CO modeling results are summarized in Table 3.1-28. The CO impacts are mainly due to the gas turbines, which have their maximum modeled impacts in elevated terrain to the southeast of the facility.

TABLE 3.1-28
**Ambient Impacts During Auxiliary Boiler Commissioning**

| Pollutant | Averaging Period | Maximum Predicted Impact (µg/m³) | Maximum Background Concentration (µg/m³) | Total Concentration (µg/m³) | NAAQS (µg/m³) | CAAQS (µg/m³) |
|---|---|---|---|---|---|---|
| $NO_2$ | 1 hour[a] | 233 | 68.2 | 270 | --[b] | 339 |
| CO | 1 hour | 4,819 | 4,375 | 9,194 | 40,000 | 23,000 |
| | 8 hours | 486 | 2,411 | 2,897 | 10,000 | 10,000 |

Note:
[a] One-hour $NO_2$ concentrations calculated using OLM and monthly hour of day. Maximum total concentration is not equal to maximum predicted concentration plus maximum background concentration because conditions do not occur simultaneously. See Appendix 3.1B.
[b] Compliance with the federal 1-hour $NO_2$ standard is not evaluated for commissioning activities because the standard is based on a three-year averaging period and commissioning will last for only two months.

## 3.1.3 Cumulative Air Quality Impacts

A cumulative impacts analysis examines potential cumulative air quality impacts that may result from the project and other reasonably foreseeable projects. Such an analysis is generally required only when project impacts are significant. To ensure that potential cumulative impacts of the project and other nearby projects are adequately considered, a cumulative impacts analysis was conducted to demonstrate that the project will not cause or contribute to any significant cumulative air quality impacts.

### 3.1.3.1 Local Impacts

The CEC requires an analysis to determine the cumulative impacts of the project and other projects within a 6-mile radius that have received construction permits, but are not yet operational or that are in the permitting process and can be expected to commence operation in the near future. A list of projects meeting these criteria was provided by the District. These sources were included in a cumulative modeling analysis that is provided in Appendix 3.1D.

### 3.1.3.2 Regional Impacts

Regional impacts are evaluated by assessing the Project's contribution to regional emissions. Although the relative importance of VOC and NOx emissions in ozone formation differs from region to region and from day to day, state law requires reductions in emissions of both precursors to reduce overall ozone levels. The change in the sum of emissions of these pollutants, equally weighted, provides a rough estimate of the impact of the Project on regional ozone levels. Similarly, a comparison of the emissions of $PM_{10}$ and $PM_{2.5}$ precursor emissions (NOx, $SO_2$, and VOC) from the Project with regional $PM_{10}$ and $PM_{2.5}$ precursor emissions provides an estimate of the impact of the Project on regional $PM_{10}$ and $PM_{2.5}$ levels.

Table 3.1-29 summarizes these comparisons. The Project's emissions increases are compared with regional emissions in 2015. San Joaquin Valley Air Basin emissions projections for 2015 were taken from CARB's web-based emission inventory projection software. Additional details regarding regional emissions are provided in Appendix 3.1D.

TABLE 3.1-29
**Comparison Of Project Emissions To Regional Precursor Emissions In 2015: Annual Basis[a]**

| | |
|---|---|
| **Ozone Precursors – Annual Basis** | |
| Total San Joaquin Valley Air Basin Ozone Precursors, tons/year | 271,718 |
| Total Project Ozone Precursor Emission, tons/year | 17.5 |
| Project Emissions as % of Basin Emissions | 0.006% |
| **$PM_{10}$ Precursors – Annual Basis** | |
| Total San Joaquin Valley Air Basin $PM_{10}$ Precursors, tons/year | 391,708 |
| Total Project $PM_{10}$ Precursor Emissions, tons/year | 24.8 |
| Project Emissions as % of Basin Emissions | 0.006% |
| **$PM_{2.5}$ Precursors – Annual Basis** | |
| Total San Joaquin Valley Air Basin $PM_{2.5}$ Precursors, tons/year | 317,943 |
| Total Project $PM_{2.5}$ Precursor Emissions, tons/year | 24.8 |
| Project Emissions as % of Basin Emissions | 0.008% |

Note:
[a] Basin-wide emissions calculated as average daily emissions multiplied by 365.

### 3.1.3.3 Greenhouse Gas Cumulative Effects Analysis

This analysis of GHG emission impacts consists of quantifying project-related GHG emissions, determining their significance in comparison to the goals of AB 32.

As directed by SB 97, the Resources Agency adopted Amendments to the CEQA Guidelines for GHG emissions (GHG CEQA Guidance) on December 30, 2009. On March 18, 2010, those amendments became effective.

The GHG CEQA Guidance includes the following elements:

- Quantification of GHG emissions;
- Determination of whether the project may increase or decrease GHG emissions as compared to the existing environment;
- Determination of whether the project emissions exceed a threshold of significance determined by the lead agency; and
- The extent to which the project complies with state, regional, or local plans for reduction or mitigation of GHGs.

**Mitigation measures.** The proposed project is intended to reduce unnecessary operation of the turbines by allowing for simultaneous startups, and to improve the efficiency of Unit 4. As noted in the CEC's 2009 Integrated Energy Policy Report,[14] net GHG emissions for the integrated electric system will decline when gas-fired generation can be used to (1) serve load growth or capacity needs more efficiently than the existing fleet; (2) improve the overall efficiency of the electric system; and/or (3) permit increased penetration of renewable generation. Therefore, the proposed project may contribute to the reduction of GHG emissions from the integrated electric system because it will allow the existing plant to serve load growth or capacity needs more efficiently than is done by the existing facility.

In addition, the project will comply with state requirements to mitigate GHG emissions through the Cap & Trade program (see Section 3.1.4.2 below). Because the project will comply with the statewide Cap & Trade program for mitigation of GHG emissions, its GHG impacts are considered to be less than significant under SJVAPCD CEQA guidelines.[15]

The GHG emissions from the proposed project are quantified in Section 3.1.2.5 and are compared with PSD significant emissions thresholds in Section 3.1.4.1 below. The comparison below shows that the GHG emissions increase attributable to the proposed project will be below the PSD significant emissions thresholds.[16] Based on all of the above factors, the GHG emissions increase attributable to the project is not considered to be significant.

## 3.1.4 Consistency with Laws, Ordinances, Regulations, and Standards

This section considers consistency separately for federal, state, and local requirements.

### 3.1.4.1 Consistency with Federal Requirements

#### Prevention of Significant Deterioration Program

The PSD requirements apply, on a pollutant-specific basis, to any project that is a new major stationary source or a major modification to an existing major stationary source. A major source is a listed facility (one of 28 PSD source categories listed in the federal Clean Air Act) that emits at least 100 TPY, or any other facility that emits at least 250 TPY. Table 3.1-30 shows that the emissions of all pollutants from the proposed project (as calculated above in Section 3.1.2.3) will be below the PSD significant emission thresholds, so PSD review will not be required.

TABLE 3.1-30
**PSD Significant Emission Thresholds**

| Pollutant | PSD Significant Emission Threshold (TPY)[a] | Project Emissions (TPY) | Significant? (Y/N) |
|---|---|---|---|
| NOx | 40 | 24.1 | N |
| $SO_2$ | 40 | 1.9 | N |
| CO | 100 | 56.8 | N |
| VOC | 40 | 15.0 | N |
| $PM_{10}$ | 15 | 9.5 | N |
| $PM_{2.5}$ | 10 | 9.5 | N |
| GHGs | 75,000[b] | 42,832 | N |
| Lead | 0.6 | neg | N |

Notes:
[a] 40 CFR 51.165 (a)(1)(xxvii)
[b] See footnote **Error! Bookmark not defined.**.

[15] SJVAPCD, "District Policy Addressing GHG Emission Impacts for Stationary Source Projects Under CEQA When Serving as the Lead Agency," December 17, 2009.

[16] Based on the Supreme Court's June 23, 2014, opinion on the GHG Tailoring Rule (Utility Air Regulatory Group v. EPA, No. 12-1146), the project would not be subject to PSD review regardless of its GHG emissions because the emissions increases of other criteria pollutants are below their respective significant emissions thresholds. However, the SJVAPCD's PSD rule (Rule 2410) cites the June 16, 2011 version of 40 CFR 52.21 and thus includes the 75,000 tpy CO2e threshold, so a comparison with that threshold is included here for completeness.

### Nonattainment New Source Review

SJVAPCD administers Nonattainment New Source Review for all pollutants. NSR is discussed further under the local requirement conformance section below.

### New Source Performance Standards (NSPS)

#### *Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units*

The requirements of Subpart 40 CFR Dc, Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units, are applicable to the new auxiliary boilers. For boilers fired only with natural gas, the NSPS does not impose any emissions limits but does require compliance with the general recordkeeping, notification, and reporting requirements of Part 60. The District permit conditions will include these Part 60 requirements.

40 CFR 60 Subpart KKKK (Standards of Performance for Stationary Combustion Turbines) would be applicable to the existing gas turbines if any of the proposed changes constitute a "modification" as defined in 40 CFR Part 60. In 40 CFR §60.2, "modification" is defined as:

> "…any physical change in, or change in the method of operation of, an existing facility which increases the amount of any air pollutant (to which a standard applies) emitted into the atmosphere by that facility or which results in the emission of any air pollutant (to which a standard applies) into the atmosphere not previously emitted."

Although the proposed changes to the advanced gas path (AGP) components will involve a physical change in one of the existing gas turbines, the SJVAPCD has previously determined that identical AGP component changes conducted on the first two gas turbines were routine maintenance and would not change permitted emissions. Similarly, the proposed AGP component changes to the third turbine do not constitute a modification because the changes will not increase the amount of any pollutant emitted by the gas turbine. Therefore, the proposed AGP component change does not meet the definition of modification and will not be subject to the NSPS. The changes will not qualify as "reconstruction" under 40 CFR §60.15, because the cost of the new components is well below 50% of the capital cost required to construct a comparable new facility. Therefore, subpart KKKK is not applicable to the proposed project.

### National Emission Standards for Hazardous Air Pollutants (NESHAP)

NESHAPs establish national emission standards to limit emissions of hazardous air pollutants (HAPs) from facilities in specific source categories. No NESHAP is applicable to the proposed project, and NESHAP requirements will not be addressed further. The NESHAPs that could potentially apply to the proposed project are as follows:

40 CFR 63 Subpart JJJJJJ applies to industrial, commercial, and institutional boilers at area sources of hazardous air pollutants. However, only general recordkeeping requirements of this regulation are applicable to natural gas-fired boilers.

40 CFR 63 Subpart YYYY (National Emission Standards for Stationary Combustion Turbines) is applicable to certain stationary combustion turbines located at a major source of HAP. The project is not a major source of HAPs, so the requirements of the subpart are not applicable.[17]

### Acid Rain Program

This program requires the monitoring and reporting of emissions of acidic compounds and their precursors from electric power generating equipment. The acid rain program is not applicable to the proposed new auxiliary boilers.

[17] The PEF gas turbines would be exempt from the requirements of Subpart YYYY in any event because the August 2008 amended rule stayed the standards for lean premix gas-fired turbines.

#### Title V Operating Permits Program

This program requires the issuance of operating permits that identify all applicable federal performance, operating, monitoring, recordkeeping, and reporting requirements. Title V applies to major facilities, Phase II acid rain facilities, subject solid waste incinerator facilities, and any facility listed by EPA as requiring a Title V permit. The project will comply with the Title V requirements by filing an application for modification to the Title V permit with the District at the same time the application for the ATC is filed.

### 3.1.4.2 Consistency with State Requirements

State law set up local air pollution control districts with the principal responsibility for regulating emissions from stationary sources. The proposed project is under the local jurisdiction of the SJVAPCD; therefore, compliance with SJVAPCD regulations will assure compliance with state air quality requirements.

#### Toxic Air Contaminant Program

This program requires compliance with adopted air toxics control measures (ATCMs) that apply to specific TACs. Compliance with SJVAPCD regulations will assure compliance with this regulation.

#### Air Toxic "Hot Spots" Act

This program requires project proponents to identify and quantify air toxics and assess potential health risks. Compliance with District Risk Management Review for Toxic Air Contaminants will ensure compliance with the requirements of the "Hot Spots" program.

#### California Clean Air Act

The California Clean Air Act (CAA) requires local air pollution control districts to attain and maintain both the federal and state ambient air quality standards at the "earliest practicable date." SJVAPCD was required to submit to CARB an air quality plan to demonstrate how the District will satisfy the required emission reduction milestones in the San Joaquin Valley Air Basin.

Air quality plans must demonstrate attainment of the state ambient air quality standards and must result in a five percent annual reduction in emissions of nonattainment pollutants (ozone, $PM_{10}$, $PM_{2.5}$, and associated precursors) in a given district (H&SC §40914). District air quality plans specify the development and adoption of more stringent regulations to achieve the requirements of the Act.

#### AB 32 (Global Warming Solutions Act) and SB 1368 (Emissions Performance Standards)

CARB has implemented a GHG Cap-and-Trade program pursuant to AB 32 and the Cap-and-Trade Regulation, requiring facilities to procure and surrender allowances equivalent to their GHG emissions. The project will comply with the Cap-and-Trade Regulation.

Regulations adopted by the CEC and the CPUC pursuant to SB 1368 prohibit utilities from entering into long-term commitments with any baseload facilities that exceed the Emission Performance Standard of 0.50 metric tons of $CO_2$ per megawatt-hour (1,100 pounds $CO_2$/MWh). Specifically, the Emission Performance Standard (EPS) applies to base load power from new power plants, new investments in existing power plants, and new or renewed contracts with terms of five years or more, including contracts with power plants located outside of California.

### 3.1.4.3 Consistency with Local Requirements

The SJVAPCD has been delegated responsibility for implementing local, state, and federal air quality regulations in the San Joaquin Valley Air Basin. The proposed project is subject to District regulations that apply to new stationary sources, to the prohibitory regulations that specify emission standards for individual equipment categories, and to the requirements for evaluation of impacts from non-criteria pollutants. The following sections include the evaluation of facility compliance with applicable District requirements.

### New Source Review Requirements

The SJVAPCD's New Source Review (NSR) rule (Regulation II, Rule 2201; New and Modified Stationary Source Review Rule) is applicable to the proposed project. There are three basic requirements within the NSR rules. First, BACT and Lowest Achievable Emission Rate (LAER) requirements must be applied to any new emission unit with potential emissions above specified threshold quantities. Second, all potential emission increases of nonattainment pollutants or precursors from the proposed source that are above specified thresholds must be offset by real, quantifiable, surplus, permanent, and enforceable emission decreases in the form of ERCs. Third, an ambient air quality impact analysis must be conducted to confirm that the project does not cause or contribute to a violation of a national or California AAQS or jeopardize public health.

**BACT.** A comparison of potential emissions with the BACT thresholds in SJVAPCD Rule 2201 is presented in Table 3.1-31. This table shows that the new auxiliary boilers are required to use BACT for NOx, CO, VOC, $SO_2$ and $PM_{10}$. There will be no increases in daily emissions from gas turbines as a result of the change in the startup permit conditions, so the gas turbines are not required to undergo a BACT review.

TABLE 3.1-31
**Applicability of BACT Requirements Under NSR**

| Pollutant | BACT Threshold, lb/day | Unit Potential to Emit, lb/day | BACT Required? |
|---|---|---|---|
| Auxiliary Boilers, each | | | |
| NOx | 2.0 | 38.9 | yes |
| $SO_2$ | 2.0 | 4.6 | yes |
| CO | 2.0 | 728.3 | yes[a] |
| VOC | 2.0 | 9.2 | yes |
| $PM_{10}$ | 2.0 | 15.4 | yes |

Notes:
[a]CO emissions would also be exempt from BACT requirements if the potential to emit of the facility was below 200,000 CO lb/yr. However, as shown in Table 3.1-10, CO PTE for the existing facility is already over this threshold.

A detailed BACT analysis was conducted to evaluate available control options for the proposed auxiliary boilers; the analysis is presented in Appendix 3.1E. A summary of the proposed BACT is provided in Table 3.1-32.

TABLE 3.1-32
**Summary of Proposed of BACT**

| Pollutant | Control Technology | Concentration |
|---|---|---|
| NOx | Low-NOx burners and SCR | 5 ppmvd @ 3% $O_2$ |
| $SO_2$ | Pipeline natural gas | n/a |
| CO | Good combustion practices | 50 ppmvd @ 3% $O_2$ |
| VOC | Good combustion practices | 10 ppmvd @ 3% $O_2$ |
| $PM_{10}$ | Pipeline natural gas | n/a |

**Offsets.** SJVAPCD Rule 2201 requires that projects with post-project stationary source PTE above specified thresholds provide emission offsets for net emissions increases from the project. Based on emissions data presented in Table 3.1-10, annual emissions of all pollutants from the existing facility will exceed the emissions offset threshold levels. According to Section 4 of Rule 2201, offsets need to be provided for all increases in stationary source emissions of NOx or VOC, calculated as the difference between post-project PTE and the baseline emissions of all new and modified emissions units, and multiplied by 1.5 to reflect the distance offset ratio of 1.5: 1 for offsets occurring at sources that are located more than 15 miles away from the project, unless and until the District demonstrates that all major sources are equipped with BACT.

Offset and mitigation requirements for the project are summarized in Table 3.1-33 below. The ERCs to be provided for the project are shown in detail in Appendix 3.1F.

TABLE 3.1-33
**Offset Requirements for the Proposed Project**

| Pollutant | Facility Potential to Emit, lb/yr[a] | Rule 2201 Offset Thresholds, lb/yr | Emissions from Proposed Project, lb/yr[b] | Offsets Required? |
|---|---|---|---|---|
| NOx | 344,853 | 20,000 | 28,396 | yes |
| $SO_2$ | 84,510 | 54,750 | 3,351 | yes |
| CO | 1,140,724 | 200,000 | 59,568 | no[c] |
| VOC | 227,682 | 20,000 | 6,680 | yes |
| $PM_{10}$ | 236,472 | 29,200 | 11,213 | yes |

Notes:
[a] PTE for the existing facility.
[b] PTE for new boilers only.
[c] CO emissions are not required to be offset as long as the applicant demonstrates that CO emissions from the project will not cause or contribute to a violation of the applicable air quality standards. The required demonstration was made in Table 3.1-27.

**Air Quality Impact Analysis.** Under the SJVACPD new source review regulations, an air quality impact analysis must be performed to confirm that the emission increases for a project will not interfere with the attainment or maintenance of an applicable ambient air quality standard or cause additional violations of a standard anywhere the standard is already exceeded. The modeling results presented in Table 3.1-31 and Table 3.1-33 show that the proposed project will not interfere with the attainment or maintenance of the applicable air quality standards or cause additional violations of any standards.

**Public Notification.** Public notice is required because the project triggers public notice requirements under Sections 5.4 and 5.9 of District Rule 2201. The project expects the District Air Pollution Control Officer will provide the required notice in a timely manner.

### Risk Management Review Requirements for Air Toxics

The SJVAPCD's Risk Management Policy for Permitting New and Modified Sources describes the requirements, procedures, and standards for evaluating the potential impact of toxic air contaminants (TAC) from new sources and modifications to existing sources. A screening health risk assessment demonstrating compliance with the policy is provided in Section 3.8, Public Health. Detailed calculations are provided in Appendix 3.1G.

### New Source Performance Standards

The SJVAPCD's Rule 4001, New Source Performance Standards, incorporates the federal NSPS from 40 CFR Part 60. Monitoring and recordkeeping requirements for BACT will be more stringent than the requirements in this rule; therefore, the project will comply with the NSPS, which apply only through 40 CFR Dc (Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units) for the addition of the auxiliary boilers.

### Federal Programs and Permits

The federal Title IV acid rain program requirement and Title V operational permit requirements are incorporated in SJVAPCD's Rules 2520 (Federally Mandated Operating Permits) and 2540 (Acid Rain

Program). Compliance with these permitting requirements is discussed above under the Federal Requirements section.

**Permit Fees**

The District requirements regarding permit fees are specified in Regulation III. This regulation establishes the filing and permit review fees for specific types of new and modified sources, as well as annual renewal fees and penalty fees for existing sources. The project will pay the applicable fees in accordance with these requirements.

**Prohibitions**

The District prohibitions for specific types of sources and pollutants are addressed in Regulation IV. The prohibition rules that apply to the proposed project are listed below.

**Rule 4101 (Visible Emissions).** Any visible emissions from the project will not be darker than No. 2 when compared to a Ringlemann Chart for any period(s) aggregating 3 minutes in any hour. Because the new auxiliary boilers will burn clean fuels, the opacity standard of not greater than 20 percent for a period or periods aggregating 3 minutes in any hour and the particulate emission concentrations limit of 0.15 grains per standard cubic feet of exhaust gas volume will not be exceeded.

**Rule 4102 (Public Nuisance).** The auxiliary boilers will not emit significant quantities of odorous or visible substances; therefore, the PEF will continue to comply with this regulation.

**Rule 4201 (Particulate Matter Emission Standards).** The emission units will have particulate matter emission rates well below the limits of the rule. The maximum grain loading for the auxiliary boilers (from Table 3.1A-2, Appendix 3.1A) is 0.005 gr/dscf, well below the 0.1 gr/dscf limit of the rule.

**Rule 4301 (Fuel Burning Equipment).** Because the auxiliary boilers will use only natural gas fuel, they will comply with the $SO_2$, NOx, and combustion contaminant limitations of the rule.

**Rule 4320 (Advanced Emission Reduction Options For Boilers, Steam Generators, And Process Heaters Greater Than 5.0 MMBtu/hr).** The auxiliary boiler will comply with the requirements of this rule by limiting NOx emissions to not more than 5 ppmvd. The applicant will submit a proposal for Continuous Emission Monitoring Systems for NOx and CO emissions to the APCO for approval.

**Rule 4801 (Sulfur Compound Emissions).** Because the auxiliary boilers will use only natural gas fuel, PEF will comply with Rule 4801 limits.

**Rule 8011 (Fugitive $PM_{10}$ Prohibitions, General Requirements).** This rule includes definitions, exemptions, requirements and fees related to the control of fugitive $PM_{10}$.

**Rule 8021 (Fugitive $PM_{10}$ Prohibitions, Construction, Demolition, Excavation, Extraction and other Earthmoving Activities).** This rule requires the use of specified control measures to control fugitive dust emissions during construction activities, and the submittal of a Dust Control Plan (DCP) prior to the commencement of construction. The project will submit the required DCP and has committed to use dust control measures during construction to minimize fugitive dust emissions.

## 3.1.5 Involved Agencies and Agency Contacts

The EPA has responsibility for enforcing, on a national basis, the requirements of many of the country's environmental and hazardous waste laws. California is under the jurisdiction of EPA Region 9, which has its offices in San Francisco. Region 9 is responsible for the local administration of EPA programs for California, Arizona, Nevada, Hawaii, and certain Pacific trust territories. EPA's activities relative to the California air pollution control program focus principally on reviewing California's submittals for the State Implementation Plan (SIP). The SIP is required by the federal Clean Air Act to demonstrate how all areas of the state will meet the national ambient air quality standards within the federally specified deadlines (42 USC §§ 7409, 7410).

The California Air Resources Board (CARB) was created in 1968 by the Mulford-Carrell Air Resources Act, through the merger of two other state agencies. CARB's primary responsibilities are to develop, adopt, implement, and enforce the state's motor vehicle pollution control program; to administer and coordinate the state's air pollution research program; to adopt and update as necessary the state's ambient air quality standards; to review the operations of the local air pollution control districts; and to review and coordinate preparation of the SIP for achievement of the federal ambient air quality standards (California Health & Safety Code (H&SC) § 39500 et seq.).

When the state's air pollution statutes were reorganized in the mid-1960s, local air pollution control districts (APCDs) were required to be established in each county of the state (H&SC § 40000 et seq.). There are three different types of districts: county, regional, and unified. In addition, special air quality management districts (AQMDs), with more comprehensive authority over non-vehicular sources as well as transportation and other regional planning responsibilities, have been established by the Legislature for several regions in California (see e.g., H&SC § 40200).

Air pollution control districts and air quality management districts in California have principal responsibility for the following activities:

- Developing plans for meeting the state and federal ambient air quality standards;
- Developing control measures for non-vehicular sources of air pollution necessary to achieve and maintain both state and federal air quality standards;
- Implementing permit programs established for the construction, modification, and operation of stationary sources of air pollution;
- Enforcing air pollution statutes and regulations governing non-vehicular sources; and
- Developing employer-based trip reduction programs.

Each level of government has adopted specific regulations that limit emissions from stationary combustion sources, several of which are applicable to this project. The other air agencies having permitting authority for this project are shown in Table 3.1-34. The applicable federal laws, ordinances, regulations and standards (LORS) and compliance with these requirements are discussed in more detail in Subsections 3.1.3 and 3.1.6. An application for a permit amendment will be filed with the SJVAPCD[18] at approximately the same time as the Petition is filed with the CEC. An application for an amendment to the facility Title V permit will be filed with the District permit amendment.

TABLE 3.1-34
**Agency Contacts**

| Agency | Authority | Contact |
|---|---|---|
| EPA Region 9 | Enforcement | Gerardo Rios, Chief<br>Permits Office, EPA Region 9<br>75 Hawthorne Street<br>San Francisco, CA 94105 |
| California Air Resources Board (CARB) | Regulatory Oversight | Mike Tollstrup, Chief<br>Project Assessment Branch, CARB<br>2020 L Street |

[18] EPA approved SJVAPCD's PSD permitting rule (Rule 2410) in 2012.

TABLE 3.1-34
**Agency Contacts**

| Agency | Authority | Contact |
|---|---|---|
| | | Sacramento, CA 95814 |
| San Joaquin Valley Air Pollution Control District (SJVAPCD) | Permit Issuance, PSD Permit Issuance, Enforcement | Arnaud Marjollet, Director<br>Permit Services, SJVAPCD<br>1990 E. Gettysburg Avenue<br>Fresno, CA 93726-0244 |

## 3.1.6 Mitigation Measures

Mitigation will be provided for project emissions in the form of offsets and the installation of BACT, as required under SJVAPCD regulations. The cumulative air quality impacts analysis described in Section 3.1.3 shows that the project will not result in significant cumulative impacts.

District Rule 2201 requires the proposed project to provide emission offsets through emission reductions from other sources. Table 3.1-35 summarizes the offset requirements applicable to the project. In calculating the ERC requirements, the project has assumed that a distance ratio of 1.5 will apply for the proposed offsets.

As discussed above, the Project's GHG impacts are not significant. State regulatory compliance requirements will be addressed through acquisition of GHG allowances under CARB's Cap-and-Trade program.

TABLE 3.1-35
**Project Offset and Mitigation Requirements**

| Pollutant | Project Emissions (lb/yr)[a] | District Offset Requirements (lb/yr)[b] | CEC Mitigation Requirements (lb/yr) | ERCs Proposed (lb/yr) |
|---|---|---|---|---|
| NOx | 28,396 | 42,594 | 28,396 | 42,594 |
| SO2 | 3,351 | 5,026 | 3,351 | 5,026 |
| VOC | 6,680 | 10,019 | 6,680 | 10,019 |
| $PM_{10}/PM_{2.5}$ | 11,213 | 16,819 | 11,213 | 16,819 |
| GHGs | 93,558 tpy | -- | Compliance with Cap & Trade Regulation | -- |

Note:
[a] PTE for new boilers only.
[b] Reflects 1.5:1 distance ratio. See Section 3.1.4.3. above.

## 3.1.7 Permits Required and Permit Schedule

Under Regulation II of its Rules and Regulations, SJVAPCD regulates the construction, alteration, replacement, and operation of new stationary emissions sources and modifications to existing sources. A draft ATC and Title V certificate of conformity is expected within approximately 180 days after acceptance of the application as complete. The draft ATC will be circulated for public and EPA comment, and a final ATC will be issued by the District after comment has been considered and addressed. Once the CEC approves the proposed amendments to the project's license, the proposed project may commence construction under the ATC (although the CEC license is expected to include additional pre-construction requirements that must be met prior to commencement of construction). This permitting process allows the SJVAPCD to adequately review proposals for new and modified air pollution sources to ensure compliance with all applicable prohibitory rules and to ensure that appropriate emission controls will be used. An ATC allows for the construction of the air pollution source and remains in effect until the PTO application is granted, denied, or cancelled. Once the project has completed construction and commences operations, SJVAPCD will require verification that the proposed modification conforms to the ATC application and, following such verification, will issue a PTO. The PTO specifies conditions that the air pollution source must meet to comply with all air quality standards and regulations.

## 3.1.8 Conditions of Certification

This section presents revisions to facility COCs triggered by the Petition. The amendment and the proposed revisions to the COCs are based on the following changes:

1) New auxiliary boilers: It is expected that the District will adopt permit conditions limiting emissions and fuel use from the auxiliary boilers and requiring compliance with specific monitoring, recordkeeping and reporting requirements. Those conditions will then be included in the project's license as new air quality conditions of certification.

2) Allow simultaneous startup of all three combustion turbines: This change will be implemented by eliminating Condition AQ-13:

   ~~**AQ-13** Only one of CTGs S-3636-1, 2 or and 3 shall be in at any one time. [District Rule 2201]~~

   ~~**Verification:** The project owner shall keep records of the turbine start-up sequence and make the site available for inspection by representatives of the District, CARB and the Commission.~~

## 3.1.9 References


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USEPA (2010a). OAQPS, Memo from Stephen D. Page, Director, to USEPA Regional Modeling Contacts and others, "Modeling Procedures for Demonstrating Compliance with PM2.5 NAAQS," March 23, 2010.

USEPA (2010b). OAQPS, Memo from Tyler Fox, Leader, Air Quality Modeling Group, to USEPA Regional Air Division Directors, "Applicability of Appendix W Modeling Guidance for the 1-hour NO2 National Ambient Air Quality Standard," June 28, 2010.

USEPA (2010c). OAQPS, Memo from Stephen D. Page, Director, to USEPA Regional Air Division Directors, "Guidance Concerning the Implementation of the 1-hour NO2 NAAQS for the Prevention of Significant Deterioration Program," June 29, 2010.

USEPA (2010d), OAQPS, Memo from Stephen D. Page, Director, to USEPA Regional Air Division Directors, "Guidance Concerning the Implementation of the 1-hour SO2 NAAQS for the Prevention of Significant Deterioration Program," August 23, 2010.

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USEPA (2014a). "New NO2 Modeling Guidance," August 12, 2014. Available at http://www.epa.gov/ttn/scram/webinar/AERMOD_14134-NO2_Memo/20140812-Webinar_Slides.pdf.

# 3.2 Biological Resources

The addition of auxiliary boilers and other changes proposed by the Petition will not cause impacts to biological resources. All activities associated with the requested modifications will occur within the project's site boundaries on previously disturbed lands. The auxiliary boilers will be installed on an existing concrete pad. Therefore, there will be no adverse impact on biological resources.

## 3.2.1 Environmental Baseline Information

### 3.2.1.1 Affected Environment

The affected environment for the proposed modifications is as described in the 1999 AFC. The area surrounding the project site has historically been used for cattle grazing, ranching, and oil development. Plant and wildlife surveys conducted for the 1999 AFC (99-AFC-7) identified a total of 169 plant species, 22 mammal species, 63 bird species, 5 amphibian species, and 10 reptile species. Descriptions of the habitat types, aquatic resources, maps of their occurrences in the project survey area, and a list of all plant and animal species observed during field surveys are included in the Biology Technical Report (Appendix N) to the Pastoria Energy Facility, L.L.C. AFC, 1999.

No new development or disturbance has occurred near the project site since its construction. The proposed modifications will occur within previously disturbed or graveled/paved areas. Therefore, updated biological resource database searches or surveys were not conducted because the baseline setting has not changed and the proposed changes to the project will occur onsite on disturbed land. The 1999 AFC and related Staff Assessment and Final Decision (99-AFC-7) evaluated potential direct and indirect impacts to biological resources to determine the permanent and temporary effects of construction, operation, maintenance, and decommissioning of the project and supporting facilities. The project owner has complied with all relevant COCs to address these impacts. Because the proposed modifications will occur within the same areas of disturbance within the existing project site, no new impacts to biological or wetland resources are expected from construction activities. Short-term construction activities will generate noise levels of less than 80 dBA at a distance of 400 feet as documented in the Final Decision 99-AFC-7C, as amended, and these noise levels are lower than those generated from the adjacent aggregate operation. Therefore, construction noise will not significantly impact biological resources and there will be no other impacts to biological resources beyond those considered as part of 99-AFC-7C.

### 3.2.1.2 Potential Effects from Operation

The auxiliary boilers are intended to operate when the plant is not fully operational to maintain steam generation, as a result, operational noise may decrease as compared to current operations. Any additional operational noise would be insignificant as compared to existing project operations and is not expected to exceed levels identified in Section 5.12 of 99-AFC-7 and in Section 3 of this Petition.

## 3.2.2 Mitigation Measures

As a result of the limits of disturbance to occur within the existing project site boundaries, no significant impacts to biological resources will result from the approval of this Petition. Therefore, additional resource protection measures, beyond those required in the Final Decision (99-AFC-7C), as amended, are necessary.

## 3.2.3 Consistency with LORS

Construction and operation of the project, as amended, will conform to all applicable biological resource LORS.

## 3.2.4 Conditions of Certification

This Petition does not require changes to the existing biological resource COCs from Final Decision (99-AFC-7C), as amended.

### 3.2.5 References Cited

California Energy Commission (CEC). 2000. *Energy Commission Decision, Application for Certification for the Pastoria Energy Facility, Docket Number 99-AFC-7*. California Energy Commission, Sacramento, California. December.

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USFWS. 1999. Formal Section 7 Consultation (Biological Opinion). Pastoria Energy Facility, Kern County, California

# 3.3 Cultural Resources

The addition of auxiliary boilers and other changes proposed by the Petition will not cause impacts to cultural resources. All activities associated with the requested modifications will occur within the project's site boundaries on previously surveyed and disturbed lands. The auxiliary boilers will be installed on an existing concrete pad. Therefore, there will be no adverse effect on cultural resources.

## 3.3.1 Environmental Baseline Information

The affected environment for the proposed modifications is as described in the Final Decision (99-AFC-7C), as amended. Extensive cultural resource data was documented and submitted to the CEC as part of construction compliance requirements. The area is remote and largely closed to the public due to the restricted access to the adjacent gravel mine, the Edmonston Pumping Plant and California Aqueduct, and the private Tejon Ranch. No new development or disturbance has occurred near the project site since its construction. The proposed modifications would occur within previously disturbed or graveled/paved areas of the project site. Therefore, updated cultural resource record search and surveys were not conducted since the baseline setting has not changed.

## 3.3.2 Environmental Consequences

The results of the cultural resource evaluation for the planned modifications remain unchanged from the information presented in Section 5.7 of 99-AFC-7 and Appendix J confidential Cultural Resources Technical Report filed as part of 99-AFC-7. The planned modifications will occur within the project site and will not involve excavation or other new surface disturbance in areas that have not already been extensively disturbed.

## 3.3.3 Mitigation Measures

As a result of the limits of disturbance to occur within the existing project site boundaries, no significant impacts to cultural resources will result from the approval of this Petition. Therefore, additional resource protection measures, beyond those required in the Final Decision (99-AFC-7C), as amended, are necessary.

## 3.3.4 Consistency with LORS

Implementation of the proposed modifications will comply with all applicable cultural resource-related LORS.

## 3.3.5 Conditions of Certification

This Petition does not require changes to the existing cultural resource COCs from Final Decision (99-AFC-7C), as amended.

## 3.3.6 References Cited

California Energy Commission (CEC). 2000. *Energy Commission Decision, Application for Certification for the Pastoria Energy Facility, Docket Number 99-AFC-7*. California Energy Commission, Sacramento, California. December.

California Energy Commission (CEC). 2006. *Energy Commission Decision, Application for Certification for the Pastoria Energy Facility Expansion Project, Docket Number 05-AFC-1*. California Energy Commission, Sacramento, California. December.

Pastoria Energy Facility, L.L.C. 1999. *Application for Certification for the Pastoria Energy Facility*. Submitted to California Energy Commission, Sacramento, California. November.

Pastoria Energy Facility, L.L.C. 2005. *Application for Certification for the Pastoria Energy Facility Expansion Project*. Submitted to California Energy Commission, Sacramento, California. April.

# 3.4 Geology and Paleontology

The addition of auxiliary boilers and other changes proposed by the Petition will not cause geological hazards or result in impacts to paleontological or geological resources. All activities associated with the requested modifications will occur within project's site boundaries on previously disturbed lands. As part of the fieldwork completed for the Pastoria Energy Facility, L.L.C. AFC, no paleontologically sensitive sediments were identified at the project site at depths relatively near the ground surface where construction will take place. Therefore, geological and paleontological resources will not be adversely affected.

## 3.4.1 Environmental Baseline Information

The affected environment for the proposed modifications remains unchanged from the Final Decision, 99-AFC-7C, as amended. The project site and surrounding area are covered mostly by Quaternary age undifferentiated alluvium unit is designated as *Qal*. This unit is covers 100 percent of the project site and was identified as having a high potential for discovery of paleontological resources as part of 99-AFC-7. During construction of the project, numerous paleontological resources were encountered, recovered, and cataloged, documented, and reported to the CEC as part of construction compliance requirements. The area surrounding the project site is remote and largely closed to the public due to the restricted access to the adjacent gravel mine, Edmonston Pumping Plant, California Aqueduct, and private property of the Tejon Ranch. No new development or disturbance has occurred near the project site since its original construction that could have discovered additional paleontological resources or sensitivities. The proposed modifications will occur within previously disturbed or graveled/paved areas of the project site and therefore, no updated paleontological resource record search or surveys were conducted since the baseline setting has not changed. In addition, due to the extensive geotechnical documentation prepared for the original project's construction, no additional geotechnical evaluations are necessary for the proposed modifications.

## 3.4.2 Environmental Consequences

The paleontological and geotechnical findings remain unchanged from the Final Decision, 99-AFC-7, as amended. A confidential Paleontological Resources Technical Report (Appendix K) was prepared for 99-AFC-7. Because the planned modifications would be conducted entirely on previously disturbed or graveled/paved areas of the project site, no new field surveys were conducted. All activities associated with the planned modifications will be confined within the existing project and thus, the site disturbance remains unchanged from the existing project. No new impacts to paleontological of geologic resources are expected.

## 3.4.3 Mitigation Measures

As a result of the limits of disturbance to occur within the existing project site boundaries, no significant impacts to geological or paleontological resources will result from the approval of this Petition. Therefore, additional resource protection measures, beyond those required in the Final Decision (99-AFC-7C), as amended, are necessary.

## 3.4.4 Consistency with LORS

The 99-AFC-7 assessment was conducted consistent with guidelines promulgated by the Society for Vertebrate Paleontology for the evaluation and mitigation of impacts to paleontological resources. The construction and operation of the proposed modifications will comply with all applicable LORS related to geologic and paleontological resources.

## 3.4.5 Conditions of Certification

This Petition does not require changes to the geology and paleontology COCs from Final Decision (99-AFC-7C), as amended.

## 3.4.6 References Cited

California Energy Commission (CEC). 2000. *Energy Commission Decision, Application for Certification for the Pastoria Energy Facility, Docket Number 99-AFC-7*. California Energy Commission, Sacramento, California. December.

California Energy Commission (CEC). 2006. *Energy Commission Decision, Application for Certification for the Pastoria Energy Facility Expansion Project, Docket Number 05-AFC-1*. California Energy Commission, Sacramento, California. December.

Pastoria Energy Facility, L.L.C. 1999. *Application for Certification for the Pastoria Energy Facility*. Submitted to California Energy Commission, Sacramento, California. November.

Pastoria Energy Facility, L.L.C. 2005. *Application for Certification for the Pastoria Energy Facility Expansion Project*. Submitted to California Energy Commission, Sacramento, California. April.

# 3.5 Hazardous Materials Management

The addition of auxiliary boilers and other changes proposed by the Petition will use require similar hazardous materials use, chemical inventory, and management different than those discussed in the Final Decision (99-AFC-7C), as amended. All activities associated with the requested modifications will occur within the project's site boundaries on previously disturbed lands. The auxiliary boilers will be installed on an existing concrete pad. Therefore, there will be no new impacts from hazardous materials management.

## 3.5.1 Environmental Baseline Information

The chemicals listed in the Final Decision, 99-AFC-7C, as amended, remain unchanged to accommodate the proposed modifications. No new chemicals are required as a result of the modifications and it will not be necessary to increase the quantities of hazardous materials currently used at the project site. Storage locations for the hazardous materials used during operation, health hazards and flammability data, and information about these materials, including trade names, chemical names, Chemical Abstract Service numbers, maximum quantities onsite, reportable quantities, California Accidental Release Program (CalARP) threshold quantities, and status as a Proposition 65 chemical (a chemical known to be carcinogenic or cause reproductive problems in humans) remain unchanged from 99-AFC-7C, as amended.

## 3.5.2 Environmental Consequences

Anhydrous ammonia is currently stored and used at the existing project, and no new ammonia storage facilities will be required to implement the modifications. The existing ammonia tank and frequency of ammonia deliveries will remain consistent with 99-AFC-7C, as amended by the CEC's approval of the 2001 Modification for Conversion from Aqueous to Anhydrous Ammonia (Tyler, 2001). No additional hazardous materials storage is required to accommodate the modifications. Therefore, no new hazardous material impacts would result from the project modifications. Hazardous materials will be handled and stored in a safe manner and in accordance with the applicable LORS consistent with the Final Decision, 99-AFC-7C, as amended.

## 3.5.3 Mitigation Measures

No significant impacts from hazardous materials handling will result from the approval of this Amendment. Therefore, mitigation measures beyond those required in the Final Decisions (99-AFC-7C) are necessary.

## 3.5.4 Consistency with LORS

The proposed modifications will conform with all applicable LORS related to hazardous materials.

## 3.5.5 Conditions of Certification

This Petition does not require changes to the hazardous material management COCs from the Final Decision (99-AFC-7C), as amended.

## 3.5.6 References Cited

California Energy Commission (CEC). 2000. *Energy Commission Decision, Application for Certification for the Pastoria Energy Facility, Docket Number 99-AFC-7*. California Energy Commission, Sacramento, California. December.

California Energy Commission (CEC). 2006. *Energy Commission Decision, Application for Certification for the Pastoria Energy Facility Expansion Project, Docket Number 05-AFC-1*. California Energy Commission, Sacramento, California. December.

Pastoria Energy Facility, L.L.C. 1999. *Application for Certification for the Pastoria Energy Facility*. Submitted to California Energy Commission, Sacramento, California. November.

Pastoria Energy Facility, L.L.C. 2005. *Application for Certification for the Pastoria Energy Facility Expansion Project*. Submitted to California Energy Commission, Sacramento, California. April.

Tyler. Rick. 2001. Pastoria Energy Facility (99-AFC-7C). Petition for Conversion from Aqueous to Anhydrous Ammonia. Hazardous Materials Management Staff Analysis, July 13.

# 3.6 Land Use

The addition of auxiliary boilers and other changes proposed by the Petition will not result in land use impacts beyond those considered in the Final Decision (99-AFC-7C), as amended. All activities associated with the requested modifications will occur within the project's site boundaries on previously disturbed lands. The auxiliary boilers will be installed on an existing concrete pad. Therefore, there will be no adverse land use impacts.

## 3.6.1 Environmental Baseline Information

Existing land uses within a 1-mile radius of the project site have not changed substantially from what was described as part of 99-AFC-7. The online Kern County zoning maps were reviewed to confirm that no changes have occurred. Surrounding land uses are primarily agricultural, with the exception of project, adjacent gravel mine, Edmonston Pump Plant, California Aqueduct, and I-5 (located approximately 5-miles west of the project site).

## 3.6.2 Environmental Consequences

No new land use impacts will occur as a result of implementation of the proposed modifications. These modifications will not physically divide an established community; conflict with applicable land use plans, policies, or regulations; or conflict with an applicable habitat conservation plan. The project site is designated Exclusive Agriculture (A) as confirmed on the Kern County Zone Maps. This Petition proposes equipment modifications to the facility and modification of the CEC license and air permit conditions to allow simultaneous startup, increase overall ramp rate for the plant and shorten the start time. The addition of the auxiliary boilers and implementation of efficiency improvements remain consistent with the existing land use and zoning designations of the property.

## 3.6.3 Mitigation Measures

No significant impacts to land use will result from the approval of this Petition. Therefore, mitigation measures beyond those in the Final Decision, 99-AFC-7C, amended, are not necessary.

## 3.6.4 Consistency with LORS

The proposed modifications will conform to all applicable LORS related to land use.

## 3.6.5 Conditions of Certification

This Petition does not require changes to the existing land use COCs from Final Decision (99-AFC-7C), as amended.

## 3.6.6 References Cited

California Energy Commission (CEC). 2000. *Energy Commission Decision, Application for Certification for the Pastoria Energy Facility, Docket Number 99-AFC-7*. California Energy Commission, Sacramento, California. December.

California Energy Commission (CEC). 2006. *Energy Commission Decision, Application for Certification for the Pastoria Energy Facility Expansion Project, Docket Number 05-AFC-1*. California Energy Commission, Sacramento, California. December.

Pastoria Energy Facility, L.L.C. 1999. *Application for Certification for the Pastoria Energy Facility*. Submitted to California Energy Commission, Sacramento, California. November.

Pastoria Energy Facility, L.L.C. 2005. *Application for Certification for the Pastoria Energy Facility Expansion Project*. Submitted to California Energy Commission, Sacramento, California. April.

CEC. 2000. Final Commission Decision, Pastoria Energy Facility, L.L.C. AFC, Docket Number 99-AFC-7. Sacramento, California. December

Kern County Planning Department. Engineering, Surveying, and Permitting Services. Zone Maps. http://esps.kerndsa.com/zmapindx.html. Accessed May 7, 2013.

# 3.7 Noise and Vibration

The addition of auxiliary boilers and other changes proposed by the Petition will not result in noise impacts greater than those considered in the Final Decision (99-AFC-7C), as amended.

## 3.7.1 Environmental Baseline Information

Land use development intensity in the project area has not changed since the ambient noise survey was conducted for 99-AFC-7. In addition, a review of recent development in the area, confirms that there are no new sensitive receptors within 1-mile of the project site boundary. The noise impact calculations conducted as part of 99-AFC-7 indicated that the normal operating noise impacts from the project would be approximately 30 dBA $L_{50}$ at the nearest residential receptor which is well below Kern County maximum allowable residential exterior noise levels of 45 dBA $L_{50}$.

## 3.7.2 Environmental Consequences

The auxiliary boilers are intended to operate when the plant is not fully operational to maintain steam generation, as a result, operational noise may decrease as compared to current operations. Because the noise analysis conducted for 99-AFC-7 was conservative and concluded that due to the proximity of the project from sensitive receptors, noise impacts will be less than significant. Any additional operational noise would be insignificant as compared to existing project operations and is not expected to exceed levels identified in Section 5.12 of 99-AFC-7, Section 3 of this Petition, and in the Final Decision (99-AFC-7C), as amended. Therefore, installation and operation of the auxiliary boilers will not affect this determination and impacts will remain less than significant.

## 3.7.3 Mitigation Measures

No significant noise impacts will result from the approval of this Petition. Therefore, mitigation measures beyond those required in the Final Decision, (99-AFC-7C) as amended, are necessary.

## 3.7.4 Consistency with LORS

Design, construction and operation of the proposed modifications will: (1) conform to all worker safety and health noise limits, (2) be conducted in accordance with applicable noise-related LORS, (3) fall below the 5 decibel increase threshold at the closest sensitive receptor, and (4) conform to existing COCs (99-AFC-7C, as amended). The noise from the proposed modifications will remain below all applicable noise standards.

## 3.7.5 Conditions of Certification

This Petition does not require changes to the existing noise and vibration COCs from Final Decision (99-AFC-7C), as amended.

## 3.7.6 References Cited

California Energy Commission (CEC). 2000. *Energy Commission Decision, Application for Certification for the Pastoria Energy Facility, Docket Number 99-AFC-7*. California Energy Commission, Sacramento, California. December.

California Energy Commission (CEC). 2006. *Energy Commission Decision, Application for Certification for the Pastoria Energy Facility Expansion Project, Docket Number 05-AFC-1*. California Energy Commission, Sacramento, California. December.

Pastoria Energy Facility, L.L.C. 1999. *Application for Certification for the Pastoria Energy Facility*. Submitted to California Energy Commission, Sacramento, California. November.

Pastoria Energy Facility, L.L.C. 2005. *Application for Certification for the Pastoria Energy Facility Expansion Project*. Submitted to California Energy Commission, Sacramento, California. April.

# 3.8 Public Health

As discussed in Section 2.0 (Description of Proposed Modifications), this Petition proposes several modifications at the project. These proposed modifications include the following:

- Adding two new auxiliary boilers to reduce startup times for the combined-cycle gas turbines;
- Changing CEC and SJVAPCD permit conditions to allow for simultaneous start-up of the three existing GE 7FA combined-cycle gas turbines;
- Upgrading the third existing (1x1) GE 7FA Series turbine with GE .04 software and Advanced Gas Path component replacements for improved efficiency; and
- Making additional technological modifications at the site that do not affect air quality or public health and do not require any changes to COCs.

The first two items listed are analyzed in this section; the second two items do not have a potential to impact public health.

This section describes and evaluates potential effects the proposed changes may have on public health. Compliance with applicable LORS is also addressed. The addition of auxiliary boilers and other changes proposed by the Petition will not result in public health impacts beyond those considered in the Final Decision (99-AFC-7C), as amended. All activities associated with the requested modifications will occur within the project's site boundaries on previously disturbed lands. The auxiliary boilers will be installed on an existing concrete pad. Therefore, there will be no adverse public health impacts.

As part of this evaluation, a screening health risk assessment (HRA) has been performed using the latest version (HARP 2) of the CARB's HARP model (CARB, 2014), the CARB July 2014 health database (CARB, 2014), the OEHHA Hot Spots Program Guidance Manual (OEHHA, 2015), and draft risk management policy guidance recently issued by the SJVAPCD.[19] The results of this HRA demonstrate that the potential impacts of implementing the proposed modifications will be below public health-related thresholds of significance.

Air will be the dominant pathway for public exposure to chemical substances released as a result of the modifications to the project. Emissions to the air will consist primarily of combustion byproducts produced by the new auxiliary boilers. Potential health risks from facility-wide emissions will occur almost entirely by direct inhalation. To be conservative, additional pathways (e.g., soil ingestion, dermal exposure, home-grown vegetable consumption,[20] and mother's milk exposure) were included in the HRA modeling.

Emissions of pollutants for which CAAQS or NAAQS are established—including $NO_2$, $SO_2$, CO, ozone, and particulate matter (PM)—are addressed in Section 3.1, Air Quality, and discussion of potential health risks associated with these substances is presented in this section. Human health risks associated with the potential accidental release of stored acutely hazardous materials are discussed in Section 3.5, Hazardous Materials Management.

Details of the public health analysis are contained in the following sections. Section 3.8.1 describes the potentially affected public health environment around the project site. Section 3.8.2 discusses the environmental impacts from construction and operation of the proposed modifications. Section 3.8.3 discusses potential cumulative public health impacts of the combined toxic air contaminant (TAC[21])

[19] Available at *http://www.valleyair.org/notices/Docs/2015/3-18-15_risk/final-draft-risk-policy-sr.pdf*. The HRA presented here follows the District's recommendations with respect to the assumptions and default values used in running the HARP 2 model. However, because this guidance has not yet been adopted, we do not rely on the District's proposed new, higher significance threshold for cancer risk of 20 in one million.

[20] This non-standard pathway was included as it has been requested by the SJVAPCD staff for previous projects within their jurisdiction.

[21] Also called non-criteria pollutants.

emissions from the project and other projects, if any, in the process of obtaining permits to construct or reasonably known by SJVAPCD or other local air permitting agencies to be entering the permitting process. These other projects are also considered in the air quality cumulative impacts analysis (Air Quality Appendix 3.1D). Section 3.8.4 discusses mitigation measures that may be needed to reduce potentially significant impacts below a level of significance. Section 3.8.5 describes the relevant Laws, Ordinances, Regulations, and Standards (LORS) that affect public health and are applicable to the proposed modifications. Section 3.8.6 describes the agencies involved in public health aspects of permitting and the CEQA analysis for the modifications, along with agency contact information. Section 3.8.7 describes public health-related permits and the schedule for obtaining those permits. Section 3.8.8 provides references cited or consulted in preparing this section.

## 3.8.1 Environmental Baseline

The project is located on a 31-acre parcel leased from Tejon Ranchcorp located 30 miles south of Bakersfield and 6.5 miles east of Interstate 5 at the base of the Tehachapi Mountains. The project site is at an elevation of approximately 1070 feet above mean sea level. The project site is relatively flat, with a gentle slope running from the southeast to the northwest. The land surrounding the project site is mainly undeveloped and used for agricultural production and cattle grazing. There is an aggregate processing plant located southeast of the project site and the Edmonston Pumping Plant is located less than a mile south of the project site. There are no parks, recreational, educational, religious or health care facilities, or commercial uses within a mile of the project site. The nearest residences are between 3 and 5 miles from the project site.

Air quality and health risk data presented by CARB in the 2008 Almanac of Emissions and Air Quality[22] for the San Joaquin Valley Air Basin show that over the period 1990 through 2005, the average concentrations for the top ten TACs have been substantially reduced, and the associated health risks for the San Joaquin Valley Air Basin and for Kern County in particular are showing a steady downward trend as well. CARB-estimated emissions inventory values for the top ten TACs for 2008 and ambient levels and associated potential risks for 2007 are presented in Table 3.8-1 for Kern County. The potential health risk for Kern County is lower than the potential health risk for the air basin as a whole.

The CEC staff evaluated impacts associated with non-criteria emissions from the project in the September 2000 Final Staff Assessment (FSA). The FSA concluded that no significant impacts were likely to be associated with the project’s non-criteria pollutant emissions and that potential cancer risks were below CEC staff’s *de minimis* level of concern. The staff’s estimated health risks are summarized in Table 3.8-2. The significant impact thresholds are discussed further below.

[22] Although CARB has published a 2013 edition of the Almanac, it does not include data on TACs.

TABLE 3.8-1
**Top Ten TACs Emitted by All Sources in the Project Area**

| TAC | 2008 Emissions, Kern County (tons/year) | 2007 Levels and Risks, Kern County | |
|---|---|---|---|
| | | Annual Average Concentration (ppbv) | Potential Health Risk[a] (in 1 million) |
| Acetaldehyde | 360 | 1.24 | 6 |
| Benzene | 645 | 0.31 | 29 |
| 1,3-Butadiene | 58 | 0.05 | 24 |
| Carbon tetrachloride | < .01 | 0.095 (2003) | 26 (2003) |
| Chromium, hexavalent | 0.03 | 0.038 ng/m$^3$ | 12 |
| Para-Dichlorobenzene | 30 | 0.15 (2006) | 10 (2006) |
| Formaldehyde | 1301 | 2.61 | 18 |
| Methylene chloride | 65 | 0.1 | <1 |
| Perchloroethylene | 96 | 0.041 | 1 |
| Diesel PM[b] | 1640 | 1.3 µg/m$^3$ (2000) | 390 (2000) |
| Total Health Risk[c] | | | 81 |

[a]Health risk represents the number of excess cancer cases per million people based on a 70-year exposure to the annual average concentration. Health risk represents only the compounds listed in this table and only those with data for the year. There may be other significant compounds for which monitoring and health risk information is not available.
[b]Diesel PM concentrations and risks are for the entire air basin. The emissions and risk estimates are based on receptor modeling and are available only for selected years.
[c]Total Health Risk shown excludes diesel PM because diesel PM concentrations are not available for 2007.

Notes:
µg/m$^3$ = micrograms per cubic meter; ng/m$^3$ = nanograms per cubic meter; ppbv = parts per billion by volume; SJVAPCD = San Joaquin Valley Air Pollution Control District

Source: CARB, 2009a. Tables C-16, C-30, and C-32.

TABLE 3.8-2
**Results of Screening Health Risk Assessment for Existing PEF**

| Health Risk | Calculated Risk | Significant Impact Threshold |
|---|---|---|
| Acute HHI | 0.57 | 1.0 |
| Chronic HHI | 0.14 | 1.0 |
| Cancer Risk | 0.56 in one million | 1 in one million |

Source: CEC Commission Final Decision (99-AFC-7), Pastoria Energy Facility, December 2000.

## 3.8.2 Environmental Analysis

This section discusses the sources and different kinds of air emissions associated with construction and operation of the proposed modifications (see Section 3.1, Air Quality), the methodology used in conducting the HRA, and the HRA results regarding potential health risks. Other potential public health risks associated with the modifications are discussed in different sections of the Petition as follows:

- Potential exposure to wastes generated is discussed in Section 3.13, Waste Management.

- Potential exposure to the hypothetical accidental release of anhydrous ammonia onsite or during offsite transport is discussed in Section 3.5, Hazardous Materials Handling.
- Potential safety and health impacts relative to the work environment of project employees are discussed in Section 3.16, Worker Safety and Fire Protection.

Project emissions to the air will consist of combustion by-products from the new auxiliary boilers, as well as emissions from the existing equipment. Inhalation is the main pathway by which air pollutants can potentially cause public health impacts. Other pathways, including dermal absorption and ingestion of soil, homegrown vegetables, and mother's milk, are also evaluated for potential exposure. As discussed below, health impacts from the proposed addition of the auxiliary boilers will not be significant.

To evaluate potential health risks, the measures of these risks are first described in terms of the types of public health effects and the significance criteria and thresholds for those effects.

### 3.8.2.1 Significance Criteria

Significance criteria exist for both cancer and non-cancer risks and are discussed separately below.

**Cancer Risk**

Cancer risk is the probability or chance of contracting cancer over a human life span (assumed to be 70 years). Carcinogens are assumed to have no threshold below which there would be no human health impact. Any exposure to a carcinogen is assumed to have some probability of causing cancer: the lower the exposure, the lower the cancer risk (i.e., a linear, no-threshold model). Under state and SJVAPCD regulations, an incremental cancer risk greater than 10-in-one million due to a project is considered to be a significant impact on public health if the emitting units are determined by SJVAPCD to be using Toxics Best Available Control Technology (T-BACT).[23] The 10-in-one-million risk level is also used by the Air Toxics "Hot Spots" (AB 2588) program and California's Proposition 65 as the public notification level for air toxic emissions from existing sources.

Animal studies or human epidemiological studies (often based on workplace exposures) are used to estimate the relationship between the dose of a particular carcinogen and the resulting excess cancer risk. The cancer potency factor for that carcinogen is the slope of that dose-response relationship. Cancer risk is estimated by multiplying the dose of a particular carcinogen by its cancer potency factor. The dominant exposure pathway is inhalation; however, additional exposure pathways are considered in this screening health risk assessment.

**Non-Cancer Health Impact**

Non-cancer health effects can be either long-term (chronic) or short-term (acute). In determining potential non-cancer health risks from air toxics, it is assumed there is a dose of the TAC below which there would be no impact on human health. The air concentration corresponding to this dose is called the Reference Exposure Level (REL). A non-cancer health impact is measured in terms of a health hazard quotient for each TAC, which is the modeled maximum annual concentration of each TAC divided by its REL. Health hazard quotients for TACs affecting the same target organ are typically summed, with the resulting totals expressed as health hazard indices for each organ system. A health hazard index of less than 1.0 is considered by the regulatory agencies to be a less-than-significant health risk.

Chronic toxicity is defined as adverse health effects from prolonged chemical exposure, caused by chemicals accumulating in the body. Because chemical accumulation to toxic levels typically occurs slowly, symptoms of chronic effects usually do not appear until long after exposure commences. The lowest no-effect chronic exposure level for a non-carcinogenic air toxic is the chronic REL. Below this threshold, the

[23] The threshold would be 1 in one million if the emitting units were determined not to be applying T-BACT.

body is capable of eliminating or detoxifying the chemical rapidly enough to prevent its accumulation. The chronic health hazard index was calculated as the sum of the chronic health hazard quotients, each of which is calculated as the chronic TAC annual concentration divided by the chronic REL of the TAC.

Acute toxicity is defined as adverse health effects caused by a brief chemical exposure of no more than 24 hours. For most chemicals, the air concentration required to produce acute effects is higher than the level required to produce chronic effects because the duration of exposure is shorter. Because acute toxicity is predominantly manifested in the upper respiratory system at threshold exposures, all acute health hazard quotients are typically summed to calculate the acute health hazard index. This method leads to an upper bound assessment.

The maximum one-hour (and 8-hour, as appropriate) average concentration of each TAC with acute health effects is divided by the specific TAC's acute REL to obtain a health hazard quotient for health effects caused by relatively high, short-term exposure to air toxics. RELs used in the hazard index calculations were those published in the CARB/OEHHA listings dated July 2014.

### 3.8.2.2 Construction Impacts

Construction of the auxiliary boilers is expected to take approximately 7 months. No significant public health effects are expected during construction. Construction practices that incorporate safety and compliance with applicable LORS and CEC COCs will be followed. In addition, mitigation measures (incorporated into the CEC COCs) to reduce air emissions from construction activities will be implemented as described in Section 3.1.

Temporary air emissions from construction are presented in detail in Appendix 3.1C, followed by a criteria pollutant air dispersion analysis that demonstrates ambient air quality standards will not be exceeded during construction. The dominant emission with potential health risk is diesel particulate matter (DPM) from combustion of diesel fuel in construction equipment (e.g., cranes, dozers, excavators, graders, front-end loaders, backhoes). DPM emissions from on-site construction are summarized in Table 3.8-3. The screening health risk assessment included in Appendix 3.1C shows that cancer risk from DPM exposure during construction will be well below 1 in one million.

TABLE 3.8-3
**Maximum Onsite Construction DPM Emissions**

| Emitting Activity | Pounds per Day | Pounds per Year |
|---|---|---|
| Construction Equipment | 0.14 | 12.92 |

Ambient air modeling for $PM_{10}$, CO, $SO_2$, and $NO_2$ was performed as described in Section 3.1 and Appendix 3.1B. Construction-related emissions are temporary and localized, resulting in no long-term significant health impacts to the public.

Small quantities of hazardous waste may be generated during the life of the project. Hazardous waste management plans will be in place so the potential for public exposure is minimal. Refer to Section 3.13, Waste Management, for more information. No acutely hazardous materials will be used or stored onsite during construction (see Section 3.5, Hazardous Materials Management). To ensure worker safety during construction, safe work practices will be followed (see Section 3.14, Worker Safety and Fire Protection).

### 3.8.2.3 Operations Impacts

Potential human health impacts associated with the proposed modifications may result from exposure to air emissions from operation of the natural gas-fired auxiliary boilers. The non-criteria pollutants emitted include certain volatile organic compounds and polycyclic aromatic hydrocarbons (PAHs) from the combustion of natural gas and ammonia from the SCR NOx control systems. These pollutants are listed in Table 3.8-4, and the detailed emission summaries and calculations are presented in Appendix 3.1A.

TABLE 3.8-4
**Pollutants Emitted to the Air from Pastoria Energy Facility Modifications**

| Criteria Pollutants | Non-criteria Pollutants (Continued) |
|---|---|
| Carbon monoxide | Hexane |
| Oxides of nitrogen | Naphthalene |
| Particulate matter | Propylene |
| Oxides of sulfur | Toluene |
| Volatile organic compounds | Xylene |
| | Other PAHs |
| **Non-criteria (Toxic) Pollutants** | Benzo(α)anthracene |
| Ammonia | Benzo(α)pyrene |
| Acetaldehyde | Benzo(β)fluoranthene |
| Acrolein | Benzo(k)fluoranthene |
| Benzene | Chrysene |
| Ethylbenzene | Dibenz(a,h)anthracene |
| Formaldehyde | Indeno(1,2,3-cd)pyrene |

Emissions of criteria pollutants associated with the proposed modifications will not cause or contribute significantly to violations of the national or California ambient air quality standards as discussed in Section 3.1, Air Quality. The proposed modifications include using BACT as required under SJVAPCD rules.

Air dispersion modeling results (see Section 3.1.2) show that emissions associated with the proposed modifications will not result in ambient concentrations of criteria pollutants that exceed ambient air quality standards, with the exception of the state $PM_{10}$ and federal $PM_{2.5}$ standards. For these pollutants, existing 24-hour and annual average $PM_{10}$ and $PM_{2.5}$ background concentrations already exceed ambient standards, while the modeling results presented in Section 3.1.2 indicate the impacts associated with the proposed modifications would not add a significant contribution. These standards are intended to protect the general public with a wide margin of safety. Therefore, implementation of the modifications will not have a significant impact on public health from emissions of criteria pollutants.

### 3.8.2.4 Public Health Impact Study Methods

Emissions of non-criteria pollutants from the proposed modifications were analyzed using emission factors previously approved by SJVAPCD, CARB, and EPA. Air dispersion modeling combined the emissions with site-specific terrain and meteorological conditions to analyze short-term and long-term arithmetic mean concentrations in air for use in the HRA. The EPA-recommended air dispersion model, AERMOD, was used along with five years (2009–2013) of compatible meteorological data from the Bakersfield meteorological station assembled and provided by the staff of SJVAPCD. The meteorological data combined surface measurements made at Bakersfield with upper air data from Oakland Airport.[24]

The HARP 2 model was used with the air dispersion modeling output from AERMOD to perform the risk assessment. The HARP 2 model implements the new risk assessment guidance provided in OEHHA's 2015

[24] The air quality modeling methodology is discussed further in Air Quality Appendix 3.1B.

Hot Spots Program Guidance Manual, and HARP 2 model operations were selected to be consistent with the draft risk management policy guidance recently issued by the SJVAPCD. In addition, new and more stringent RELs have been adopted for some TACs. Because the new risk assessment procedures result in modeled risks that may be significantly higher than those predicted using the old procedures, the risk assessment for the existing facility has also been updated using the new procedures to more appropriately represent the increased risks due to the new boilers.

**Risk Analysis Method**

The ambient air quality modeling analysis for the criteria pollutant impact assessment is discussed in detail in Section 3.1.2.5 (Air Quality). The stack parameters used to evaluate annual and 1- and 8-hour average impacts for criteria pollutants were also used in modeling cancer risk and chronic health hazard index, and acute health hazard index, respectively. Health risks potentially associated with the estimated concentrations of pollutants in air were characterized in terms of potential lifetime cancer risk (for carcinogenic substances), or comparison with RELs for non-cancer health effects (for non-carcinogenic substances).

Health risks were evaluated for a hypothetical Maximum Exposed Individual (MEI) located at the Point of Maximum Impact (PMI). The cancer risk to the MEI at the PMI is referred to as the Maximum Incremental Cancer Risk, or MICR. Human health risks associated with emissions from the proposed modifications are unlikely to be higher at any other location than at the PMI. If there is no significant impact associated with concentrations in air at the PMI location, it is assumed to be unlikely that there would be significant impacts in any other location. Health risks were also evaluated for a hypothetical Maximally Exposed Individual Resident (MEIR), an individual assumed to be located at the MEIR point (i.e., a residential receptor) where the highest concentrations of air pollutants associated with project emissions are predicted to occur, based on air dispersion modeling. The PMI (and thus the MICR) is not necessarily associated with actual exposure because in many cases the PMI is in an uninhabited area. Therefore, the MICR is generally higher than the MEIR. Both the MICR and the MEIR are residential risks and are based on a 24 hour per day, 365 day per year, 70 year lifetime exposure.

Health risks are also assessed for the hypothetical Maximally Exposed Individual Worker, or MEIW. This assessment reflects potential workplace risks, which have a shorter duration than residential risks. Workplace risks reflect 8 hour per day, 245 days per year, 40-year lifetime exposure. Because this is a screening analysis, the MEIW risk is assessed at the PMI (the most conservative assumption).

Health risks potentially associated with concentrations of carcinogenic pollutants in air were calculated as estimated excess lifetime cancer risks. The total cancer risk at any specific location is found by summing the contributions from each carcinogen.

The inhalation cancer potency factors and RELs used to characterize health risks associated with modeled concentrations in air are taken from the *Consolidated Table of OEHHA/CARB Approved Risk Assessment Health Values* (CARB, July 2014) and are presented in Table 3.8-5.

### 3.8.2.5 Characterization of Risks from Toxic Air Pollutants

The estimated potential maximum cancer risks for the MICR at the location of PMI and for the MEIW are shown in Table 3.8-6. The maximum carcinogenic risk is well below the SJVAPCD’s 10 in one million threshold of significance for sources applying T-BACT. The natural gas fuel that will be used by the new auxiliary boilers is T-BACT for this class and category of source. The maximum cancer risk for the existing equipment was shown in Table 3.8-2 to be 0.56 in one million for the original licensing proceeding; using the new OEHHA and proposed SJVAPCD guidance, the maximum cancer risk for the existing equipment is 1.9 in one million. However, as stated in the SJVAPCD’s draft guidance,

TABLE 3.8-5
**Toxicity Values Used to Characterize Health Risks**

| Toxic Air Contaminant | Inhalation Cancer Potency Factor (mg/kg-d)$^{-1}$ | Chronic Reference Exposure Level (µg/m$^3$) | Acute Reference Exposure Level (µg/m$^3$) |
|---|---|---|---|
| Acetaldehyde | 0.010 | 140 | 470 (1-hr)<br>300 (8-hr) |
| Acrolein | — | 0.35 | 2.5 (1-hr)<br>0.7 (8-hr) |
| Ammonia | — | 200 | 3,200 |
| Benzene | 0.10 | 3.0 | 27 (1-hr)<br>3.0 (8-hr) |
| 1,3-Butadiene | 0.60 | 2.0 | 660 (1-hr)<br>9.0 (8-hr) |
| Ethyl Benzene | 0.0087 | 2,000 | — |
| Formaldehyde | 0.021 | 9 | 55 (1-hr)<br>9 (8-hr) |
| Hexane | — | 7,000 | — |
| Naphthalene | 0.12 | 9.0 | — |
| PAHs (as BaP) | 3.9 | — | — |
| Propylene | — | 3,000 | — |
| Propylene oxide | 0.013 | 30 | 3,100 |
| Toluene | — | 300 | 37,000 |
| Xylenes | — | 700 | 22,000 |

Notes:
µg/m$^3$ = microgram(s) per cubic meter
mg/kg-d = milligram(s) per kilogram per day

Source: CARB/OEHHA, July 3, 2014.

TABLE 3.8-6
**Summary of Estimated Incremental Health Risks of the Project**

| Receptor | Carcinogenic Risk[a] | Acute Health Hazard Index[b] | Chronic Health Hazard Index | |
|---|---|---|---|---|
| | | | 8-hour[c] | Annual[d] |
| Maximum Incremental Risk at PMI | | | | |
| Existing Equipment | 1.9 in one million | 0.1 | $3.7 \times 10^{-3}$ | $9.6 \times 10^{-3}$ |
| New Auxiliary Boilers | 0.6 in one million | 0.03 | $2.3 \times 10^{-4}$ | $1.4 \times 10^{-3}$ |
| Total PEF, after modification | 2.2 in one million | 0.1 | $3.8 \times 10^{-3}$ | $9.6 \times 10^{-3}$ |

TABLE 3.8-6
**Summary of Estimated Incremental Health Risks of the Project**

| Receptor | Carcinogenic Risk[a] | Acute Health Hazard Index[b] | Chronic Health Hazard Index 8-hour[c] | Chronic Health Hazard Index Annual[d] |
|---|---|---|---|---|
| Maximally Exposed Individual Worker (MEIW) at PMI | | | | |
| Existing Equipment | 0.17 in one million | n/a 0.1 | $3.7 \times 10^{-3}$ | $6.6 \times 10^{-3}$ |
| New Auxiliary Boilers | 0.01 in one million | n/a 0.03 | $2.3 \times 10^{-4}$ | $9.5 \times 10^{-4}$ |
| Total PEF, after modification | 0.18 in one million | n/a 0.1 | $3.8 \times 10^{-3}$ | $6.6 \times 10^{-3}$ |
| Significance Level | 10[e] | 1.0 1.0 | 1.0 | 1.0 |

[a] Derived (OEHHA) method used to determine significance of modeled risks.
[b] Acute analysis is done as a single point exposure and is not affected by the type of analysis or exposure duration.
[c] 8-hour chronic HHI is the same for residential and worker exposure as the maximum 8-hour exposure is assumed to occur during workplace hours.
[d] Annual chronic HHI for workplace exposure is calculated as 250 work days per year ÷ 365 total days per year times annual chronic HHI for residential exposure.
[e] The draft SJVAPCD revised guidance proposes a significance threshold for cancer risk of 20 in one million; however, that guidance has not yet been adopted.

> "…the new methodologies result in a much higher calculated risk…it is important to recognize that although the risk calculation methodology is changing, and will result in higher calculated risk, the apparent increase in risk is not caused by increases in actual emissions or exposures to toxic air contaminants."[25]

Further, although maximum modeled potential carcinogenic risk is greater than 1 in one million for the facility, the areas where the modeled risk exceeds 1 in one million are limited to isolated areas immediately outside the fenceline and in elevated terrain to the southeast, within 2 miles of the facility. These areas are uninhabited, so no residential or sensitive receptors will actually be exposed to this modeled risk.

The maximum potential acute and non-cancer health hazard indices associated with concentrations in air are also shown in Table 3.8-6. These results indicate that the acute and chronic non-cancer health hazard indices are far below 1.0, the threshold of significance. Therefore, the analyses of cancer and non-cancer risks associated with chronic or acute exposures demonstrate that the risks fall below significance thresholds used for regulating emissions of toxic air contaminants to the air.[26]

Historically, exposure to any level of a carcinogen has been considered to have a finite risk of inducing cancer. There is no threshold for carcinogenicity. Because risks at low levels of exposure cannot be quantified directly by either animal or epidemiological studies, mathematical models have estimated such risks by

[25] SJVAPCD, "Final Draft Staff Report with Appendices for Update to District's Risk Management Policy to Address OEHHA's Revised Risk Assessment Guidance Document," March 18, 2015, p. 3.

[26] OEHHA has released draft updated HRA guidance that incorporates new risk assessment assumptions that may double or triple calculated risks over those calculated using the existing version of the guidance. The updated guidance has not yet been finalized or incorporated into ARB's HARP model, so the results presented here reflect existing guidance. However, the calculated risks are so low that they would still be insignificant even if doubled or tripled.

extrapolation from high to low doses. This modeling procedure is designed to provide a highly conservative estimate of cancer risks based on the most sensitive species of laboratory animal for extrapolation to humans (i.e., the assumption being that humans are as sensitive as the most sensitive animal species). Therefore, the risk is not likely to be higher than risks estimated using inhalation cancer potency factors and is most likely lower, and could even be zero (EPA 1991).

The analysis of potential cancer risk described in this section employs methods and assumptions generally applied by regulatory agencies for this purpose. Given the importance of assuring public health, this analysis uses highly conservative methods and assumptions, meaning they tend to over-predict the potential for adverse effects. Conservative methodology and assumptions include those summarized below.

- The analysis includes representative weather data over a period of 5 years to ensure that the least favorable conditions producing the highest ground-level concentration of power plant emissions are included. The analysis then assumes that these worst-case weather conditions, which in reality occurred only once in 5 years, will occur every year for 70 years.
- The new auxiliary boilers are assumed to operate at 100 percent of their allowable levels. In reality, all equipment will operate less than 100 percent of the time.
- The location of the highest ground-level concentration of non-criteria pollutants is identified and the analysis then assumes that a sensitive individual resides at this location. In fact, the nearest residence is at least 3 miles away.
- The analysis includes the new procedures and assumptions in the OEHHA guideline that increase risk (uses the new age-specific sensitivity factors and breathing rates); and none of the factors that reduce it (does not consider fraction of time away from home or spatial averaging; does not reduce residential or worker exposure time as recommended), increasing the stringency of the risk assessment by more than a factor of 3.

Taken together, these methods and assumptions create a scenario that is more potentially adverse to human health than conditions that exist in the real world. For example, if the worst-case weather conditions could occur on a winter evening but the worst-case emission rates could occur on a summer afternoon, the analysis nonetheless assumes that these events occur at the same time. The point of using these conservative assumptions is to consciously overstate the potential impacts of the project. No one individual will experience exposures as great as those assumed for this analysis. By determining that even this highly overstated exposure will not be significant, the analysis provides a high degree of confidence that the much lower exposures that actual persons will experience will not result in any significant increase in cancer risk. In short, the analysis ensures that there will not be any significant public health impacts at any location, under any weather condition, under any operating condition.

A separately transmitted compact disc contains the HRA modeling input and output files.

### 3.8.2.6 Hazardous Materials

Hazardous materials will continue to be used and stored at the project site. The addition of the new auxiliary boilers and the operational changes requested in this Petition will not affect the quantities of hazardous materials stored or used at the project. Continued use of hazardous materials will not result in significant impacts to public health. Best management practices will continue to be used and mitigation measures will remain in place to prevent releases.

The California Accidental Release Prevention (CalARP) Program regulations and Code of Federal Regulations (CFR) Title 40 Part 68 under the Clean Air Act establish emergency response planning requirements for acutely hazardous materials. These regulations require, among other things, preparation of a Risk Management Plan (RMP), which is a comprehensive program to identify hazards and predict the areas that may be affected by a release of a program-listed hazardous material. Anhydrous ammonia is currently stored and used at the existing project, and no new ammonia storage facilities will be required to implement the modifications. The project will continue to comply with the current RMP that covers the existing anhydrous ammonia tank.

### 3.8.2.7 Operation Odors

A small amount of ammonia used to control NOx emissions can "slip" past the SCR catalyst and be emitted from the exhaust stack, but this amount emitted at the design stack height is less than that required to produce an odor offsite. The expected exhaust gas ammonia concentration, known as ammonia "slip," will not exceed 10 parts per million by volume (ppmv). After mixing with the atmosphere, the concentration at ground level will be far below the detectable odor threshold of 5 ppmv that the Compressed Gas Association has determined to be acceptable, as well as being below the ACGIH[27] TLV[28] and STEL[29] values of 25 and 35 ppm, respectively (adopted 2003). Therefore, potential ammonia emissions would not create a significant odor. Other combustion contaminants are not present at concentrations that could produce a significant odor.

### 3.8.2.9 Electromagnetic Field Exposure

Based on recent findings of the National Institute of Environmental Health Sciences (NIEHS, 1999), electromagnetic field (EMF) exposures are not expected to result in a significant impact on public health. The NIEHS report to the U.S. Congress found "the probability that EMF exposure is truly a health hazard is currently small. The weak epidemiological associations and lack of any laboratory support for these associations provide only marginal scientific support that exposure to this agent is causing any degree of harm" (NIEHS, 1999).

### 3.8.2.10 Summary of Impacts

Results from the HRA based on emissions modeling indicate that there will be no significant incremental public health risks from construction or operation of the proposed modifications. Results from criteria pollutant modeling for routine operations indicate that potential ambient concentrations of $NO_2$, CO, $SO_2$, and $PM_{10}$ would not exceed ambient air quality standards, with the exception of the state $PM_{10}$ and federal $M_{2.5}$ standards. For these pollutants, existing 24-hour and annual average $PM_{10}$ and $PM_{2.5}$ background concentrations already exceed applicable standards, while the project would not add a significant contribution. The ambient air quality standards protect public health with a margin of safety for the most sensitive subpopulations (Section 3.1).

## 3.8.3 Mitigation Measures

The proposed modifications have been designed to minimize TAC emissions and impacts. No additional mitigation measures are needed for the project's TAC emissions because the potential air quality and public health impacts are less than significant.

## 3.8.4 Consistency with LORS

Construction and operation of the modifications will conform with all applicable LORS related to public health as identified in the Final Decision (99-AFC-7C), as amended.

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27 American Congress of Government Industrial Hygienists

28 Threshold Limit Value

29 Short-term Exposure Level

## 3.8.5 Conditions of Certification

This Petition does not require public health COCs. Consistent with Final Decision (99-AFC-7C), as amended, a discussion of applicable COCs that control project air quality emissions are included under Air Quality, Section 3.1.

## 3.8.6 References

California Air Resources Board. 2014. Consolidated table of OEHHA/CARB approved risk assessment health values. Accessed at *http://arbis.arb.ca.gov/toxics/healthval/contable.pdf*. July.

California Air Resources Board (CARB). 2015. HARP Model, Version 2. Accessed at *http://www.arb.ca.gov/toxics/harp/harp.htm*. March.

California Air Resources Board (ARB). 2003. *Recommended Interim Risk Management Policy for Inhalation-based Residential Cancer Risk*.

California Energy Commission (CEC). 2000. *Energy Commission Decision, Application for Certification for the Pastoria Energy Facility, Docket Number 99-AFC-7*. California Energy Commission, Sacramento, California. December.

California Energy Commission (CEC). 2006. *Energy Commission Decision, Application for Certification for the Pastoria Energy Facility Expansion Project, Docket Number 05-AFC-1*. California Energy Commission, Sacramento, California. December.

National Institute of Environmental Health Sciences (NIEHS). 1999. Environmental Health Institute report concludes evidence is 'weak' that EMFs cause cancer. Press release. National Institute of Environmental Health Sciences, National Institutes of Health.

OEHHA. 2015. *Air Toxics Hotspots Program Guidance Manual for Preparation of Health Risk Assessments*. February.

Pastoria Energy Facility, L.L.C. 1999. *Application for Certification for the Pastoria Energy Facility*. Submitted to California Energy Commission, Sacramento, California. November.

Pastoria Energy Facility, L.L.C. 2005. *Application for Certification for the Pastoria Energy Facility Expansion Project*. Submitted to California Energy Commission, Sacramento, California. April.

San Joaquin Valley Air Pollution Control District. 2001. Risk Management Policy for Permitting New and Modified Sources. March. [30]

San Joaquin Valley Air Pollution Control District. 2007. Guidance for Air Dispersion Modeling. January.

San Joaquin Valley Unified Air Pollution Control District. 2015. *Final Draft Staff Report: Update to District's Risk Management Policy to Address OEHHA's Revised Risk Assessment Guidance Document*. March.

U.S. Environmental Protection Agency. 1991. Risk Assessment for Toxic Air Pollutants: A Citizen's Guide. EPA 450/3-90-024. March 1991. http://www.epa.gov/ttn/atw/3_90_024.html

U.S. Environmental Protection Agency (EPA). 2005. *Guideline on Air Quality Models*, 40 CFR, Part 51, Appendix W, November.

[30] SJVAPCD is considering updates to the District's Risk Management Policy to address OEHHA's revised draft risk assessment document; however, no final action has been taken.

# 3.9 Socioeconomics

Construction and operation of the auxiliary boilers and other changes proposed by the Petition will not result in land use impacts beyond those considered in the Final Decision, (99-AFC-7C), as amended. All activities associated with the requested modifications will occur within the project's site boundaries on previously disturbed lands. The auxiliary boilers will be installed on an existing concrete pad. The project site is located in an unincorporated area of Southern Kern County and the proposed modifications will have a minor effect on tax distribution. These modifications will contribute construction jobs and revenue to the local economy and will provide net economic benefits. The number of jobs during the operational phase will remain the same, and will not result in a change to the local economy. Finally, the project's tax rates and capital costs will be larger and this will increase the economic benefits of the project to the local economy. Therefore, there will be no new socioeconomic impacts beyond those identified in the Final Decision, (99-AFC-7C), as amended.

## 3.9.1 Environmental Baseline Information

The following subsections describe the effects of construction and operation that will take place as a result of construction of the auxiliary boiler and other proposed modifications.

### 3.9.1.1 Construction Phase Impact

#### Construction Workforce

Construction of the auxiliary boiler will take place over approximately 7 months. Table 3.9-1 identifies the construction workforce for the proposed project modifications. Construction personnel requirements will peak at approximately 143 workers in month 5 of the construction period. It is also anticipated that certain major maintenance will occur simultaneously with the upgrades.

TABLE 3.9-1
**Construction Workforce by Month**

| Construction Personnel Requirement | Number of Craft/Month | | | | | | |
|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| Auxiliary boiler foundation | 5 | 20 | 30 | 7 | 80 | 50 | 2 |
| Mechanical tie-ins for auxiliary boiler installation | 5 | 5 | 30 | 4 | 55 | 50 | 6 |
| Auxiliary boiler installation | | | 10 | | 9 | 16 | 8 |
| Major Maintenance Staff[1] | 2 | | 7 | | | | 56 |
| Construction Management Staff | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Technical Advisor | | 1 | 1 | 1 | 1 | 2 | 3 |
| **Total Craft** | **13** | **25** | **77** | **13** | **143** | **119** | **76** |

[1] As described in Section 2.0, Calpine's current schedule anticipates the modifications covered under this Petition to occur with scheduled maintenance.

#### Fiscal Resources

The total construction cost of the project is estimated to be approximately $136 million, of which $23.8 million will be paid out as wages and salaries, including benefits (estimated using an average of $77.10 hour). Local products subject to county taxes will be purchased during the construction process. Local governments will not realize property tax revenue, which reflects the value of the completed facility, until after construction is complete. Sales tax revenue will be realized, however, when the construction period begins. Approximately $13.6 million of total local product purchases would be taxed during project construction. The sales tax rate in Kern County is 7.5 percent (as of February 2016). The total tax revenue from the sale of local products would be approximately $1,030,000.

#### 3.9.1.2 Operations Phase Impacts

The project, with the new equipment modifications, will not require additional workforce or result in significantly higher operational costs beyond those discussed in the Final Decision (99-AFC-7C), as amended.

### 3.9.2 Environmental Consequences

No significant impacts to socioeconomics will result from the approval of this Petition. The project will not cause an influx of construction or operation workers into the local area; will not have an adverse effect on employment, housing, schools, medical, tax revenues, and fire and police protection; will result in increased revenue from sales taxes due to construction activities; and will recruit employees and purchase materials within the Kern County area to the greatest extent possible.

### 3.9.3 Mitigation Measures

No changes to the mitigation measures included in the Final Decision, (99-AFC-7C), as amended, are necessary.

### 3.9.4 Consistency with LORS

Construction and operation of the modifications will conform with all applicable LORS related to socioeconomics as identified in the Final Decision (99-AFC-7C), as amended.

### 3.9.5 Conditions of Certification

This Petition does not require changes to the existing socioeconomic COCs from Final Decision (99-AFC-7C), as amended.

### 3.9.6 References

Pastoria Energy Facility, L.L.C. 1999. *Application for Certification for the Pastoria Energy Facility*. Submitted to California Energy Commission (CEC). 2000.

*California Energy Commission (CEC), 2000. Commission Decision for the Pastoria Energy Facility, Docket Number 99-AFC-7*. Sacramento, California. December.

California Energy Commission (CEC). 2006. *Energy Commission Decision, Application for Certification for the Pastoria Energy Facility Expansion Project, Docket Number 05-AFC-1*. California Energy Commission, Sacramento, California. December.

Pastoria Energy Facility, L.L.C. 2005. *Application for Certification for the Pastoria Energy Facility Expansion Project*. Submitted to California Energy Commission, Sacramento, California. April.

# 3.10 Soil and Water Resources

The addition of auxiliary boilers and other changes proposed by the Petition will require soil and water management requirements as described in the Final Decision (99-AFC-7C), as amended. All activities associated with the requested modifications will occur within the project's site boundaries on previously disturbed lands. The auxiliary boilers will be installed on an existing concrete pad. Compliance with the existing drainage and water quality requirements included in the Final Decision, (99-AFC-7C), as amended, will not result in impacts to soil and water resources.

## 3.10.1 Environmental Baseline Information

The affected environment for soil resources associated with the project site is as described in the Final Decision, (99-AFC-7C), as amended. The project site and surrounding area contains nearly level to moderately steep soils on alluvial fans, flood plains, and stream terraces on the southeastern portion of the San Joaquin Valley adjacent to the Tehachapi Mountains (Pastoria Energy Facility, L.L.C. AFC). The project site is primarily located on an alluvial fan associated with the proximity of the site to the Pastoria Creek drainage located approximately 1000 feet west of the site. Soil mapping units present at the project site consist of Hesperia sandy loam a very deep, well drained, and moderately susceptible to wind and water erosion. Surrounding land use is primarily agricultural, with the exception of the project, the adjacent gravel mine, Edmonston Pump Plant, and California Aqueduct. The nearest water feature that could potentially be affected by runoff from the project is Pastoria Creek, located approximately 1,000 feet away. The proposed modifications would occur within previously disturbed or graveled/paved areas of the project site.

### 3.10.1.1 Topography

Soils in the proposed project area were evaluated as part of 99-AFC-7 using the online Soil Survey of Kern County, California Southeastern Part (Pastoria Energy Facility, L.L.C., 1999). The project site is located primarily on an alluvial fan and, to a lesser extent, a recent stream bottom (Pastoria Energy Facility, L.L.C., 1999). The project site and much of the surrounding areas are located within the Federal Emergency Management Agency (FEMA) Flood Zone A, also referred to as the 100-year flood zone. The project site is relatively flat with a gentle slope of about 4 percent from the southeast (high point) to the northwest. The existing site elevation ranges from about 1,088 feet down to 1,058 feet (or approximately 1,070 feet). Pastoria Creek is located about 1,000 feet west of the site and the creek is the natural drainage path for runoff in the site area. The vegetation on the plant site and adjacent construction laydown area consists of non-native grassland.

### 3.10.1.2 Soil Mapping Units

Soil mapping units present at the plant site and adjacent area consists primarily of Hesperia sandy loam and, to a lesser extent, Psamments-Xerolls complex. The Hesperia sandy loam soil is very deep and well drained. The shrink-swell potential is low, and this soil generally has only slight limitations for building site development. The Psamments-Xerolls complex is very deep, excessively to moderately well drained, with coarse and moderately coarse surface soils. Flooding is common on portions of this soil.

## 3.10.2 Environmental Consequences

The environmental consequences and applicable mitigation measures included in the Final Decision, 99-AFC-7C, as amended will be adequate to address potential impacts associated with implementation of the proposed modifications. Because conditions that could lead to water or wind-related soil erosion and changes to water runoff patterns are not present, erosion is not expected to occur during the construction. Implementation of the proposed modifications will be conducted entirely within the existing project site in areas that were previously disturbed and are presently covered with concrete. Best management practices (BMP) will be implemented during construction in accordance with the site-specific Stormwater Pollution Prevention Plan (SWPPP), and Erosion Control and Revegetation Plan (ECRP) to reduce the impact of runoff, erosion, and sediment transport from the project site. Because of inherently low soil erodibility and based on compliance with applicable stormwater regulations during construction and operation of the project, consistent with the findings from the Final Decision, 99-AFC-7C, as amended, impacts from soil erosion will be less than significant.

Consistent with the Final Decision, 99-AFC-7C, as amended, BMPs included within the existing SWPPP and ECRP will be applied, as necessary, to minimize erosion, maintain water quality, protect property from erosion damage, and prevent accelerated soil erosion or dust generation that could impact soil productivity and capacity during construction. Water erosion will be minimized through the use of sediment barriers, and wind erosion potential would be reduced significantly by keeping soil moist and by covering and/or hydro-seeding soil stockpiles. Upon completion of construction activities, land surfaces would be permanently stabilized. Therefore, soil erosion losses after construction are expected to be negligible.

## 3.10.3 Mitigation Measures

Temporary erosion control measures required for the SWPPP and ECRP will be implemented before construction begins, and will be evaluated and maintained during construction. These measures typically include but are not limited to revegetation, mulching, physical stabilization, and dust suppression. During construction, dust erosion control measures will be implemented to minimize wind-blown soil loss. Water would be sprayed on the soil in construction areas to control dust prior to completion of permanent control measures. Since no significant impacts to soil and water resources will result from the approval of this Petition, additional mitigation measures beyond those included in the Final Decision (99-AFC-7C), as amended, are not necessary.

## 3.10.4 Consistency with LORS

Implementation of the proposed modifications will conform to all applicable LORS related to soil and water resources as identified in the Final Decision, 99-AFC-7C, as amended.

## 3.10.5 Conditions of Certification

This Petition does not require changes to the existing soil and water resources COCs from Final Decision (99-AFC-7C), as amended.

## 3.10.6 References Cited

*California Energy Commission (CEC), 2000. Commission Decision for the Pastoria Energy Facility, Docket Number 99-AFC-7*. Sacramento, California. December.

California Energy Commission (CEC). 2006. *Energy Commission Decision, Application for Certification for the Pastoria Energy Facility Expansion Project, Docket Number 05-AFC-1*. California Energy Commission, Sacramento, California. December.

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Pastoria Energy Facility, L.L.C. 2005. *Application for Certification for the Pastoria Energy Facility Expansion Project*. Submitted to California Energy Commission, Sacramento, California. April.

# 3.11 Traffic and Transportation

The addition of auxiliary boilers and the other proposed modifications to the existing project will not result in traffic and transportation impacts greater than those considered in the Final Decision (99-AFC-7C), as amended. Project construction would not result in substantial changes to the traffic and transportation findings and conclusions of the Final Decision for 99-AFC-7C, as amended. Traffic volumes in the region have had limited changes since the preparation of the AFC, the surrounding roadways continue to operate at acceptable levels of service (LOS) and can accommodate the minimal construction traffic required for the proposed modification. In all cases roadways would still be within Kern County and California Department of Transportation (Caltrans), established range of acceptable operations. This section provides a summary of existing traffic conditions, anticipated construction project trip generation and distribution, and analyzes the potential traffic impacts of the project.

## 3.11.1 Environmental Baseline Information

### 3.11.1.1 Surrounding Roadway Network

No major changes to the transportation infrastructure or roadway capacity have occurred in the vicinity of the project site since the preparation of the AFC (99-AFC-7), as amended, and the subsequent 2005 Pastoria Energy Facility Expansion AFC (05-AFC-1). Current highway volumes (Caltrans, Traffic Data Branch, 2011) were reviewed against the traffic volumes evaluated in 05-AFC-1. This review confirmed minimal changes on all previously evaluated roadway segments. The roadways currently operate at LOS D or better, which is within County and Caltrans minimum acceptable LOS standards for roadways. Vehicle and trucks would continue to access the site using Edmonston Pump Plant Road off of Interstate-5 (I-5). Local roadways are shown on Figure 1-1.

## 3.11.2 Environmental Consequences

The impact of the proposed modifications is measured by the potential change in the traffic operations of surrounding intersections and roadways. Traffic associated with the project after the 7-month construction period is not expected to change from the traffic considered in the Final Decision (99-AFC-7C), as amended. Therefore, this assessment focuses on the project traffic under a worst-case peak construction period.

### 3.11.2.1 Construction Trip Generation

The amount of traffic generated by the proposed modifications was estimated based on the anticipated construction schedule, activities, and workforce, including the number of employees and anticipated daily vehicle activity at the site as shown in Tables 3.1-17 and 3.11-1. The vehicle trips associated with the project were separated into construction worker trips (generally auto trips) and delivery trips (truck trips). The number of construction workers will fluctuate throughout the 7-month construction period, with the peak construction effort onsite occurring during Month 5, when 143 workers are projected. As a conservative estimate it assumed that none of the construction workers will carpool. Therefore, the construction workforce will generate 167 average daily trips (ADT), 84 AM peak hour trips and 84 PM peak hour trips.

The average number of deliveries per day is estimated to be ten. It is assumed that the truck trips would be spread evenly throughout the day, beginning at 8:00 AM and ending at 4:30 PM. Also, it was assumed that all inbound deliveries would occur in the first eight hours, and all exiting delivery truck trips would occur in the last eight hours. The resulting estimate was five trips during the morning peak hour and five trips during the afternoon peak hour.

TABLE 3.11-1
**Construction Project Trip Generation**

| Trip Type | ADT | AM Peak Hour | | | PM Peak Hour | | |
|---|---|---|---|---|---|---|---|
| | | In | Out | Total | In | Out | Total |
| Delivery Trucks | 10 | 5 | 0 | 5 | 0 | 5 | 5 |
| Delivery Trucks PCE (1.5)* | 150 | 10 | 0 | 10 | 0 | 10 | 10 |
| Workers | 143 | 72 | 0 | 72 | 0 | 72 | 72 |
| Total Construction Traffic in PCE | 203 | 87 | 0 | 87 | 0 | 87 | 87 |

*PCE = passenger car equivalent

Notes: Construction schedule and manpower loading provided by Applicant. Construction activity assumed to occur 10 hours per day; 5 days per week; 22 days per month. All worker and delivery truck travel assumed to travel to the project site. Estimated round-trip travel distance is 70 miles and assumes no carpooling due to short duration of construction period.

### 3.11.2.2 Construction Traffic Distribution

Based on the regional street network and anticipated employee origins and destinations, it is anticipated that construction traffic would come from the Bakersfield Metro-area approximately 35-miles north of the project site. The distribution of project trips on the regional and local road network is assumed to be the same as previously updated and included in 05-AFC-1.

### 3.11.2.3 Existing Plus Construction Traffic Conditions

The proposed modifications would result in temporary, short-term increases in local traffic as a result of construction-related workforce traffic (employee travel to and from the site) and material deliveries. Based upon the PCE volumes in Table 3.11-1, during peak construction, the project is projected to add 203 daily trips, with 87 trips each occurring during the morning and afternoon peak hours. This is considered a conservative estimate since it was assumed that 100 percent of the workforce would drive alone and arrive during the peak hours. In addition, construction work typically begins early (before 7:00 AM) and finishes early (by 3:30 PM), further reducing the number of vehicles during the peak hour.

In general, the surrounding roadways currently operate well below capacity given the remote and rural nature of the area, and the existing low daily volumes on these roadways. Although there are portions of Highway 99 that are operating at LOS D, the roadway operations are within Caltrans' acceptable LOS standard (LOS E for Highway 99 and typically LOS D for most state facilities). The project added traffic would represent a 0.2% increase in traffic o this highway. Furthermore, this amount of additional traffic on all study area roadways will result in a negligible increase in traffic volumes as compared to roadway capacities. In all cases there is sufficient capacity to accommodate the temporary increase in traffic during construction resulting in little effect on roadway operations. The roadways would still be within Caltrans' and Kern County's range of acceptable operations.

## 3.11.3 Mitigation Measures

No significant impacts to the local or regional traffic and transportation network will result from the approval of this Petition. Therefore, mitigation measures beyond those included in the Final Decision (99-AFC-7C), as amended, are necessary. The existing construction traffic control plan and implementation program, required under COC TRANS-4, includes appropriate measures to address construction traffic at the intersection of the project site access and Edmonston Pumping Plant roads, timing of heavy equipment and building material deliveries, signing, lighting, flagging, emergency access, and traffic controls.

## 3.11.4 Consistency with LORS

The project, as amended, will remain consistent with all applicable LORS related to traffic and transportation.

## 3.11.5 Conditions of Certification

This Petition does not require changes to the existing transportation COCs from Final Decision (99-AFC-7C), as amended.

## 3.11.6 References Cited

*California Energy Commission (CEC), 2000. Commission Decision for the Pastoria Energy Facility, Docket Number 99-AFC-7*. Sacramento, California. December.

California Energy Commission (CEC). 2006. *Energy Commission Decision, Application for Certification for the Pastoria Energy Facility Expansion Project, Docket Number 05-AFC-1*. California Energy Commission, Sacramento, California. December.

Pastoria Energy Facility, L.L.C. 1999. *Application for Certification for the Pastoria Energy Facility*. Submitted to California Energy Commission (CEC). 2000.

Pastoria Energy Facility, L.L.C. 2005. *Application for Certification for the Pastoria Energy Facility Expansion Project*. Submitted to California Energy Commission, Sacramento, California. April.

State of California, 2012. Department of Transportation, Traffic Operations Division. Traffic and Vehicle Data Systems Unit. 2011 Traffic Volumes on CSHS. http://traffic-counts.dot.ca.gov/2011all.html. Accessed May 6, 2013.

# 3.12 Visual Resources

The addition of auxiliary boilers and the other proposed modifications will not result in significant impacts on visual resources because they will not cause noticeable changes visible to offsite observers or from the key observation points (KOPs) identified in 99-AFC-7.

## 3.12.1 Environmental Baseline Information

Visual conditions surrounding the project site have not changed since approval of the project (99-AFC-7). Surrounding land use is primarily agricultural, with the exception of the existing project, adjacent gravel mine, Edmonston Pump Plant, and California Aqueduct. Interstate Highway 5 (I-5) is located approximately 5 miles west of the project site. No new sensitive receptors have been constructed or relocated since the approval of 99-AFC-7. Figure 1-3 is a photograph of the existing project.

## 3.12.2 Environmental Consequences

Addition of the auxiliary boilers at the northeastern portion of the project site will not be visible from the KOPs evaluated as part of 99-AFC-7. These new facilities will mostly be screened by existing project components. At the intersection of the project site access road and Edmonston Pump Plant Road, there may be a subtle change in the visual massing of structures; however, this is not considered a high sensitivity KOP and therefore implementation of the proposed modifications will not change the conclusions from the Final Decision (99-AFC-7C), as amended.

## 3.12.3 Mitigation Measures

No significant impacts to visual resources will result from the approval of this Petition. Therefore, mitigation measures beyond those included in the Final Decision are not necessary.

## 3.12.4 Consistency with LORS

Implementation of the proposed modifications will conform to all applicable LORS related to visual resources as identified in the Final Decision, 99-AFC-7C, as amended.

## 3.12.5 Conditions of Certification

This Petition does not require changes to the existing visual resources COCs from Final Decision (99-AFC-7C), as amended.

## 3.12.6 References

*California Energy Commission (CEC), 2000. Commission Decision for the Pastoria Energy Facility, Docket Number 99-AFC-7*. Sacramento, California. December.

California Energy Commission (CEC). 2006. *Energy Commission Decision, Application for Certification for the Pastoria Energy Facility Expansion Project, Docket Number 05-AFC-1*. California Energy Commission, Sacramento, California. December.

Pastoria Energy Facility, L.L.C. 1999. *Application for Certification for the Pastoria Energy Facility*. Submitted to California Energy Commission (CEC). 2000.

Pastoria Energy Facility, L.L.C. 2005. *Application for Certification for the Pastoria Energy Facility Expansion Project*. Submitted to California Energy Commission, Sacramento, California. April.

# 3.13 Waste Management

The addition of auxiliary boilers and other changes proposed by the Petition will require similar waste management requirements as described in the Final Decision (99-AFC-7C), as amended. All activities associated with the requested modifications will occur within the project's site boundaries on previously disturbed lands. The auxiliary boilers will be installed on an existing concrete pad. Compliance with the existing Waste Management Program (WMP) and COCs included in the Final Decision, (99-AFC-7C), as amended, would not in impacts to waste management.

## 3.13.1 Environmental Baseline Information

Wastewater, non-hazardous and hazardous waste will be generated during construction of the auxiliary boilers and other proposed changes covered under this Petition. It is anticipated that operation waste production will be similar to the existing project operational waste. All waste will be disposed of in accordance with project existing Construction and Operational WMPs, which detail types of waste and appropriate disposal, consistent with the Final Decision, (99-AFC-7C), as amended.

During construction activities for the auxiliary boilers and turbine upgrades, the primary waste generated will be non-hazardous waste, although limited amounts of hazardous waste will also be generated which are addressed under Section 3.5, above. The types of waste and their estimated quantities are described in the following discussion. Typical wastes generated during construction are identified in Table 3.13-1. After installation of the auxiliary boilers and the other proposed modifications, the project owner anticipates that operation waste production will be similar to existing project operational waste generation. The existing oil-water separator will be used to process runoff from the new equipment. Stormwater runoff from the new facilities, as well as any new plant equipment drains, will similarly be discharged to the existing onsite storm water detention pond.

### 3.13.1.1 Nonhazardous Solid Waste

The following nonhazardous waste streams may be generated during construction of the auxiliary boilers and modifications:

**Paper, wood, glass, and plastics.** Approximately 2 ½ tons of paper, wood, glass, and plastics will be generated from packing materials, waste lumber, insulation, and empty nonhazardous chemical containers during construction. These wastes will be placed in dumpsters or recycled where practical. Waste that cannot be recycled will be disposed of weekly in a Class III landfill.

**Metal.** Approximately 500 pounds of metal, including steel (from welding and cutting operations, packing materials, and empty nonhazardous chemical containers) and aluminum waste (from packing materials and electrical wiring) will be generated during construction. Waste will be recycled, where practical, and non-recyclable waste will be deposited in a Class III landfill.

### 3.13.1.2 Hazardous Waste

Hazardous waste generated during construction will consist of a minimal amount of solvents, spent lead acid batteries, welding materials, and dried paint.

TABLE 3.13-1
**Wastes Generated During the 7-month Construction Phase**

| Waste | Origin | Composition | Estimated Quantity | Classification | Disposal |
|---|---|---|---|---|---|
| Scrap wood, glass, plastic, paper, calcium silicate and mineral wool insulation | Construction (C) | Normal refuse | 333 pounds/ month (dumpster) | Non-hazardous | Recycle and/or dispose at Class II/III landfill |
| Scrap metals | (C) | Parts, containers | 50 pounds/ month | Non-hazardous | Recycle and/or dispose at Class III landfill |
| Concrete | (C) | Concrete | 1.5 tons during construction | Non-hazardous | Recycle and/or dispose at Class III landfill |
| Empty liquid material containers | (C) | Drums, containers, totes | 20 containers | Non-hazardous solids | Containers <5 gallons disposed as normal refuse. Containers >5 gallons returned to vendors for recycling or reconditioning |
| Spent welding materials (i.e., welding rods) | (C) | Solid | 5 pounds/month | Non-hazardous | Recycle with vendors or dispose at Class I landfill, if hazardous |
| Waste oil filters | (C) equipment and vehicles | Solids | 5 pounds/month | Non-hazardous | Recycle at permitted treatment, storage and disposal facilities (TSDF) |
| Oily rags, oil sorbent excluding lube oil flushes | Cleanup of small spills | Hydrocarbons | 5 pounds/month | Hazardous | Recycle or dispose at permitted TSDF |
| Solvents, paint, adhesives | Maintenance | Varies | 150 pounds/ month | Hazardous | Recycle at permitted TSDF |
| Spent lead acid batteries | (C) equipment, trucks | Heavy metals | 5 to 10 batteries | Hazardous | Store no more than 10 batteries (up to 1-year) – recycle offsite |
| Spent alkaline batteries | Equipment | Metals | 5 to 10 batteries | Universal Waste solids | Recycle or dispose at offsite Universal Waste Destination Facility (UWDF) |
| Waste oil | Equipment, vehicles | Hydrocarbons | 5 gallons/month | Non-RCRA Hazardous Liquid | Dispose at permitted TSDF |
| Sanitary waste | Portable toilet holding tanks | Sewage | 50 gallons/day | Non-hazardous Liquid | Remove by contracted sanitary service |
| Fluorescent, mercury vapor lamps | Lighting | Metals and PCBs | 5 to 10 pounds/ year | Universal Waste solids | Recycle or dispose at offsite UWDF |

Notes: RCRA = Resource Conservation and Recovery Act of 1976; TSDF = Treatment, storage, and disposal facility; UWDF = Universal Waste Destination Facility

### 3.13.1.3 Waste Disposal

#### Solid Waste Disposal

Non-hazardous waste (often referred to as municipal waste or garbage) will be recycled or deposited in a Class III landfill. Less than 5 tons of non-hazardous waste will be generated during construction. The facility currently disposes of non-hazardous solid waste at the Taft, Shafter-Wasco, and Lost Hills disposal facilities serving Kern County waste generators. Hazardous wastes will be delivered to a permitted offsite TSDF for treatment or recycling, or will be deposited in a permitted Class I landfill as identified in project's existing Operational WMP.

Non-hazardous waste will continue to be generated during operation in similar quantities as to what is currently being generated. Installation of the auxiliary boilers will occur within an existing concrete pad and will not require new excavation. Therefore, the proposed modifications are not expected to result in impacts related to solid waste disposal.

#### Hazardous Waste Disposal

As described in the project's existing WMP, hazardous waste generated will be stored at the facility for less than 90 days. The waste will then be transported to a TSDF by a permitted hazardous waste transporter consistent with the requirements specified in the Final Decision (99-AFC-7C), as amended. According to the Department of Toxic Substance Control, there are over 50 facilities in California that can accept hazardous waste for treatment and recycling (DTSC, 2012). For ultimate disposal, California has three hazardous waste (Class I) landfills. The closest commercial hazardous waste disposal facility is Waste Management's Kettleman Hills Landfill.

#### 3.13.4 Waste Disposal Summary

The proposed modifications will generate a limited amount of non-hazardous waste during the 7-month construction period that will contribute to the total waste generated in Kern County and in California. However, there is adequate recycling and landfill capacity in California to recycle and dispose of the waste generated during the construction activities. It is estimated that the additional facilities for the project will generate approximately 6 tons of solid waste during construction (including less than a ½ ton of hazardous waste), Considering that 437,436 tons of solid waste was landfilled in Kern County in the year 2012, the project's l contribution during the 7-month construction period will represent less than one percent of the county's total waste generation in a single year (CalRecycle, 2013b). Therefore, the impact of the project on solid waste recycling and disposal capacity will not be significant.

Hazardous waste generated will consist of waste oil, filters, and fluids used to clean piping. Waste oil and deionization trailer wastes will be recycled when feasible. Existing COC WASTE-3, Waste Management Plan, will be adequate to address construction and operational waste management requirements associated with the proposed modifications. Hazardous waste treatment and disposal capacity in California is more than adequate to handle the limited amounts of hazardous materials generated from implementation of the proposed modifications. Therefore, the effect of the project modifications on hazardous waste recycling, treatment, and disposal capability will be less than significant.

## 3.13.2 Mitigation Measures

No significant impacts in terms of waste management would result from the approval of this Petition. Therefore, mitigation measures beyond those identified in the Final Decision (99-AFC-7C), as amended, are necessary.

## 3.13.3 Consistency with LORS

Construction and operation of the proposed modifications will conform with all applicable LORS related to waste management as identified in the Appendix A to the Final Decision (99-AFC-7C), as amended.

## 3.13.4 Conditions of Certification

This Petition does not require changes to the existing waste management COCs from Final Decision (99-AFC-7C), as amended.

## 3.13.5 References

*California Energy Commission (CEC), 2000. Commission Decision for the Pastoria Energy Facility, Docket Number 99-AFC-7*. Sacramento, California. December.

California Energy Commission (CEC). 2006. *Energy Commission Decision, Application for Certification for the Pastoria Energy Facility Expansion Project, Docket Number 05-AFC-1*. California Energy Commission, Sacramento, California. December.

CalRecycle. 2013a. Solid Waste Information System (SWIS) Database, Kern County. http://www.calrecycle.ca.gov/SWFacilities/Directory/Search.aspx. Accessed April 18.

CalRecycle. 2013b. *2012 Landfill Summary Tonnage* Report, Kern County. http://www.calrecycle.ca.gov/SWFacilities/Landfills/Tonnages/. Accessed April 18.

Department of Toxic Substance Control (DTSC). 2012. *California Commercial Offsite Hazardous Waste Management Facilities*. http://www.envirostor.dtsc.ca.gov/public/commercial_offsite.asp. April 2012.

Pastoria Energy Facility, L.L.C. 1999. *Application for Certification for the Pastoria Energy Facility*. Submitted to California Energy Commission (CEC). 2000.

Pastoria Energy Facility, L.L.C. 2005. *Application for Certification for the Pastoria Energy Facility Expansion Project*. Submitted to California Energy Commission, Sacramento, California. April.

# 3.14 Worker Safety and Fire Protection

The addition of auxiliary boilers and other changes proposed by the Petition will not result in additional worker safety and fire protection than those described in the Final Decision (99-AFC-7C), as amended. All activities associated with the requested modifications will occur within the project's site boundaries on previously disturbed lands. The auxiliary boilers will be installed on an existing concrete pad. All construction and operation workers will undergo proper safety training in conformance with the existing health and safety requirements described in (99-AFC-7C), as amended. Implementation of the proposed modifications will not result in impacts different than those analyzed by the CEC as part of 99-AFC-7C, as amended. As a result, any potential worker safety and fire protection impacts associated with this Petition will be less than significant.

## 3.14.1 Environmental Baseline Information

The project modifications will occur within the existing project boundaries on a concrete pad in an area identified for future facility modifications.

## 3.14.2 Mitigation Measures

No significant impacts in terms of worker safety and fire protection will result from the approval of this Petition. Therefore, mitigation measures beyond those included in the Final Decision (99-AFC-7C, as amended) are necessary.

## 3.14.3 Consistency with LORS

Additional LORS, specific to boiler installation and operation, are now in effect since the certification of 99-AFC-7 and are identified in Table 3.14-1. The construction and operation of the proposed modifications will conform with all applicable LORS related to worker safety and fire protection consistent with the Final Decision, (99-AFC-7C), as amended, and the additional LORS identified in Table 3.14-1.

TABLE 3.14-1
**Additional Laws, Ordinances, Regulations, and Standards Applicable for Worker Health and Safety**

| LORS | Applicability |
|---|---|
| **Applicable National Consensus Standards for Worker Health and Safety** | |
| National Fire Prevention Association (NFPA) 85, Boiler and Combustion Systems Hazard Code | Requirements for boiler design, installation, operation, maintenance, and training |
| American National Standards Institute/American Society for Mechanical Engineers (ANSI/ASME), Boiler and Pressure Vessel Code | Specifications and requirements for pressure vessels |

## 3.14.4 Conditions of Certification

This Petition does not require changes to the existing worker safety and fire protection COCs from Final Decision (99-AFC-7C), as amended.

## 3.14.5 References

*California Energy Commission (CEC), 2000. Commission Decision for the Pastoria Energy Facility, Docket Number 99-AFC-7*. Sacramento, California. December.

California Energy Commission (CEC). 2006. *Energy Commission Decision, Application for Certification for the Pastoria Energy Facility Expansion Project, Docket Number 05-AFC-1*. California Energy Commission, Sacramento, California. December.

Pastoria Energy Facility, L.L.C. 1999. *Application for Certification for the Pastoria Energy Facility*. Submitted to California Energy Commission (CEC). 2000.

Pastoria Energy Facility, L.L.C. 2005. *Application for Certification for the Pastoria Energy Facility Expansion Project*. Submitted to California Energy Commission, Sacramento, California. April.

SECTION 4.0

# Potential Effects on the Public

This section discusses the potential effects on the public that may result from the modifications proposed in this Petition, pursuant to CEC Siting Regulations (Title 20, CCR, Section 1769[a][1][G]).

The changes to the project, as proposed in this Petition, will not result in any greater impacts on the public and property owners than those analyzed during project licensing (99-AFC-7C), as amended, and therefore, resulting in no effect on the public and property owners beyond what was originally approved by the CEC.

Therefore, impacts on the public and property owners will be the same as those analyzed during the license proceeding for the project.

SECTION 5.0

# List of Property Owners

CEC Siting Regulations (Title 20, CCR, Section 1769[a][1][H]) require that the property owners of the site are identified. The project site is owned by Tejon Ranchcorp and leased to the project owner, pursuant to an existing lease.  Tejon Ranchcorp also owns the land within 500 feet surrounding the existing lease.

SECTION 6.0

# Potential Effects on Property Owners

This section addresses potential effects of the proposed modification discussed in this Petition on nearby property owners, the public, and parties in the application proceeding, pursuant to CEC Siting Regulations (Title 20, CCR, Section 1769 [a][1][I]).

The project, as modified, will not differ significantly in potential effects on adjacent land owners, compared with the project as previously proposed. The project, therefore, would have no adverse effects on nearby property owners, the public, or other parties as determined in the Final Decision, 99-AFC-7C, as amended.

# APPENDIX 3.1A

# Detailed Emissions Calculations

# APPENDIX 3.1A

# DETAILED EMISSIONS CALCULATIONS

The following tables are provided in this appendix:

**Table 3.1A-1**
**PEF Amendment**
**Potential to Emit for the Existing PEF Permit Units**

| Pollutant | Potential to Emit | | |
|---|---|---|---|
| | Hourly (lb) | Daily (lb) | Annual (tons) |
| Gas Turbines (1) | | | |
| | (each) | | (total, 3 units) |
| NOx (2) | 17.03 | 450 | 172.2 |
| SOx | 3.495 | 84 | 42.4 |
| CO (2) | 24.92 | 2113 | 610.1 |
| VOC (2) | 5.14 | 355 | 113.8 |
| PM10/PM2.5 | 9.0 | 216 | 112.2 |
| Emergency Generator (3) | | | |
| NOx | 1.84 | 44.2 | 0.09 |
| SOx | 0.014 | 0.3 | 0.001 |
| CO | 3.62 | 86.9 | 0.18 |
| VOC | 0.23 | 5.5 | 0.01 |
| PM10/PM2.5 | 0.11 | 2.6 | 0.01 |
| Diesel Fire Pump Engine (3) | | | |
| NOx | 4.44 | 106.7 | 0.22 |
| SOx | 0.14 | 3.3 | 0.007 |
| CO | 0.23 | 5.5 | 0.01 |
| VOC | 0.09 | 2.1 | 0.004 |
| PM10/PM2.5 | 0.056 | 1.3 | 0.003 |
| 8-Cell Cooling Tower (1) | | | |
| PM10/PM2.5 | 0.92 | 22.1 | 4.03 |
| 4-Cell Cooling Tower (1) | | | |
| PM10/PM2.5 | 0.46 | 11.1 | 2.03 |

Notes:
1. PTE based on permit limits.
2. Hourly PTE does not reflect startup or shutdown emissions. Startup and shutdown emissions are included in daily and annual PTE.
3. Annual PTE based on 100 hrs/yr of operation.

**Table 3.1A-2**
**PEF Amendment**
**Emissions and Operating Parameters for New Auxiliary Boilers**

| | |
|---|---|
| Device | Aux Boiler |
| Fuel | Natural Gas |
| Maximum Heat Input (MMBtu/hr each) | 91.4 |
| F-factor (dscf/MMBtu) | 8,710 |
| Reference O2 | 3% |
| Actual O2 | 3% |
| Exhaust Temperature (F) | 300 |
| Exhaust Rate (dscfm @ 3% O2) | 15,485 |
| Exhaust Rate (wacfm @ actual O2) | 28,453 |

| Pollutant | Emission Rate, ppmvd @ 3% O2 | Emission Factors (lb/MMBtu) | Maximum Emissions (lb/hr) |
|---|---|---|---|
| NOx (normal operation) | 5.0 | 0.006 | 0.55 |
| NOx (startup/shutdown) | 83.6 | 0.10 | 9.14 |
| SOx | 1.26 | 0.002 | 0.19 |
| CO | 50 | 0.036 | 3.4 |
| VOC | 10 | 0.004 | 0.38 |
| PM10 | 0.005 gr/dscf | 0.007 | 0.64 |

**Table 3.1A-3**
**PEF Amendment**
**Hourly, Daily, and Annual Criteria Pollutant Emissions for New Auxiliary Boilers**

| | | | | Emissions, lb/hr | | | | |
|---|---|---|---|---|---|---|---|---|
| Auxiliary Boiler | max. hour | hrs/day | hrs/yr | NOx | SOx | CO | VOC | PM10 |
| Normal operation | 0 | 21 | 7665 | 0.55 | 0.19 | 3.4 | 0.38 | 0.64 |
| Startup/shutdown | 1 | 3 | 1095 | 9.1 | 0.19 | 3.4 | 0.38 | 0.64 |

| | NOx | | | SOx | | | CO | | | VOC | | | PM10 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Equipment | 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 |
| Auxiliary Boiler 1 | 9.14 | 38.9 | 14,198 | 0.19 | 4.6 | 1,675 | 3.40 | 728.3 | 29,784 | 0.38 | 9.2 | 3,340 | 0.64 | 15.4 | 5,606 |
| Auxiliary Boiler 2 | 9.14 | 38.9 | 14,198 | 0.19 | 4.6 | 1,675 | 3.40 | 728.3 | 29,784 | 0.38 | 9.2 | 3,340 | 0.64 | 15.4 | 5,606 |
| Total | 18.28 lb/hr | 77.8 lb/day | 28,396 lb/yr | 0.38 lb/hr | 9.2 lb/day | 3,351 lb/yr | 6.80 lb/hr | 1,456.6 lb/day | 59,568 lb/yr | 0.76 lb/hr | 18.3 lb/day | 6,680 lb/yr | 1.28 lb/hr | 30.7 lb/day | 11,213 lb/yr |

**Table 3.1A-4**
**PEF Amendment**
**Greenhouse Gas Emissions from the New Auxiliary Boilers**

| Unit | Rated Capacity, MMBtu/hr | Equivalent Full-Load Operating Hours per year | Maximum Fuel Use, MMBtu/yr | GHG Potential to Emit | | | |
|---|---|---|---|---|---|---|---|
| | | | | metric tons/yr | | | CO2e, tons/yr |
| | | | | CO2 | CH4 | N2O | |
| Auxiliary Boiler 1 | 91.4 | 8,760 | 800,646 | 42,482 | 0.80 | 0.08 | |
| Auxiliary Boiler 2 | 91.4 | 8,760 | 800,646 | 42,482 | 0.80 | 0.08 | |
| Total | | | 1,601,300 | 84,965 | 1.60 | 0.16 | |
| CO2eq | | | | 84,965 | 40.0 | 47.7 | |
| | | | | | TOTAL | 85,052 | 93,558 |

| | Emission Factors, kg/MMBtu (1) | | |
|---|---|---|---|
| | CO2 (2) | CH4 (3) | N2O (3) |
| Natural Gas | 53.06 | 1.00E-03 | 1.00E-04 |
| GWP (4) | 1 | 25 | 298 |

Notes: 1. Calculation methods and emission factors from 40 CFR 98 Subpart C.
2. Table C-1.
3. Table C-2.
4. Global Warming Potential; 40 CFR 98 Table A-1.

**Table 3.1A-5**
**PEF Amendment**
**Baseline Emissions for Unit 4**

| Year | Emissions, tpy | | | | | | Fuel Use, MMBtu | CO2e, metric tons | Weighted CO2e EF |
|---|---|---|---|---|---|---|---|---|---|
| | NOx | SOx | CO | VOC | PM10/PM2.5 | CO2e | | | |
| 2013 | 33.1 | 3.5 | 5.1 | 0.6 | 9.0 | 698,886 | 11,760,060 | 633,911 | 118.86 |
| 2012 | 27.7 | 3.0 | 6.9 | 1.0 | 5.9 | 592,902 | 9,976,729 | 537,779 | 118.86 |
| 2011 | 22.9 | 2.1 | 24.4 | 1.8 | 5.8 | 405,216 | 6,818,635 | 367,543 | 118.86 |
| 2010 | 30.6 | 2.8 | 32.2 | 2.1 | 8.2 | 580,561 | 9,768,990 | 526,586 | 118.86 |
| 2009 | 35.3 | 3.2 | 25.1 | 1.7 | | 673,210 | 11,328,052 | 610,621 | 118.86 |
| 2008 | 36.8 | 3.6 | 13.2 | 0.8 | 16.7 | 764,200 | 12,859,142 | 693,152 | 118.86 |
| 2007 | 32.5 | 1.1 | 34.4 | 2.3 | 19.4 | 640,931 | 10,784,901 | 581,343 | 118.86 |
| 2006 | 23.9 | 1.0 | 5.9 | 2.1 | 17.5 | 574,457 | 9,666,352 | 521,050 | 118.86 |
| Baseline Prd | 08/09 | 08/09 | 09/10 | 06/07 | 06/07 | 08/09 | | | |
| Baseline Em | 36.04 | 3.39 | 28.69 | 2.19 | 18.44 | 718,705 | | | |

Source: PEF facility annual inventories.

**Table 3.1A-6**
**PEF Amendment**
**Future Actual Comparison: Unit 4**

| - | | | Warm/ | | | NOx | | | SO2 | CO | | | VOC | | | PM10/PM2.5 | NOx | CO | VOC | PM10/PM2.5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Base Load hrs/yr | Cold Start events/yr | Hot Start events/yr | Shutdown events/yr[1] | Total MMBtu [2] | Base Load lb/hr | Cold Start lb/event | Warm Start lb/event | Base lb/hr | Base Load lb/hr | Cold Start lb/event | Warm Start lb/event | Base Load lb/hr | Cold Start lb/event | Warm Start lb/event | lb/hr | Shutdown lb/event | Shutdown lb/event | Shutdown lb/event | Shutdown lb/event |
| Predicted Operation After Upgrades | 6434 | 50 | 79 | 129 | 10,966,156 | 11.8 | 82.7 | 39.9 | 1.097 | 2.30 | 444 | 230 | 1.03 | 89 | 89 | 3.81 | 50.0 | 57.6 | 50 | 3.81 |

| | NOx | SOx | CO | VOC | PM10 | CO2 |
|---|---|---|---|---|---|---|
| | Total tpy | Total tpy | Total tpy | Total tpy | Total tpy | Total TPY |
| Predicted Operation After Upgrades | 44.73 | 3.73 | 31.31 | 12.27 | 12.94 | 651,706 |

| Emissions Changes Due to Proposed Upgrades, Unit 4 | | | | | | |
|---|---|---|---|---|---|---|
| | Emissions, tons per year | | | | | |
| | NOx | $SO_2$ | CO | VOC | $PM_{10}/PM_{2.5}$ | GHG |
| Projected Actual Emissions | 44.7 | 3.7 | 31.3 | 12.3 | 12.9 | 651,706 |
| Baseline Actual Emissions | 34.9 | 3.6 | 4.3 | 0.5 | 9.1 | 702,431 |
| Net Emissions Increase | 9.9 | 0.2 | 27.0 | 11.7 | 3.9 | -50,725 |
| New Aux Boilers | 14.2 | 1.7 | 29.8 | 3.3 | 5.6 | 93,558 |
| Project Emissions | 24.1 | 1.9 | 56.8 | 15.0 | 9.5 | 42,832 |

Notes:

1. Based on one shutdown event for every startup event.
2. From Pastoria2_.04_Impact.xls (Ventyx runs)

**Table 3.1A-7**
**PEF Amendment**
**Non-Criteria Pollutant Emissions for New Auxiliary Boilers**

| Pollutant | Emission Factor(1) lb/MMscf | Max. Hourly Emissions per unit lbs/hr (3) | Annual Emissions per Boiler, tpy (4) | Total Annual Emissions, Two Boilers, tpy (4) |
|---|---|---|---|---|
| Ammonia | (2) | 0.40 | 1.55 | 3.10 |
| Propylene | 5.30E-01 | 0.05 | 0.18 | 0.36 |
| Hazardous Air Pollutants | | | | |
| Acetaldehyde | 3.10E-03 | 2.76E-04 | 1.06E-03 | 2.12E-03 |
| Acrolein | 2.70E-03 | 2.41E-04 | 9.23E-04 | 1.85E-03 |
| Benzene | 5.80E-03 | 5.17E-04 | 1.98E-03 | 3.96E-03 |
| Ethylbenzene | 6.90E-03 | 6.15E-04 | 2.36E-03 | 4.72E-03 |
| Formaldehyde | 1.23E-02 | 1.10E-03 | 4.20E-03 | 8.41E-03 |
| Hexane | 4.60E-03 | 4.10E-04 | 1.57E-03 | 3.14E-03 |
| Naphthalene | 3.00E-04 | 2.67E-05 | 1.03E-04 | 2.05E-04 |
| PAHs (excluding naphthalene) | 4.00E-04 | 3.57E-05 | 1.37E-04 | 2.73E-04 |
| Toluene | 2.65E-02 | 2.36E-03 | 9.06E-03 | 1.81E-02 |
| Xylene | 1.97E-02 | 1.76E-03 | 6.73E-03 | 1.35E-02 |
| Total HAPs = | | | | 0.06 |

Notes:

(1) From Ventura County APCD AB2588 Combustion Emission Factors (May 17, 2001) natural gas fired external combustion equipment greater 10-100 MMBtu/hr.

(2) Based on 10 ppm ammonia slip from SCR system.

(3) Based on hourly heat input rate of — 91.40 MMBtu/hr; 0.089 MMscf/hr per boiler

(4) Based on maximum hourly heat input rate — 7665 hrs/yr; 683 MMscf/yr per boiler

(5) Emission factors for individual PAHs from AP-42 Table 1.4-3.

(6) Emission factors for individual PAHs adjusted proportionally so that total of "Adjusted EF" equals Total PAH EF of 4.0 E-04 lb/MMscf shown above.
lb/MMscf converted to lb/MMBtu using 1056 Btu/scf

| | Mean EF (Note 5) | Adjusted EF (Note 6) | Emissions lb/hr | Emissions lb/yr |
|---|---|---|---|---|
| Benzo(a)anthracene | 1.80E-06 | 5.22E-05 | 4.65E-06 | 3.57E-02 |
| Benzo(a)pyrene | 1.20E-06 | 3.48E-05 | 3.10E-06 | 2.38E-02 |
| Benzo(b)fluoranthrene | 1.20E-06 | 3.48E-05 | 3.10E-06 | 2.38E-02 |
| Benzo(k)fluoranthrene | 1.80E-06 | 5.22E-05 | 4.65E-06 | 3.57E-02 |
| Chrysene | 1.80E-06 | 5.22E-05 | 4.65E-06 | 3.57E-02 |
| Dibenz(a,h)anthracene | 1.20E-06 | 3.48E-05 | 3.10E-06 | 2.38E-02 |
| Fluoranthene | 3.00E-06 | 8.70E-05 | 7.75E-06 | 5.94E-02 |
| Indeno(1,2,3-cd)pyrene | 1.80E-06 | 5.22E-05 | 4.65E-06 | 3.57E-02 |
| Total | 1.38E-05 | 4.00E-04 | 3.57E-05 | 2.73E-01 |

**Table 3.1A-8**
**PEF Amendment**
**Non-Criteria Pollutant Emissions From Existing CTGs**

| Pollutant | CTG Emission Factor(1) lb/MMBtu | Existing CTGs Max. Hourly Emissions lbs/hr (each) | Existing CTGs Annual Emissions tpy (each) |
|---|---|---|---|
| Ammonia | (2) | 24.62 | 107.82 |
| Propylene | 7.30E-04 | 1.34 | 5.87 |
| Hazardous Air Pollutants | | | |
| Acetaldehyde | 4.14E-05 | 7.61E-02 | 0.33 |
| Acrolein | 6.63E-06 | 1.22E-02 | 5.33E-02 |
| Benzene | 1.24E-05 | 2.28E-02 | 1.00E-01 |
| 1,3-Butadiene | 4.45E-07 | 8.18E-04 | 3.58E-03 |
| Ethylbenzene | 3.31E-05 | 6.09E-02 | 0.27 |
| Formaldehyde | 7.39E-04 | 1.36 | 3.33 |
| Hexane | 2.45E-04 | 0.45 | 1.97 |
| Naphthalene | 1.35E-06 | 2.47E-03 | 1.08E-02 |
| PAHs (excluding naphthalene)(5 | 9.32E-07 | 1.71E-03 | 7.50E-03 |
| Propylene oxide | 3.00E-05 | 5.52E-02 | 0.24 |
| Toluene | 1.38E-04 | 0.25 | 1.11 |
| Xylene | 6.63E-05 | 0.12 | 0.53 |
| Total HAPs = | | | 7.96 |

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.

(2) Based on 10 ppm ammonia slip from SCR system. Equivalent to 0.0134 lb/MMBtu.

(3) Based on maximum CTG firing rate of 1837.00 MMBtu/hr per CTG

(4) Based on maximum CTG firing rate (from (3)) for 8760 hrs/yr.
16,092,120 MMBtu/yr per CTG

(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

(6) Formaldehyde limited to <10 tons per year for all three units, per permit condition.

| | Mean EF (Note 1) | Adjusted EF (Note 5) | Emissions lb/hr | Emissions tpy |
|---|---|---|---|---|
| Benzo(a)anthracene | 2.14E-08 | 1.61E-07 | 2.95E-04 | 1.29E-03 |
| Benzo(a)pyrene | 1.32E-08 | 9.89E-08 | 1.82E-04 | 7.95E-04 |
| Benzo(b)fluoranthrene | 1.07E-08 | 8.04E-08 | 1.48E-04 | 6.47E-04 |
| Benzo(k)fluoranthrene | 1.04E-08 | 7.82E-08 | 1.44E-04 | 6.30E-04 |
| Chrysene | 2.39E-08 | 1.79E-07 | 3.29E-04 | 1.44E-03 |
| Dibenz(a,h)anthracene | 2.23E-08 | 1.67E-07 | 3.07E-04 | 1.34E-03 |
| Indeno(1,2,3-cd)pyrene | 2.23E-08 | 1.67E-07 | 3.07E-04 | 1.34E-03 |
| Total | 1.24E-07 | 9.32E-07 | 1.71E-03 | 7.50E-03 |

**Table 3.1A-9**
**PEF Amendment**
**Non-Criteria Pollutant Emissions From Existing Auxiliary Equipment**

**Emergency Generator**

| | |
|---|---|
| Make | Caterpillar |
| Model | G3512 |
| Fuel | Natural Gas |
| Engine Output (bhp) | 815 |
| Fuel Consumpton Rate (cfh) | 6,480 |
| Annual Operating Hours | 200 |

| Pollutant | Emission Factor (lb/mmcf) | Maximum Hourly Emissions (lb/hr) | Maximum Annual Emissions (lb/yr) |
|---|---|---|---|
| Acetaldehyde | 5.29E-01 | 3.43E-03 | 0.69 |
| Acrolein | 5.90E-02 | 3.82E-04 | 0.08 |
| Benzene | 2.18E-01 | 1.41E-03 | 0.28 |
| 1,3-Butadiene | 3.67E-01 | 2.38E-03 | 0.48 |
| Formaldehyde | 4.71E+00 | 3.05E-02 | 6.10 |
| Naphthalene | 2.51E-02 | 1.63E-04 | 0.03 |
| PAHs | 1.34E-04 | 8.71E-07 | 1.74E-04 |
| Benz(a)anthracene | 5.88E-05 | 3.81E-07 | 7.62E-05 |
| Benzo(b)fluoranthene | 4.09E-05 | 2.65E-07 | 5.30E-05 |
| Benzo(k)fluoranthene | 7.83E-06 | 5.07E-08 | 1.01E-05 |
| Benzo(a)pyrene | 2.70E-06 | 1.75E-08 | 3.50E-06 |
| Chrysene | 1.43E-05 | 9.27E-08 | 1.85E-05 |
| Dibenz(a,h)anthracene | 2.70E-06 | 1.75E-08 | 3.50E-06 |
| Indeno(1,2,3-cd)pyrene | 7.17E-06 | 4.65E-08 | 9.29E-06 |
| Toluene | 2.39E-01 | 1.55E-03 | 0.31 |
| Xylene | 6.46E-01 | 4.19E-03 | 0.84 |

**Diesel Fire Pump Engine**

| | |
|---|---|
| Make | John Deere |
| Model | JW6H-UF60 |
| Fuel | Diesel |
| Engine Output (bhp) | 360 |
| Fuel Consumpton Rate (gal/hr) | 17 |
| Annual Operating Hours | 100 |

| Pollutant | Emission Factor (g/bhp-hr) | Maximum Hourly Emissions (lb/hr) | Maximum Annual Emissions (lb/yr) |
|---|---|---|---|
| Diesel exhaust particulate | 7.00E-02 | 5.56E-02 | 5.56 |

# Attachment 3.1A-1
# SJVAPCD Permits to Operate for Pastoria Energy Facility

**San Joaquin Valley**
**AIR POLLUTION CONTROL DISTRICT**

**HEALTHY AIR LIVING™**

JAN 18 2012

RECEIVED JAN 26 2012

Harry Scarborough
Pastoria Energy Facility, LLC
P. O. Box 866
Lebec, Ca 93243

**Re: Notice of Final Action - Title V Permit**
**District Facility # S-3636**
**Project # S-1060513**

Dear Mr. Scarborough:

The District has issued the Final Title V Permit for Pastoria Energy Facility, LLC. The preliminary decision for this project was made on November 10, 2010. No comments were received subsequent to the District preliminary decision. Enclosed are the Final Title V Permit and public notice to be published approximately three days from the date of this letter.

Thank you for your cooperation in this matter. Should you have any questions, please contact Mr. Jim Swaney, Permit Services Manager, at (559) 230-5900.

Sincerely,

David Warner
Director of Permit Services

Attachments

cc: Kamaljit Sran, Permit Services Engineer

<Newspaper>

**SAN JOAQUIN VALLEY**
**AIR POLLUTION CONTROL DISTRICT**
**NOTICE OF FINAL DECISION TO ISSUE**
**FEDERALLY MANDATED OPERATING PERMIT**

NOTICE IS HEREBY GIVEN that the San Joaquin Valley Air Pollution Control District has made its final decision to issue the initial Federally Mandated Operating Permit to Pastoria Energy Facility, LLC for its Electricity Generating Facility Located at 39789 Edmondston Pumping Plant Road in Arvin in Kern County, California.

The District's analysis of the legal and factual basis for this proposed action, project #S-1060513, is available for public inspection at http://www.valleyair.org/notices/public_notices_idx.htm and the District office at the address below. For additional information regarding this matter, please contact Mr. Jim Swaney, Permit Services Manager, at (559) 230-5900, or contact David Warner, Director of Permit Services, in writing at SAN JOAQUIN VALLEY AIR POLLUTION CONTROL DISTRICT, 1990 E. GETTYSBURG AVE, FRESNO, CA 93726-0244.

# Permit to Operate

**FACILITY:** S-3636 **EXPIRATION DATE:** 02/29/2016

| | |
|---|---|
| **LEGAL OWNER OR OPERATOR:** | PASTORIA ENERGY FACILITY, LLC |
| **MAILING ADDRESS:** | 39789 EDMONSTON PUMPING PLANT RD<br>PO BOX 866<br>LEBEC, CA 93243-0866 |
| **FACILITY LOCATION:** | TEJON RANCH 30 MILES S OF BAKERSFIELD<br>AND 6.5 MILES E OF GRAPEVINE<br>RANCHO EL TEJON, CA |
| **FACILITY DESCRIPTION:** | POWER GENERATION |

The Facility's Permit to Operate may include Facility-wide Requirements as well as requirements that apply to specific permit units.

This Permit to Operate remains valid through the permit expiration date listed above, subject to payment of annual permit fees and compliance with permit conditions and all applicable local, state, and federal regulations. This permit is valid only at the location specified above, and becomes void upon any transfer of ownership or location. Any modification of the equipment or operation, as defined in District Rule 2201, will require prior District approval. This permit shall be posted as prescribed in District Rule 2010.

Seyed Sadredin
Executive Director / APCO

David Warner
Director of Permit Services

# San Joaquin Valley
# Air Pollution Control District

**FACILITY:** S-3636-0-0 **EXPIRATION DATE:** 02/29/2016

## FACILITY-WIDE REQUIREMENTS

1. The owner or operator 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 and Kern County Rule 111] Federally Enforceable Through Title V Permit
2. 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 and Kern County Rule 111] Federally Enforceable Through Title V Permit
3. The owner or operator of any stationary source operation that emits more than 25 tons per year of nitrogen oxides or reactive organic compounds, shall provide the District annually with a written statement in such form and at such time as the District prescribes, showing actual emissions of nitrogen oxides and reactive organic compounds from that source. [District Rule 1160, 5.0] Federally Enforceable Through Title V Permit
4. 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 or the use of which may eliminate, reduce, or control the issuance of air contaminants, shall first obtain an Authority to Construct (ATC) from the District unless exempted by District Rule 2020 (12/20/07). [District Rule 2010, 3.0 and 4.0; and 2020] Federally Enforceable Through Title V Permit
5. The permittee must comply with all conditions of the permit including permit revisions originated by the District. All terms and conditions of a permit that are required pursuant to the Clean Air Act (CAA), including provisions to limit potential to emit, are enforceable by the EPA and Citizens under the CAA. Any permit noncompliance constitutes a violation of the CAA and the District Rules and Regulations, and is grounds for enforcement action, for permit termination, revocation, reopening and reissuance, or modification; or for denial of a permit renewal application. [District Rules 2070, 7.0; 2080; and 2520, 9.9.1 and 9.13.1] Federally Enforceable Through Title V Permit
6. A Permit to Operate or an Authority to Construct shall not be transferred unless a new application is filed with and approved by the District. [District Rule 2031] Federally Enforceable Through Title V Permit
7. Every application for a permit required under Rule 2010 (12/17/92) shall be filed in a manner and form prescribed by the District. [District Rule 2040] Federally Enforceable Through Title V Permit
8. The operator shall maintain records of required monitoring that include: 1) the date, place, and time of sampling or measurement; 2) the date(s) analyses were performed; 3) the company or entity that performed the analysis; 4) the analytical techniques or methods used; 5) the results of such analysis; and 6) the operating conditions at the time of sampling or measurement. [District Rule 2520, 9.4.1] Federally Enforceable Through Title V Permit
9. The operator shall retain records of all required monitoring data and support information for a period of at least 5 years from the date of the monitoring sample, measurement, or report. Support information includes copies of all reports required by the permit and, for continuous monitoring instrumentation, all calibration and maintenance records and all original strip-chart recordings. [District Rule 2520, 9.4.2] Federally Enforceable Through Title V Permit

FACILITY-WIDE REQUIREMENTS CONTINUE ON NEXT PAGE

10. The operator shall submit reports of any required monitoring at least every six months unless a different frequency is required by an applicable requirement. All instances of deviations from permit requirements must be clearly identified in such reports. [District Rule 2520, 9.5.1] Federally Enforceable Through Title V Permit

11. Deviations from permit conditions must be promptly reported, including deviations attributable to upset conditions, as defined in the permit. For the purpose of this condition, promptly means as soon as reasonably possible, but no later than 10 days after detection. The report shall include the probable cause of such deviations, and any corrective actions or preventive measures taken. All required reports must be certified by a responsible official consistent with section 10.0 of District Rule 2520 (6/21/01). [District Rules 2520, 9.5.2 and 1100, 7.0] Federally Enforceable Through Title V Permit

12. If for any reason a permit requirement or condition is being challenged for its constitutionality or validity by a court of competent jurisdiction, the outcome of such challenge shall not affect or invalidate the remainder of the conditions or requirements in that permit. [District Rule 2520, 9.7 and PSD Permit (99-03), VII] Federally Enforceable Through Title V Permit

13. It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of the permit. [District Rule 2520, 9.8.2] Federally Enforceable Through Title V Permit

14. The permit may be modified, revoked, reopened and reissued, or terminated for cause. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any permit condition. [District Rule 2520, 9.8.3] Federally Enforceable Through Title V Permit

15. The permit does not convey any property rights of any sort, or any exclusive privilege. [District Rule 2520, 9.8.4] Federally Enforceable Through Title V Permit

16. The Permittee shall furnish to the District, within a reasonable time, any information that the District may request in writing to determine whether cause exists for modifying, revoking and reissuing, or terminating the permit or to determine compliance with the permit. Upon request, the permittee shall also furnish to the District copies of records required to be kept by the permit or, for information claimed to be confidential, the permittee may furnish such records directly to EPA along with a claim of confidentiality. [District Rule 2520, 9.8.5] Federally Enforceable Through Title V Permit

17. The permittee shall pay annual permit fees and other applicable fees as prescribed in Regulation III of the District Rules and Regulations. [District Rule 2520, 9.9] Federally Enforceable Through Title V Permit

18. Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to enter the permittee's premises where a permitted source is located or emissions related activity is conducted, or where records must be kept under condition of the permit. [District Rule 2520, 9.13.2.1 and PSD Permit (99-03), V] Federally Enforceable Through Title V Permit

19. Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to have access to and copy, at reasonable times, any records that must be kept under the conditions of the permit. [District Rule 2520, 9.13.2.2 and PSD Permit (99-03), V] Federally Enforceable Through Title V Permit

20. Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to inspect at reasonable times any facilities, equipment, practices, or operations regulated or required under the permit. [District Rule 2520, 9.13.2.3 and PSD Permit (99-03), V] Federally Enforceable Through Title V Permit

21. Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to sample or monitor, at reasonable times, substances or parameters for the purpose of assuring compliance with the permit or applicable requirements. [District Rule 2520, 9.13.2.4 and PSD Permit (99-03), V] Federally Enforceable Through Title V Permit

FACILITY-WIDE REQUIREMENTS CONTINUE ON NEXT PAGE

22. No air contaminants shall be discharged into the atmosphere for a period or periods aggregating more than 3 minutes in any one hour which is as dark or darker than Ringelmann #1 or equivalent to 20% opacity and greater, unless specifically exempted by District Rule 4101 (02/17/05). If the equipment or operation is subject to a more stringent visible emission standard as prescribed in a permit condition, the more stringent visible emission limit shall supersede this condition. [District Rule 4101, and County Rules 401 (in all eight counties in the San Joaquin Valley)] Federally Enforceable Through Title V Permit

23. No person shall manufacture, blend, repackage, supply, sell, solicit or apply any architectural coating with a VOC content in excess of the corresponding limit specified in Table of Standards 1 effective until 12/30/10 or Table of Standards 2 effective on and after 1/1/11 of District Rule 4601 (12/17/09) for use or sale within the District. [District Rule 4601, 5.1] Federally Enforceable Through Title V Permit

24. All VOC-containing materials subject to Rule 4601 (12/17/09) shall be stored in closed containers when not in use. [District Rule 4601, 5.4] Federally Enforceable Through Title V Permit

25. The permittee shall comply with all the Labeling and Test Methods requirements outlined in Rule 4601 sections 6.1 and 6.3 (12/17/09). [District Rule 4601, 6.1 and 6.3] Federally Enforceable Through Title V Permit

26. With each report or document submitted under a permit requirement or a request for information by the District or EPA, the permittee shall include a certification of truth, accuracy, and completeness by a responsible official. [District Rule 2520, 9.13.1 and 10.0] Federally Enforceable Through Title V Permit

27. If the permittee performs maintenance on, or services, repairs, or disposes of appliances, the permittee shall comply with the standards for Recycling and Emissions Reduction pursuant to 40 CFR Part 82, Subpart F. [40 CFR 82 Subpart F] Federally Enforceable Through Title V Permit

28. If the permittee performs service on motor vehicles when this service involves the ozone-depleting refrigerant in the motor vehicle air conditioner (MVAC), the permittee shall comply with the standards for Servicing of Motor Vehicle Air Conditioners pursuant to all the applicable requirements as specified in 40 CFR Part 82, Subpart B. [40 CFR Part 82, Subpart B] Federally Enforceable Through Title V Permit

29. 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 (8/19/2004) or Rule 8011 (8/19/2004). [District Rule 8021 and 8011] Federally Enforceable Through Title V Permit

30. Outdoor handling, storage and transport of any bulk material which emits dust shall comply with the requirements of District Rule 8031, unless specifically exempted under Section 4.0 of Rule 8031 (8/19/2004) or Rule 8011 (8/19/2004). [District Rule 8031 and 8011] Federally Enforceable Through Title V Permit

31. 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 (8/19/2004) or Rule 8011 (8/19/2004). [District Rule 8041 and 8011] Federally Enforceable Through Title V Permit

32. 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 (8/19/2004) or Rule 8011 (8/19/2004). [District Rule 8051 and 8011] Federally Enforceable Through Title V Permit

33. 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 (8/19/2004) or Rule 8011 (8/19/2004). [District Rule 8061 and Rule 8011] Federally Enforceable Through Title V Permit

FACILITY-WIDE REQUIREMENTS CONTINUE ON NEXT PAGE

34. Any unpaved vehicle/equipment area that anticipates more than 50 Average annual daily Trips (AADT) shall comply with the requirements of Section 5.1.1 of District Rule 8071. Any unpaved vehicle/equipment area that anticipates more than 150 vehicle trips per day (VDT) shall comply with the requirements of Section 5.1.2 of District Rule 8071. On each day that 25 or more VDT with 3 or more axles will occur on an unpaved vehicle/equipment traffic area, the owner/operator shall comply with the requirements of Section 5.1.3 of District Rule 8071. On each day when a special event will result in 1,000 or more vehicles that will travel/park on an unpaved area, the owner/operator shall comply with the requirements of Section 5.1.4 of District Rule 8071. All sources shall comply with the requirements of Section 5.0 of District Rule 8071 unless specifically exempted under Section 4.0 of Rule 8071 (9/16/2004) or Rule 8011 (8/19/2004). [District Rule 8071 and Rule 8011] Federally Enforceable Through Title V Permit

35. Any owner or operator of a demolition or renovation activity, as defined in 40 CFR 61.141, shall comply with the applicable inspection, notification, removal, and disposal procedures for asbestos containing materials as specified in 40 CFR 61.145 (Standard for Demolition and Renovation). [40 CFR 61 Subpart M] Federally Enforceable Through Title V Permit

when due?

36. The permittee shall submit certifications of compliance with the terms and standards contained in Title V permits, including emission limits, standards and work practices, to the District and the EPA annually (or more frequently as specified in an applicable requirement or as specified by the District). The certification shall include the identification of each permit term or condition, the compliance status, whether compliance was continuous or intermittent, the methods used for determining the compliance status, and any other facts required by the District to determine the compliance status of the source. [District Rule 2520, 9.16] Federally Enforceable Through Title V Permit

37. The permittee shall submit an application for Title V permit renewal to the District at least six months, but not greater than 18 months, prior to the permit expiration date. [District Rule 2520, 5.2] Federally Enforceable Through Title V Permit

38. When a term is not defined in a Title V permit condition, the definition in the rule cited as the origin and authority for the condition in a Title V permits shall apply. [District Rule 2520, 9.1.1] Federally Enforceable Through Title V Permit

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

40. When applicable to 40 CFR Part 68, a subject facility shall submit to the proper authority a Risk Management Plan when mandated by the regulation. [40 CFR Part 68] Federally Enforceable Through Title V Permit

41. The owners and operators of each affected source and each affected unit at the source shall: (i) Operate the unit in compliance with a complete Acid Rain permit application or a superceding Acid Rain permit issued by the permitting authority; and (ii) Have an Acid Rain permit. The Title V permit shall serve as the facility's Acid Rain permit. [40 CFR 72.9] Federally Enforceable Through Title V Permit

42. The owners and operators and, to the extent applicable, designated representative of each affected source and each affected unit at the source shall comply with the monitoring requirements as provided in 40 CFR part 75. [40 CFR 72.9 & 40 CFR 75] Federally Enforceable Through Title V Permit

43. The emissions measurements recorded and reported in accordance with 40 CFR part 75 shall be used to determine compliance by the unit with the Acid Rain emissions limitations and emissions reduction requirements for sulfur dioxide. [40 CFR 72.9 & 40 CFR 75] Federally Enforceable Through Title V Permit

44. The owners and operators of each source and each affected unit at the source shall: (i) Hold allowances, as of the allowance transfer deadline, in the unit's compliance subaccount (after deductions under 40 CFR 73.34(c)) not less than the total annual emissions of sulfur dioxide for the previous calendar year from the unit; and (ii) Comply with the applicable Acid Rain emissions limitations for sulfur dioxide. [40 CFR 72.9 & 40 CFR 73] Federally Enforceable Through Title V Permit

45. Each ton of sulfur dioxide emitted in excess of the Acid Rain emissions limitations for sulfur dioxide shall constitute a separate violation of the Act. [40 CFR 72.9] Federally Enforceable Through Title V Permit

46. Allowances shall be held in, deducted from, or transferred among Allowance Tracking System accounts in accordance with the Acid Rain Program. [40 CFR 72.9] Federally Enforceable Through Title V Permit

FACILITY-WIDE REQUIREMENTS CONTINUE ON NEXT PAGE

These terms and conditions are part of the Facility-wide Permit to Operate.

47. An allowance shall not be deducted in order to comply with the requirements under 40 CFR part 72.9(c)(1)(i), prior to the calendar year for which the allowance was allocated. [40 CFR 72.9] Federally Enforceable Through Title V Permit

48. An allowance allocated by the Administrator under the Acid Rain Program is a limited authorization to emit sulfur dioxide in accordance with the Acid Rain Program. No provision of the Acid Rain Program, the Acid Rain permit application, the Acid Rain permit, or the written exemption under 40 CFR 72.7 and 72.8 and no provision of law shall be construed to limit the authority of the United States to terminate or limit such authorization. [40 CFR 72.9] Federally Enforceable Through Title V Permit

49. An allowance allocated by the Administrator under the Acid Rain Program does not constitute a property right. [40 CFR 72.9] Federally Enforceable Through Title V Permit

50. The designated representative of an affected unit that has excess emissions in any calendar year shall submit a proposed offset plan, as required under 40 CFR part 77. For the purposes of this condition, the term "excess emissions" is defined in 40 CFR 72.2. [40 CFR 72.9 & 40 CFR 77] Federally Enforceable Through Title V Permit

51. The owners and operators of an affected unit that has excess emissions in any calendar year shall: (i) Pay without demand the penalty required, and pay up on demand the interest on that penalty; and (ii) Comply with the terms of an approved offset plan, as required by 40 CFR part 77. For the purposes of this condition, the term "excess emissions" is defined in 40 CFR 72.2. [40 CFR 72.9 & 40 CFR 77] Federally Enforceable Through Title V Permit

52. The owners and operators of the source and each affected unit at the source shall keep on site at the source each of the following documents for a period of 5 years from the date the document is created. This period may be extended for cause, at any time prior to the end of 5 years, in writing by the Administrator or permitting authority: (i) The certificate of representation for the designated representative for the source and each affected unit at the source and all documents that demonstrate the truth of the statements in the certificate of representation, in accordance with 40 CFR part 72.24; provided that the certificate and documents shall be retained on site at the source beyond such 5-year period until such documents are superseded because of the submission of a new certificate of representation changing the designated representative; (ii) All emissions monitoring information, in accordance with 40 CFR part 75; (iii) Copies of all reports, compliance certifications, and other submissions and all records made or required under the Acid Rain Program; (iv) Copies of all documents used to complete an Acid Rain permit application and any other submission under the Acid Rain Program or to demonstrate compliance with the requirements of the Acid Rain Program. [40 CFR 72.9 & 40 CFR 75] Federally Enforceable Through Title V Permit

53. The designated representative of an affected source and each affected unit at the source shall submit the reports and compliance certifications required under the Acid Rain Program, including those under 40 CFR 75 Subpart I. [40 CFR 72.9 & 40 CFR 75] Federally Enforceable Through Title V Permit

54. Any provision of the Acid Rain Program that applies to an affected source (including a provision applicable to the designated representative of an affected source) shall also apply to the owners and operators of such source and of the affected units at the source. [40 CFR 72.9] Federally Enforceable Through Title V Permit

55. FACILITY OPERATION: All equipment, facilities, and systems installed or used to achieve compliance with the terms and conditions of the permit shall at all times be maintained in good working order and be operated as efficiently as possible so as to minimize air pollutant emissions. [PSD Permit (SJ 99-03), III] Federally Enforceable Through Title V Permit

56. MALFUNCTION: A. Reporting: The EPA Regional Administrator shall be notified by telephone, facsimile, or electronic mail transmission within two (2) working days following any failure of air pollution control equipment, process equipment, or of a process to operate in a normal manner, which results in an increase in emissions above any allowable emission limit stated in the PSD permit for units S-3636-1, S-3636-2, or S-3636-3. In addition, the Regional Administrator shall be notified in writing within fifteen (15) days of any such failure. The notification shall include all information required by Section IV.A of the PSD permit. Compliance with this malfunction notification provision shall not excuse or otherwise constitute a defense to any violation of this permit or of any law or regulation that such malfunction may cause, except as provided for in Section IV.B of the PSD permit. [PSD Permit (SJ SJ 99-03), IV.A] Federally Enforceable Through Title V Permit

FACILITY-WIDE REQUIREMENTS CONTINUE ON NEXT PAGE

57. MALFUNCTION: B. Treatment of Emissions: 1. Definition of malfunction: A malfunction means a sudden and reasonably unforeseeable breakdown of equipment or of a process beyond the control of the source requiring immediate corrective action to restore normal operation. 2. Emissions in excess of the limits in the PSD permit conditions for permit units S-3636-1, S-3636-2, or S-3636-3 shall constitute a violation and may be the subject of enforcement proceedings. 3. Affirmative defense: In the context of an enforcement proceeding, excess emissions shall not be subject to penalty if the permittee demonstrates compliance with all of the requirements of Section IV.B.3 of the PSD permit. 4. All emissions, including those associated with a malfunction which may be eligible for an affirmative defense, must be included in all emissions calculations and demonstrations of compliance with annual emission limits specified in PSD permit. [PSD Permit (SJ SJ 99-03), IV.B] Federally Enforceable Through Title V Permit

58. TRANSFER OF OWNERSHIP: In the event of any changes in control or ownership of the facilities to be constructed, the PSD permit shall be binding on all subsequent owners and operators. The applicant shall notify the succeeding owner and operator of the existence of the PSD permit and its conditions by letter, a copy of which shall be forwarded to the EPA Regional Administrator and the State and local Air Pollution Control Agency. [PSD Permit (SJ 99-03), VI] Federally Enforceable Through Title V Permit

59. OTHER APPLICABLE REGULATIONS: The owner and operator of the facility shall construct and operate the stationary source in compliance with all other applicable provisions of 40 CFR Parts 52, 60, and 61 and all other applicable federal, state, and local air quality regulations. [PSD Permit (SJ 99-03), VIII] Federally Enforceable Through Title V Permit

60. Any requirements established by PSD permit for the gathering and reporting of information are not subject to review by the Office of Management and Budget (OMB) under the Paperwork Reduction Act because PSD permit is not an "information collection request" within the meaning of 44 U.S.C. §§ 3502(4), 3502 (11), 3507, 3512, and 3518. Furthermore, PSD permit and any information gathering and reporting requirements established by PSD permit are exempt from OMB review under the Paperwork Reduction Act because it is directed to fewer than ten persons, 44 U.S.C. § 3502(4) and § 3502(11); 5 CFR Part 1320.5(a). [PSD Permit (SJ 99-03), IX] Federally Enforceable Through Title V Permit

61. Agency Notification: All correspondence as required by the PSD permit shall be forwarded to EPA at the following address: Director, Air Division (Attn: Air-1), U. S. Environmental Protection Agency, Region 9, 75 Hawthorne Street San Francisco, CA 94105-3901. [PSD Permit (SJ 99-03), XI] Federally Enforceable Through Title V Permit

62. On January 31, 2012, the initial Title V permit was issued. The reporting periods for the Report of Required Monitoring and the Compliance Certification Report are based upon this initial permit issuance date, unless alternative dates are approved by the District Compliance Division. These reports are due within 30 days after the end of the reporting period. [District Rule 2520] Federally Enforceable Through Title V Permit

# San Joaquin Valley
# Air Pollution Control District

**PERMIT UNIT:** S-3636-1-4 **EXPIRATION DATE:** 02/29/2016

**EQUIPMENT DESCRIPTION:**
168 MW NOMINALLY RATED GENERAL ELECTRIC 7FA NATURAL GAS FIRED GAS TURBINE ENGINE/ELECTRICAL GENERATOR #1 WITH DRY LOW NOX COMBUSTORS AND SELECTIVE CATALYTIC REDUCTION, WITH HRSG #1 AND 185 MW STEAM TURBINE #1 IN A TWO ON ONE COMBINED CYCLE WITH GAS TURBINE ENGINE S-3636-2

## PERMIT UNIT REQUIREMENTS

1. Combustion turbine and electrical generator lube oil vents shall be equipped with mist eliminators to maintain visible emissions from lube oil vents no greater than 5% opacity, except for three minutes in any hour. [District Rule 2201] Federally Enforceable Through Title V Permit

2. Combustion turbine engine(GTE) shall be equipped with continuously recording fuel gas flowmeter. [District Rule 2201 and PSD Permit (SJ 99-03) X.K] Federally Enforceable Through Title V Permit

3. Heat recovery steam generator (HRSG) exhaust duct downstream of the SCR unit shall be equipped with continuously recording emissions monitors (CEM) for NOx, CO, and O2. All CEMs shall be dedicated to this unit and shall meet the requirements of 40 CFR Part 60 Appendices B & F (for CO), and 40 CFR Part 75 (for NOx and O2), and shall be capable of monitoring emissions during normal operating conditions and during startups and shutdowns, provided the CEM(s) pass the relative accuracy requirements for startups and shutdown specified herein. If relative accuracy of CEM(s) cannot be certified during startup conditions, CEM results during startup and shutdown events shall be replaced with startup emission rates obtained during source testing to determine compliance with emission limits in conditions 13, 17 and 18. [District Rule 2201 and PSD Permit (SJ 99-03) X.H.1] Federally Enforceable Through Title V Permit

4. HRSG exhaust duct shall be equipped with a continuously recording emission monitor upstream of the SCR unit for measuring the NOx concentration for the purposes of calculating ammonia slip. Permittee shall check, record, and quantify the calibration drift (CD) at two concentration values at least once daily (approximately 24 hours). The calibration shall be adjusted whenever the daily zero or high-level CD exceeds 5%. If either the zero or high-level CD exceeds 5% for five consecutive daily periods, the analyzer shall be deemed out-of-control. If either the zero or high-level CD exceeds 10% during any CD check, analyzer shall be deemed out-of-control. If the analyzer is out-of-control, the permittee shall take appropriate corrective action and then repeat the CD check. [District Rule 2201] Federally Enforceable Through Title V Permit

5. Ammonia injection grid shall be equipped with operational ammonia flowmeter and injection pressure indicator. [District Rule 2201] Federally Enforceable Through Title V Permit

6. Exhaust stack shall be equipped with permanent provisions to allow collection of stack gas samples consistent with EPA test methods. [District Rule 1081 and PSD Permit (SJ 99-03) X.C.3] Federally Enforceable Through Title V Permit

7. Heat recovery steam generator design shall provide space for additional selective catalytic reduction catalyst and oxidation catalyst if required to meet NOx and CO emission limits. [District Rule 2201] Federally Enforceable Through Title V Permit

8. Permittee shall monitor and record exhaust gas temperature at selective catalytic reduction and oxidation catalyst inlets. [District Rule 2201] Federally Enforceable Through Title V Permit

PERMIT UNIT REQUIREMENTS CONTINUE ON NEXT PAGE

9. GTE shall be fired exclusively on natural gas, consisting primarily of methane and ethane, with a sulfur content no greater than 0.75 grains of sulfur compounds (as S) per 100 dry scf of natural gas. [District Rule 2201 and PSD Permit (SJ 99-03) X.K] Federally Enforceable Through Title V Permit

10. Cold startup is defined as the period beginning with turbine initial firing until the unit meets the lb/hr and ppmv emission limits in condition 15. Cold startup means a startup when the combustion turbine has not been in operation during the preceding 72 hours. Duration of the cold startups shall not exceed 3 hours. [District Rule 2201 and PSD Permit (SJ 99-03) X.G.5] Federally Enforceable Through Title V Permit

11. Only one of GTEs S-3636-1, '2 or '3 shall be in startup at any one time. [District Rule 2201 and PSD Permit (SJ 99-03) X.G.2] Federally Enforceable Through Title V Permit

12. Ammonia shall be injected when the selective catalytic reduction system catalyst temperature exceeds 500 degrees F. Permittee shall monitor and record catalyst temperature during periods of startup. [District Rule 2201] Federally Enforceable Through Title V Permit

13. During the cold startup GTE exhaust emissions shall not exceed any of the following: NOx (as NO2) - 130 lb, VOC - 273 lb or CO - 1235 lb, in any one hour. [District Rule 2201 and PSD Permit (SJ 99-03) X.G.1] Federally Enforceable Through Title V Permit

14. By two hours after turbine initial firing, GTE exhaust emissions shall not exceed any of the following: NOx (as NO2) - 12.2 ppmv @ 15% O2 or CO - 25 ppmv @ 15% O2. [District Rule 4703] Federally Enforceable Through Title V Permit

15. Emission rates from GTE, except during startup and/or shutdown, shall not exceed any of the following: NOx (as NO2) - 17.03 lb/hr and 2.5 ppmvd @ 15% O2, VOC - 2.0 ppmvd @ 15% O2, CO - 24.92 lb/hr and 6 ppmvd @ 15% O2 or ammonia - 10 ppmvd @15% O2. NOx (as NO2) emission limit is a one-hour average. Ammonia emission limit is a twenty-four hour rolling average. All other emission limits are three-hour rolling averages. [District Rules 2201, 4703 and PSD Permit (SJ 99-03) X.D & .E] Federally Enforceable Through Title V Permit

16. Emission rates from the GTE shall not exceed either of the following: PM10 - 9.0 lb/hr and SOx (as SO2) - 3.495 lb/hr. Emission limits are three-hour rolling averages. [District Rules 2201, 4001, and PSD Permit (SJ 99-03) X.F] Federally Enforceable Through Title V Permit

17. On any day when a startup or shutdown occurs, emission rates from GTE shall not exceed any of the following: PM10 - 216 lb/day, SOx (as SO2) - 84 lb/day, NOx (as NO2) - 450 lb/day, VOC - 355 lb/day or CO - 2,113 lb/day. [District Rule 2201] Federally Enforceable Through Title V Permit

18. Combined annual emissions from GTEs S-3636-1, '2 and '3, calculated on a twelve consecutive month rolling basis, shall not exceed any of the following: PM10 - 224,343 lb/year , SOx (as SO2) - 84,780 lb/year, NOx (as NO2) - 344,484 lb/year, VOC - 227,619 lb/year or CO - 1,220,166 lb/year. [District Rule 2201] Federally Enforceable Through Title V Permit

19. Combined annual emissions of all hazardous air pollutants (HAPS) from GTEs S-3636-1, '2 and '3, calculated on a twelve consecutive month rolling basis, shall not exceed 25 tons/year. Combined annual emissions of any single HAP from GTEs S-3636-1, '2 and '3, calculated on a twelve consecutive month rolling basis, shall not exceed 10 tons/year. [District Rule 4002] Federally Enforceable Through Title V Permit

20. 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] Federally Enforceable Through Title V Permit

21. 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] Federally Enforceable Through Title V Permit

PERMIT UNIT REQUIREMENTS CONTINUE ON NEXT PAGE

22. Compliance with ammonia slip limit shall be demonstrated by using the following calculation procedure: ammonia slip ppmv @ 15% O2 = ((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 NOx concentration ppmv at 15% O2 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 NH3 CEM, the permittee must submit a monitoring plan for District review and approval. [District Rule 4102]

23. Compliance with the short term emission limits (ppmv @ 15% O2 and lb/hr) shall be demonstrated annually by District witnessed in situ sampling of exhaust gases by a qualified independent source test firm at full load conditions as follows - NOx: ppmvd @ 15% O2 and lb/hr, CO: ppmvd @ 15% O2 and lb/hr, VOC: ppmvd @ 15% O2 and lb/hr, PM10: lb/hr, and ammonia: ppmvd @ 15% O2. Sample collection to demonstrate compliance with ammonia emission limit shall be based on three consecutive test runs of thirty minutes each. [District Rule 1081 and PSD Permit (SJ 99-03) X.C.1] Federally Enforceable Through Title V Permit

24. Compliance with the startup NOx, CO, and VOC mass emission limits shall be demonstrated for one of the GTEs (S-3636-1, '2, or '3) at least once every seven years by District witnessed in situ sampling of exhaust gases by a qualified independent source test firm. CEM relative accuracy shall be determined during startup source testing in accordance with methodology approved by the District. If CEM data is not certifiable to determine compliance with NOx and CO startup emissions limits, then source testing to measure startup NOx and CO mass emissions rates shall be conducted at least once every 12 months. [District Rule 1081] Federally Enforceable Through Title V Permit

25. Based on the initial speciated HAPS and total VOC source test conducted for one of the GTEs (S-3636-1, '2 or '3), Pastoria shall correlate the total HAPS emissions rate and the single highest HAP emission rate to the VOC mass emission determined during the speciated HAPs source test. Annual compliance with the HAPS emissions limit (25 tpy all HAPS or 10 tpy any single HAP) shall be by the combined VOC emissions rates for the GTEs (S-3636-1, '2 and '3) determined during annual compliance source testing and the correlation between VOC emissions and HAP(S). [District Rule 4002] Federally Enforceable Through Title V Permit

26. Compliance with natural gas sulfur content limit shall be demonstrated periodically as required by 40 CFR 60 Subpart GG and 40 CFR 75. [District Rules 2540 and PSD Permit (SJ 99-03) X.K] Federally Enforceable Through Title V Permit

27. 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. Official test results and field data collected by source tests required by conditions on this permit shall be submitted to the District within 60 days of testing. [District Rule 1081 and PSD Permit (SJ 99-03) X.C.2] Federally Enforceable Through Title V Permit

28. Source test plans for seven-year source tests shall include a method for measuring the VOC/CO surrogate relationship that will be used to demonstrate compliance with VOC lb/hr, lb/day, and lb/twelve month rolling emission limits. [District Rule 2201] Federally Enforceable Through Title V Permit

29. The following test methods shall be used PM10: EPA method 5 (front half and back half), NOx: EPA Method 7E or 20, CO: EPA method 10 or 10B, O2: EPA Method 3, 3A, or 20, VOC: EPA method 18 or 25, ammonia: BAAQMD ST-1B, and fuel gas sulfur content: ASTM D3246. 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, 4001, 4703, and PSD Permit (SJ 99-03) X.C.2] Federally Enforceable Through Title V Permit

30. The permittee shall maintain hourly records of NOx, CO, and ammonia emission concentrations (ppmv @ 15% O2), and hourly, daily, and twelve month rolling average records of NOx and CO emissions. Compliance with the hourly, daily, and twelve month rolling average VOC emission limits shall be demonstrated by the CO CEM data and the VOC/CO relationship determined by annual CO and VOC source tests. [District Rule 2201] Federally Enforceable Through Title V Permit

31. The permittee shall maintain records of SOx lb/hr, lb/day, and lb/twelve month rolling average emission. SOx emissions shall be based on fuel use records, natural gas sulfur content, and mass balance calculations. [District Rule 2201 and PSD Permit (SJ 99-03) X.K] Federally Enforceable Through Title V Permit

PERMIT UNIT REQUIREMENTS CONTINUE ON NEXT PAGE

32. Permittee shall maintain the following records for the GTE: occurrence, duration, and type of any startup, shutdown, or malfunction; performance testing; emission measurements; total daily and rolling twelve month average hours of operation; hourly quantity of fuel used and gross three hour average operating load. [District Rules 2201 & 4703] Federally Enforceable Through Title V Permit

33. Permittee shall maintain the following records for the continuous emissions monitoring system (CEMS): performance testing, evaluations, calibrations, checks, maintenance, adjustments, and any period during which a CEMS was inoperative. [District Rules 2201 & 4703, and PSD Permit (SJ 99-03) X.I.1] Federally Enforceable Through Title V Permit

34. Permittee shall provide notification and record keeping as required under 40 CFR, Part 60, Subpart A, 60.7. [District Rule 4001] Federally Enforceable Through Title V Permit

35. All records required to be maintained by this permit shall be maintained for a period of five years and shall be made readily available for District inspection upon request. [District Rule 2201] Federally Enforceable Through Title V Permit

36. 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] Federally Enforceable Through Title V Permit

37. Audits of continuous emission monitors shall be conducted quarterly, except during quarters in which relative accuracy and total accuracy testing is performed, in accordance with EPA guidelines. The District shall be notified prior to completion of the audits. Audit reports shall be submitted along with quarterly compliance reports to the District. [District Rule 1080] Federally Enforceable Through Title V Permit

38. 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] Federally Enforceable Through Title V Permit

39. The permittee shall submit a written report to the APCO for each calendar quarter, within 30 days of the end of the quarter, including: time intervals, data and magnitude of excess emissions, nature and cause of excess (if known), corrective actions taken and preventive measures adopted; averaging period used for data reporting shall correspond to the averaging period for each respective emission standard; applicable time and date of each period during which the CEM was inoperative (except for zero and span checks) and the nature of system repairs and adjustments; and a negative declaration when no excess emissions occurred. [District Rule 1080 and PSD Permit (SJ 99-03) X.I.3] Federally Enforceable Through Title V Permit

40. The combined annual emissions rate from all three CTGs and emergency engines S-3636-7-4 & -12-1, based on 12-month rolling average, must not exceed 344,485 lbs NOx and 1,140,000 lbs CO. [PSD Permit (SJ 99-03) X.D & .E] Federally Enforceable Through Title V Permit

41. The annual SOx emissions from each CTG, based on 12-month rolling average, must not exceed 28,170 lbs. [PSD Permit (SJ 99-03) X.F] Federally Enforceable Through Title V Permit

42. During the hot startup of any CTG, the combined emissions from any one CTG and HRSG exhausts must not exceed 107 lbs of NOx or 903 lbs of CO in any one hour. Hot startup means a startup when the combustion turbine has been in operation during the preceding 8 hours and duration of hot start-ups shall not exceed 1 hour. [PSD Permit (SJ 99-03) X.G.1] Federally Enforceable Through Title V Permit

43. During the warm startup of any CTG, the combined emissions from any one CTG and HRSG exhausts must not exceed 119 lbs of NOx or 1021 lbs of CO in any one hour. Warm startup means a startup that is not a hot or cold startup and duration of warm startups shall not exceed 2.5 hours. [PSD Permit (SJ 99-03) X.G.1] Federally Enforceable Through Title V Permit

44. During the Shutdown of any CTG, the combined emissions from any one CTG and HRSG exhausts must not exceed 58.5 lbs of NOx or 222.5 lbs of CO in any one hour. Shutdown shall be defined as the period beginning with the lowering of equipment from base load and lasting until fuel flow is completely off and combustion has ceased and duration of shutdowns shall not exceed one half hour. [PSD Permit (SJ 99-03) X.G.1] Federally Enforceable Through Title V Permit

PERMIT UNIT REQUIREMENTS CONTINUE ON NEXT PAGE

45. Total number of start-ups and shut-downs for the facility shall not exceed 674 events per year. [PSD Permit (SJ 99-03) X.G.6] Federally Enforceable Through Title V Permit

46. Any excess emission indicated by the CEM system must be considered a violation of the applicable emission limit in the PSD permit. [PSD Permit (SJ 99-03) X.I.4] Federally Enforceable Through Title V Permit

47. The quality assurance project plan used by the Permittee for the certification and operation of the continuous emissions monitors, which meets the requirements of 40 CFR Part 60, Appendix F, must be available upon request to EPA. [PSD Permit (SJ 99-03) X.I.5] Federally Enforceable Through Title V Permit

**PERMIT UNIT:** S-3636-2-4 **EXPIRATION DATE:** 02/29/2016

**EQUIPMENT DESCRIPTION:**
168 MW NOMINALLY RATED GENERAL ELECTRIC 7FA NATURAL GAS FIRED GAS TURBINE ENGINE/ELECTRICAL GENERATOR #2 WITH DRY LOW NOX COMBUSTORS, SELECTIVE CATALYTIC REDUCTION, HRSG #2, AND A SINGLE 185 MW STEAM TURBINE #1 SHARED WITH GAS TURBINE ENGINE S-3636-1

# PERMIT UNIT REQUIREMENTS

1. Combustion turbine and electrical generator lube oil vents shall be equipped with mist eliminators to maintain visible emissions from lube oil vents no greater than 5% opacity, except for three minutes in any hour. [District Rule 2201] Federally Enforceable Through Title V Permit
2. Combustion turbine engine(GTE) shall be equipped with continuously recording fuel gas flowmeter. [District Rule 2201 and PSD Permit (SJ 99-03) X.K] Federally Enforceable Through Title V Permit
3. Heat recovery steam generator (HRSG) exhaust duct downstream of the SCR unit shall be equipped with continuously recording emissions monitors (CEM) for NOx, CO, and O2. All CEMs shall be dedicated to this unit and shall meet the requirements of 40 CFR Part 60 Appendices B & F (for CO), and 40 CFR Part 75 (for NOx and O2), and shall be capable of monitoring emissions during normal operating conditions and during startups and shutdowns, provided the CEM(s) pass the relative accuracy requirements for startups and shutdown specified herein. If relative accuracy of CEM(s) cannot be certified during startup conditions, CEM results during startup and shutdown events shall be replaced with startup emission rates obtained during source testing to determine compliance with emission limits in conditions 13, 17 and 18. [District Rule 2201 and PSD Permit (SJ 99-03) X.H.1] Federally Enforceable Through Title V Permit
4. HRSG exhaust duct shall be equipped with a continuously recording emission monitor upstream of the SCR unit for measuring the NOx concentration for the purposes of calculating ammonia slip. Permittee shall check, record, and quantify the calibration drift (CD) at two concentration values at least once daily (approximately 24 hours). The calibration shall be adjusted whenever the daily zero or high-level CD exceeds 5%. If either the zero or high-level CD exceeds 5% for five consecutive daily periods, the analyzer shall be deemed out-of-control. If either the zero or high-level CD exceeds 10% during any CD check, analyzer shall be deemed out-of-control. If the analyzer is out-of-control, the permittee shall take appropriate corrective action and then repeat the CD check. [District Rule 2201] Federally Enforceable Through Title V Permit
5. Ammonia injection grid shall be equipped with operational ammonia flowmeter and injection pressure indicator. [District Rule 2201] Federally Enforceable Through Title V Permit
6. Exhaust stack shall be equipped with permanent provisions to allow collection of stack gas samples consistent with EPA test methods. [District Rule 1081 and PSD Permit (SJ 99-03) X.C.3] Federally Enforceable Through Title V Permit
7. Heat recovery steam generator design shall provide space for additional selective catalytic reduction catalyst and oxidation catalyst if required to meet NOx and CO emission limits. [District Rule 2201] Federally Enforceable Through Title V Permit
8. Permittee shall monitor and record exhaust gas temperature at selective catalytic reduction and oxidation catalyst inlets. [District Rule 2201] Federally Enforceable Through Title V Permit

PERMIT UNIT REQUIREMENTS CONTINUE ON NEXT PAGE

9. GTE shall be fired exclusively on natural gas, consisting primarily of methane and ethane, with a sulfur content no greater than 0.75 grains of sulfur compounds (as S) per 100 dry scf of natural gas. [District Rule 2201 and PSD Permit (SJ 99-03) X.K] Federally Enforceable Through Title V Permit

10. Cold startup is defined as the period beginning with turbine initial firing until the unit meets the lb/hr and ppmv emission limits in condition 15. Cold startup means a startup when the combustion turbine has not been in operation during the preceding 72 hours. Duration of the cold startups shall not exceed 3 hours. [District Rule 2201 and PSD Permit (SJ 99-03) X.G.5] Federally Enforceable Through Title V Permit

11. Only one of GTEs S-3636-1, '2 or '3 shall be in startup at any one time. [District Rule 2201 and PSD Permit (SJ 99-03) X.G.2] Federally Enforceable Through Title V Permit

12. Ammonia shall be injected when the selective catalytic reduction system catalyst temperature exceeds 500 degrees F. Permittee shall monitor and record catalyst temperature during periods of startup. [District Rule 2201] Federally Enforceable Through Title V Permit

13. During the cold startup GTE exhaust emissions shall not exceed any of the following: NOx (as NO2) - 130 lb, VOC - 273 lb or CO - 1235 lb, in any one hour. [District Rule 2201 and PSD Permit (SJ 99-03) X.G.1] Federally Enforceable Through Title V Permit

14. By two hours after turbine initial firing, GTE exhaust emissions shall not exceed any of the following: NOx (as NO2) - 12.2 ppmv @ 15% O2 or CO - 25 ppmv @ 15% O2. [District Rule 4703] Federally Enforceable Through Title V Permit

15. Emission rates from GTE, except during startup and/or shutdown, shall not exceed any of the following: NOx (as NO2) - 17.03 lb/hr and 2.5 ppmvd @ 15% O2, VOC - 2.0 ppmvd @ 15% O2, CO - 24.92 lb/hr and 6 ppmvd @ 15% O2 or ammonia - 10 ppmvd @15% O2. NOx (as NO2) emission limit is a one-hour average. Ammonia emission limit is a twenty-four hour rolling average. All other emission limits are three-hour rolling averages. [District Rules 2201, 4703 and PSD Permit (SJ 99-03) X.D & .E] Federally Enforceable Through Title V Permit

16. Emission rates from the GTE shall not exceed either of the following: PM10 - 9.0 lb/hr and SOx (as SO2) - 3.495 lb/hr. Emission limits are three-hour rolling averages. [District Rules 2201, 4001, and PSD Permit (SJ 99-03) X.F] Federally Enforceable Through Title V Permit

17. On any day when a startup or shutdown occurs, emission rates from GTE shall not exceed any of the following: PM10 - 216 lb/day, SOx (as SO2) - 84 lb/day, NOx (as NO2) - 450 lb/day, VOC - 355 lb/day or CO - 2,113 lb/day. [District Rule 2201] Federally Enforceable Through Title V Permit

18. Combined annual emissions from GTEs S-3636-1, '2 and '3, calculated on a twelve consecutive month rolling basis, shall not exceed any of the following: PM10 - 224,343 lb/year , SOx (as SO2) - 84,780 lb/year, NOx (as NO2) - 344,484 lb/year, VOC - 227,619 lb/year or CO - 1,220,166 lb/year. [District Rule 2201] Federally Enforceable Through Title V Permit

19. Combined annual emissions of all hazardous air pollutants (HAPS) from GTEs S-3636-1, '2 and '3, calculated on a twelve consecutive month rolling basis, shall not exceed 25 tons/year. Combined annual emissions of any single HAP from GTEs S-3636-1, '2 and '3, calculated on a twelve consecutive month rolling basis, shall not exceed 10 tons/year. [District Rule 4002] Federally Enforceable Through Title V Permit

20. 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] Federally Enforceable Through Title V Permit

21. 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] Federally Enforceable Through Title V Permit

PERMIT UNIT REQUIREMENTS CONTINUE ON NEXT PAGE

22. Compliance with ammonia slip limit shall be demonstrated by using the following calculation procedure: ammonia slip ppmv @ 15% O2 = ((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 NOx concentration ppmv at 15% O2 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 NH3 CEM, the permittee must submit a monitoring plan for District review and approval. [District Rule 4102]

23. Compliance with the short term emission limits (ppmv @ 15% O2 and lb/hr) shall be demonstrated annually by District witnessed in situ sampling of exhaust gases by a qualified independent source test firm at full load conditions as follows - NOx: ppmvd @ 15% O2 and lb/hr, CO: ppmvd @ 15% O2 and lb/hr, VOC: ppmvd @ 15% O2 and lb/hr, PM10: lb/hr, and ammonia: ppmvd @ 15% O2. Sample collection to demonstrate compliance with ammonia emission limit shall be based on three consecutive test runs of thirty minutes each. [District Rule 1081 and PSD Permit (SJ 99-03) X.C.1] Federally Enforceable Through Title V Permit

24. Compliance with the startup NOx, CO, and VOC mass emission limits shall be demonstrated for one of the GTEs (S-3636-1, '2, or '3) at least once every seven years by District witnessed in situ sampling of exhaust gases by a qualified independent source test firm. CEM relative accuracy shall be determined during startup source testing in accordance with methodology approved by the District. If CEM data is not certifiable to determine compliance with NOx and CO startup emissions limits, then source testing to measure startup NOx and CO mass emissions rates shall be conducted at least once every 12 months. [District Rule 1081] Federally Enforceable Through Title V Permit

25. Based on the initial speciated HAPS and total VOC source test conducted for one of the GTEs (S-3636-1, '2 or '3), Pastoria shall correlate the total HAPS emissions rate and the single highest HAP emission rate to the VOC mass emission determined during the speciated HAPs source test. Annual compliance with the HAPS emissions limit (25 tpy all HAPS or 10 tpy any single HAP) shall be by the combined VOC emissions rates for the GTEs (S-3636-1, '2 and '3) determined during annual compliance source testing and the correlation between VOC emissions and HAP(S). [District Rule 4002] Federally Enforceable Through Title V Permit

26. Compliance with natural gas sulfur content limit shall be demonstrated periodically as required by 40 CFR 60 Subpart GG and 40 CFR 75. [District Rules 2540 and PSD Permit (SJ 99-03) X.K] Federally Enforceable Through Title V Permit

27. 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. Official test results and field data collected by source tests required by conditions on this permit shall be submitted to the District within 60 days of testing. [District Rule 1081 and PSD Permit (SJ 99-03) X.C.2] Federally Enforceable Through Title V Permit

28. Source test plans for seven-year source tests shall include a method for measuring the VOC/CO surrogate relationship that will be used to demonstrate compliance with VOC lb/hr, lb/day, and lb/twelve month rolling emission limits. [District Rule 2201] Federally Enforceable Through Title V Permit

29. The following test methods shall be used PM10: EPA method 5 (front half and back half), NOx: EPA Method 7E or 20, CO: EPA method 10 or 10B, O2: EPA Method 3, 3A, or 20, VOC: EPA method 18 or 25, ammonia: BAAQMD ST-1B, and fuel gas sulfur content: ASTM D3246. 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, 4001, 4703, and PSD Permit (SJ 99-03) X.C.2] Federally Enforceable Through Title V Permit

30. The permittee shall maintain hourly records of NOx, CO, and ammonia emission concentrations (ppmv @ 15% O2), and hourly, daily, and twelve month rolling average records of NOx and CO emissions. Compliance with the hourly, daily, and twelve month rolling average VOC emission limits shall be demonstrated by the CO CEM data and the VOC/CO relationship determined by annual CO and VOC source tests. [District Rule 2201] Federally Enforceable Through Title V Permit

31. The permittee shall maintain records of SOx lb/hr, lb/day, and lb/twelve month rolling average emission. SOx emissions shall be based on fuel use records, natural gas sulfur content, and mass balance calculations. [District Rule 2201 and PSD Permit (SJ 99-03) X.K] Federally Enforceable Through Title V Permit

PERMIT UNIT REQUIREMENTS CONTINUE ON NEXT PAGE

32. Permittee shall maintain the following records for the GTE: occurrence, duration, and type of any startup, shutdown, or malfunction; performance testing; emission measurements; total daily and rolling twelve month average hours of operation; hourly quantity of fuel used and gross three hour average operating load. [District Rules 2201 & 4703] Federally Enforceable Through Title V Permit

33. Permittee shall maintain the following records for the continuous emissions monitoring system (CEMS): performance testing, evaluations, calibrations, checks, maintenance, adjustments, and any period during which a CEMS was inoperative. [District Rules 2201 & 4703, and PSD Permit (SJ 99-03) X.I.1] Federally Enforceable Through Title V Permit

34. Permittee shall provide notification and record keeping as required under 40 CFR, Part 60, Subpart A, 60.7. [District Rule 4001] Federally Enforceable Through Title V Permit

35. All records required to be maintained by this permit shall be maintained for a period of five years and shall be made readily available for District inspection upon request. [District Rule 2201] Federally Enforceable Through Title V Permit

36. 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] Federally Enforceable Through Title V Permit

37. Audits of continuous emission monitors shall be conducted quarterly, except during quarters in which relative accuracy and total accuracy testing is performed, in accordance with EPA guidelines. The District shall be notified prior to completion of the audits. Audit reports shall be submitted along with quarterly compliance reports to the District. [District Rule 1080] Federally Enforceable Through Title V Permit

38. 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] Federally Enforceable Through Title V Permit

39. The permittee shall submit a written report to the APCO for each calendar quarter, within 30 days of the end of the quarter, including: time intervals, data and magnitude of excess emissions, nature and cause of excess (if known), corrective actions taken and preventive measures adopted; averaging period used for data reporting shall correspond to the averaging period for each respective emission standard; applicable time and date of each period during which the CEM was inoperative (except for zero and span checks) and the nature of system repairs and adjustments; and a negative declaration when no excess emissions occurred. [District Rule 1080 and PSD Permit (SJ 99-03) X.I.3] Federally Enforceable Through Title V Permit

40. The combined annual emissions rate from all three CTGs and emergency engines S-3636-7-4 & -12-41 based on 12-month rolling average, must not exceed 344,485 lbs NOx and 1,140,000 lbs CO. [PSD Permit (SJ 99-03) X.D & .E] Federally Enforceable Through Title V Permit

41. The annual SOx emissions from each CTG, based on 12-month rolling average, must not exceed 28,170 lbs. [PSD Permit (SJ 99-03) X.F] Federally Enforceable Through Title V Permit

42. During the hot startup of any CTG, the combined emissions from any one CTG and HRSG exhausts must not exceed 107 lbs of NOx or 903 lbs of CO in any one hour. Hot startup means a startup when the combustion turbine has been in operation during the preceding 8 hours and duration of hot start-ups shall not exceed 1 hour. [PSD Permit (SJ 99-03) X.G.1] Federally Enforceable Through Title V Permit

43. During the warm startup of any CTG, the combined emissions from any one CTG and HRSG exhausts must not exceed 119 lbs of NOx or 1021 lbs of CO in any one hour. Warm startup means a startup that is not a hot or cold startup and duration of warm startups shall not exceed 2.5 hours. [PSD Permit (SJ 99-03) X.G.1] Federally Enforceable Through Title V Permit

44. During the Shutdown of any CTG, the combined emissions from any one CTG and HRSG exhausts must not exceed 58.5 lbs of NOx or 222.5 lbs of CO in any one hour. Shutdown shall be defined as the period beginning with the lowering of equipment from base load and lasting until fuel flow is completely off and combustion has ceased and duration of shutdowns shall not exceed one half hour. [PSD Permit (SJ 99-03) X.G.1] Federally Enforceable Through Title V Permit

PERMIT UNIT REQUIREMENTS CONTINUE ON NEXT PAGE

45. Total number of start-ups and shut-downs for the facility shall not exceed 674 events per year. [PSD Permit (SJ 99-03) X.G.6] Federally Enforceable Through Title V Permit
46. Any excess emission indicated by the CEM system must be considered a violation of the applicable emission limit in the PSD permit. [PSD Permit (SJ 99-03) X.I.4] Federally Enforceable Through Title V Permit
47. The quality assurance project plan used by the Permittee for the certification and operation of the continuous emissions monitors, which meets the requirements of 40 CFR Part 60, Appendix F, must be available upon request to EPA. [PSD Permit (SJ 99-03) X.I.5] Federally Enforceable Through Title V Permit

**PERMIT UNIT:** S-3636-3-4 **EXPIRATION DATE:** 02/29/2016

**EQUIPMENT DESCRIPTION:**
168 MW NOMINALLY RATED GENERAL ELECTRIC 7FA NATURAL GAS FIRED GAS TURBINE ENGINE/ELECTRICAL GENERATOR #3 WITH DRY LOW NOX COMBUSTORS, SELECTIVE CATALYTIC REDUCTION, HRSG #1 AND 90 MW STEAM TURBINE #2

# PERMIT UNIT REQUIREMENTS

1. Combustion turbine and electrical generator lube oil vents shall be equipped with mist eliminators to maintain visible emissions from lube oil vents no greater than 5% opacity, except for three minutes in any hour. [District Rule 2201] Federally Enforceable Through Title V Permit

2. Combustion turbine engine(GTE) shall be equipped with continuously recording fuel gas flowmeter. [District Rule 2201 and PSD Permit (SJ 99-03) X.K] Federally Enforceable Through Title V Permit

3. Heat recovery steam generator (HRSG) exhaust duct downstream of the SCR unit shall be equipped with continuously recording emissions monitors (CEM) for NOx, CO, and O2. All CEMs shall be dedicated to this unit and shall meet the requirements of 40 CFR Part 60 Appendices B & F (for CO), and 40 CFR Part 75 (for NOx and O2), and shall be capable of monitoring emissions during normal operating conditions and during startups and shutdowns, provided the CEM(s) pass the relative accuracy requirements for startups and shutdown specified herein. If relative accuracy of CEM(s) cannot be certified during startup conditions, CEM results during startup and shutdown events shall be replaced with startup emission rates obtained during source testing to determine compliance with emission limits in conditions 13, 17 and 18. [District Rule 2201 and PSD Permit (SJ 99-03) X.H.1] Federally Enforceable Through Title V Permit

4. HRSG exhaust duct shall be equipped with a continuously recording emission monitor upstream of the SCR unit for measuring the NOx concentration for the purposes of calculating ammonia slip. Permittee shall check, record, and quantify the calibration drift (CD) at two concentration values at least once daily (approximately 24 hours). The calibration shall be adjusted whenever the daily zero or high-level CD exceeds 5%. If either the zero or high-level CD exceeds 5% for five consecutive daily periods, the analyzer shall be deemed out-of-control. If either the zero or high-level CD exceeds 10% during any CD check, analyzer shall be deemed out-of-control. If the analyzer is out-of-control, the permittee shall take appropriate corrective action and then repeat the CD check. [District Rule 2201] Federally Enforceable Through Title V Permit

5. Ammonia injection grid shall be equipped with operational ammonia flowmeter and injection pressure indicator. [District Rule 2201] Federally Enforceable Through Title V Permit

6. Exhaust stack shall be equipped with permanent provisions to allow collection of stack gas samples consistent with EPA test methods. [District Rule 1081 and PSD Permit (SJ 99-03) X.C.3] Federally Enforceable Through Title V Permit

7. Heat recovery steam generator design shall provide space for additional selective catalytic reduction catalyst and oxidation catalyst if required to meet NOx and CO emission limits. [District Rule 2201] Federally Enforceable Through Title V Permit

8. Permittee shall monitor and record exhaust gas temperature at selective catalytic reduction and oxidation catalyst inlets. [District Rule 2201] Federally Enforceable Through Title V Permit

PERMIT UNIT REQUIREMENTS CONTINUE ON NEXT PAGE

9. GTE shall be fired exclusively on natural gas, consisting primarily of methane and ethane, with a sulfur content no greater than 0.75 grains of sulfur compounds (as S) per 100 dry scf of natural gas. [District Rule 2201 and PSD Permit (SJ 99-03) X.K] Federally Enforceable Through Title V Permit

10. Cold startup is defined as the period beginning with turbine initial firing until the unit meets the lb/hr and ppmv emission limits in condition 15. Cold startup means a startup when the combustion turbine has not been in operation during the preceding 72 hours. Duration of the cold startups shall not exceed 3 hours. [District Rule 2201 and PSD Permit (SJ 99-03) X.G.5] Federally Enforceable Through Title V Permit

11. Only one of GTEs S-3636-1, '2 or '3 shall be in startup at any one time. [District Rule 2201 and PSD Permit (SJ 99-03) X.G.2] Federally Enforceable Through Title V Permit

12. Ammonia shall be injected when the selective catalytic reduction system catalyst temperature exceeds 500 degrees F. Permittee shall monitor and record catalyst temperature during periods of startup. [District Rule 2201] Federally Enforceable Through Title V Permit

13. During the cold startup GTE exhaust emissions shall not exceed any of the following: NOx (as NO2) - 130 lb, VOC - 273 lb or CO - 1235 lb, in any one hour. [District Rule 2201 and PSD Permit (SJ 99-03) X.G.1] Federally Enforceable Through Title V Permit

14. By two hours after turbine initial firing, GTE exhaust emissions shall not exceed any of the following: NOx (as NO2) - 12.2 ppmv @ 15% O2 or CO - 25 ppmv @ 15% O2. [District Rule 4703] Federally Enforceable Through Title V Permit

15. Emission rates from GTE, except during startup and/or shutdown, shall not exceed any of the following: NOx (as NO2) - 17.03 lb/hr and 2.5 ppmvd @ 15% O2, VOC - 2.0 ppmvd @ 15% O2, CO - 24.92 lb/hr and 6 ppmvd @ 15% O2 or ammonia - 10 ppmvd @15% O2. NOx (as NO2) emission limit is a one-hour average. Ammonia emission limit is a twenty-four hour rolling average. All other emission limits are three-hour rolling averages. [District Rules 2201, 4703 and PSD Permit (SJ 99-03) X.D & .E] Federally Enforceable Through Title V Permit

16. Emission rates from the GTE shall not exceed either of the following: PM10 - 9.0 lb/hr and SOx (as SO2) - 3.495 lb/hr. Emission limits are three-hour rolling averages. [District Rules 2201, 4001, and PSD Permit (SJ 99-03) X.F] Federally Enforceable Through Title V Permit

17. On any day when a startup or shutdown occurs, emission rates from GTE shall not exceed any of the following: PM10 - 216 lb/day, SOx (as SO2) - 84 lb/day, NOx (as NO2) - 450 lb/day, VOC - 355 lb/day or CO - 2,113 lb/day. [District Rule 2201] Federally Enforceable Through Title V Permit

18. Combined annual emissions from GTEs S-3636-1, '2 and '3, calculated on a twelve consecutive month rolling basis, shall not exceed any of the following: PM10 - 224,343 lb/year , SOx (as SO2) - 84,780 lb/year, NOx (as NO2) - 344,484 lb/year, VOC - 227,619 lb/year or CO - 1,220,166 lb/year. [District Rule 2201] Federally Enforceable Through Title V Permit

19. Combined annual emissions of all hazardous air pollutants (HAPS) from GTEs S-3636-1, '2 and '3, calculated on a twelve consecutive month rolling basis, shall not exceed 25 tons/year. Combined annual emissions of any single HAP from GTEs S-3636-1, '2 and '3, calculated on a twelve consecutive month rolling basis, shall not exceed 10 tons/year. [District Rule 4002] Federally Enforceable Through Title V Permit

20. 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] Federally Enforceable Through Title V Permit

21. 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] Federally Enforceable Through Title V Permit

PERMIT UNIT REQUIREMENTS CONTINUE ON NEXT PAGE

22. Compliance with ammonia slip limit shall be demonstrated by using the following calculation procedure: ammonia slip ppmv @ 15% O2 = ((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 NOx concentration ppmv at 15% O2 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 NH3 CEM, the permittee must submit a monitoring plan for District review and approval. [District Rule 4102]

23. Compliance with the short term emission limits (ppmv @ 15% O2 and lb/hr) shall be demonstrated annually by District witnessed in situ sampling of exhaust gases by a qualified independent source test firm at full load conditions as follows - NOx: ppmvd @ 15% O2 and lb/hr, CO: ppmvd @ 15% O2 and lb/hr, VOC: ppmvd @ 15% O2 and lb/hr, PM10: lb/hr, and ammonia: ppmvd @ 15% O2. Sample collection to demonstrate compliance with ammonia emission limit shall be based on three consecutive test runs of thirty minutes each. [District Rule 1081 and PSD Permit (SJ 99-03) X.C.1] Federally Enforceable Through Title V Permit

24. Compliance with the startup NOx, CO, and VOC mass emission limits shall be demonstrated for one of the GTEs (S-3636-1, '2, or '3) at least once every seven years by District witnessed in situ sampling of exhaust gases by a qualified independent source test firm. CEM relative accuracy shall be determined during startup source testing in accordance with methodology approved by the District. If CEM data is not certifiable to determine compliance with NOx and CO startup emissions limits, then source testing to measure startup NOx and CO mass emissions rates shall be conducted at least once every 12 months. [District Rule 1081] Federally Enforceable Through Title V Permit

25. Based on the initial speciated HAPS and total VOC source test conducted for one of the GTEs (S-3636-1, '2 or '3), Pastoria shall correlate the total HAPS emissions rate and the single highest HAP emission rate to the VOC mass emission determined during the speciated HAPs source test. Annual compliance with the HAPS emissions limit (25 tpy all HAPS or 10 tpy any single HAP) shall be by the combined VOC emissions rates for the GTEs (S-3636-1, '2 and '3) determined during annual compliance source testing and the correlation between VOC emissions and HAP(S). [District Rule 4002] Federally Enforceable Through Title V Permit

26. Compliance with natural gas sulfur content limit shall be demonstrated periodically as required by 40 CFR 60 Subpart GG and 40 CFR 75. [District Rules 2540 and PSD Permit (SJ 99-03) X.K] Federally Enforceable Through Title V Permit

27. 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. Official test results and field data collected by source tests required by conditions on this permit shall be submitted to the District within 60 days of testing. [District Rule 1081 and PSD Permit (SJ 99-03) X.C.2] Federally Enforceable Through Title V Permit

28. Source test plans for seven-year source tests shall include a method for measuring the VOC/CO surrogate relationship that will be used to demonstrate compliance with VOC lb/hr, lb/day, and lb/twelve month rolling emission limits. [District Rule 2201] Federally Enforceable Through Title V Permit

29. The following test methods shall be used PM10: EPA method 5 (front half and back half), NOx: EPA Method 7E or 20, CO: EPA method 10 or 10B, O2: EPA Method 3, 3A, or 20, VOC: EPA method 18 or 25, ammonia: BAAQMD ST-1B, and fuel gas sulfur content: ASTM D3246. 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, 4001, 4703, and PSD Permit (SJ 99-03) X.C.2] Federally Enforceable Through Title V Permit

30. The permittee shall maintain hourly records of NOx, CO, and ammonia emission concentrations (ppmv @ 15% O2), and hourly, daily, and twelve month rolling average records of NOx and CO emissions. Compliance with the hourly, daily, and twelve month rolling average VOC emission limits shall be demonstrated by the CO CEM data and the VOC/CO relationship determined by annual CO and VOC source tests. [District Rule 2201] Federally Enforceable Through Title V Permit

31. The permittee shall maintain records of SOx lb/hr, lb/day, and lb/twelve month rolling average emission. SOx emissions shall be based on fuel use records, natural gas sulfur content, and mass balance calculations. [District Rule 2201 and PSD Permit (SJ 99-03) X.K] Federally Enforceable Through Title V Permit

PERMIT UNIT REQUIREMENTS CONTINUE ON NEXT PAGE

32. Permittee shall maintain the following records for the GTE: occurrence, duration, and type of any startup, shutdown, or malfunction; performance testing; emission measurements; total daily and rolling twelve month average hours of operation; hourly quantity of fuel used and gross three hour average operating load. [District Rules 2201 & 4703] Federally Enforceable Through Title V Permit

33. Permittee shall maintain the following records for the continuous emissions monitoring system (CEMS): performance testing, evaluations, calibrations, checks, maintenance, adjustments, and any period during which a CEMS was inoperative. [District Rules 2201 & 4703, and PSD Permit (SJ 99-03) X.I.1] Federally Enforceable Through Title V Permit

34. Permittee shall provide notification and record keeping as required under 40 CFR, Part 60, Subpart A, 60.7. [District Rule 4001] Federally Enforceable Through Title V Permit

35. All records required to be maintained by this permit shall be maintained for a period of five years and shall be made readily available for District inspection upon request. [District Rule 2201] Federally Enforceable Through Title V Permit

36. 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] Federally Enforceable Through Title V Permit

37. Audits of continuous emission monitors shall be conducted quarterly, except during quarters in which relative accuracy and total accuracy testing is performed, in accordance with EPA guidelines. The District shall be notified prior to completion of the audits. Audit reports shall be submitted along with quarterly compliance reports to the District. [District Rule 1080] Federally Enforceable Through Title V Permit

38. 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] Federally Enforceable Through Title V Permit

39. The permittee shall submit a written report to the APCO for each calendar quarter, within 30 days of the end of the quarter, including: time intervals, data and magnitude of excess emissions, nature and cause of excess (if known), corrective actions taken and preventive measures adopted; averaging period used for data reporting shall correspond to the averaging period for each respective emission standard; applicable time and date of each period during which the CEM was inoperative (except for zero and span checks) and the nature of system repairs and adjustments; and a negative declaration when no excess emissions occurred. [District Rule 1080 and PSD Permit (SJ 99-03) X.I.3] Federally Enforceable Through Title V Permit

40. The combined annual emissions rate from all three CTGs and emergency engines S-3636-7-4 & -12-1, based on 12-month rolling average, must not exceed 344,485 lbs NOx and 1,140,000 lbs CO. [PSD Permit (SJ 99-03) X.D & .E] Federally Enforceable Through Title V Permit

41. The annual SOx emissions from each CTG, based on 12-month rolling average, must not exceed 28,170 lbs. [PSD Permit (SJ 99-03) X.F] Federally Enforceable Through Title V Permit

42. During the hot startup of any CTG, the combined emissions from any one CTG and HRSG exhausts must not exceed 107 lbs of NOx or 903 lbs of CO in any one hour. Hot startup means a startup when the combustion turbine has been in operation during the preceding 8 hours and duration of hot start-ups shall not exceed 1 hour. [PSD Permit (SJ 99-03) X.G.1] Federally Enforceable Through Title V Permit

43. During the warm startup of any CTG, the combined emissions from any one CTG and HRSG exhausts must not exceed 119 lbs of NOx or 1021 lbs of CO in any one hour. Warm startup means a startup that is not a hot or cold startup and duration of warm startups shall not exceed 2.5 hours. [PSD Permit (SJ 99-03) X.G.1] Federally Enforceable Through Title V Permit

44. During the Shutdown of any CTG, the combined emissions from any one CTG and HRSG exhausts must not exceed 58.5 lbs of NOx or 222.5 lbs of CO in any one hour. Shutdown shall be defined as the period beginning with the lowering of equipment from base load and lasting until fuel flow is completely off and combustion has ceased and duration of shutdowns shall not exceed one half hour. [PSD Permit (SJ 99-03) X.G.1] Federally Enforceable Through Title V Permit

PERMIT UNIT REQUIREMENTS CONTINUE ON NEXT PAGE

45. Total number of start-ups and shut-downs for the facility shall not exceed 674 events per year. [PSD Permit (SJ 99-03) X.G.6] Federally Enforceable Through Title V Permit

46. Any excess emission indicated by the CEM system must be considered a violation of the applicable emission limit in the PSD permit. [PSD Permit (SJ 99-03) X.I.4] Federally Enforceable Through Title V Permit

47. The quality assurance project plan used by the Permittee for the certification and operation of the continuous emissions monitors, which meets the requirements of 40 CFR Part 60, Appendix F, must be available upon request to EPA. [PSD Permit (SJ 99-03) X.I.5] Federally Enforceable Through Title V Permit

# San Joaquin Valley
# Air Pollution Control District

**PERMIT UNIT:** S-3636-4-4 **EXPIRATION DATE:** 02/29/2016

**EQUIPMENT DESCRIPTION:**
FORCED DRAFT COOLING TOWER WITH 8 CELLS AND HIGH EFFICIENCY DRIFT ELIMINATOR

## PERMIT UNIT REQUIREMENTS

1. Permittee shall maintain and make available to the District upon request vendor supplied justification for the correction factor used to correlate blowdown TDS to drift TDS and correct for the amount of drift that stays suspended in the atmosphere. Correction factor is used in the equation below to calculate cooling tower PM10 emissions rate. [District Rule 2201] Federally Enforceable Through Title V Permit
2. No hexavalent chromium containing compounds shall be added to cooling tower circulating water. [District Rule 7012 and 40 CFR 63.402] Federally Enforceable Through Title V Permit
3. Drift eliminator drift rate shall not exceed 0.0005%. [District Rule 2201] Federally Enforceable Through Title V Permit
4. PM10 emission rate shall not exceed 22.1 lb/day. [District Rule 2201] Federally Enforceable Through Title V Permit
5. Compliance with the PM10 daily emission limit shall be demonstrated as follows: PM10 lb/day = circulating water recirculation rate x total dissolved solids concentration in the blowdown water x design drift rate x correction factor. [District Rule 2201] Federally Enforceable Through Title V Permit
6. Compliance with PM10 emission limit shall be determined by blowdown water sample analysis by independent laboratory at least weekly. [District Rule 1081] Federally Enforceable Through Title V Permit

# San Joaquin Valley
# Air Pollution Control District

**PERMIT UNIT:** S-3636-5-4 **EXPIRATION DATE:** 02/29/2016

**EQUIPMENT DESCRIPTION:**
4 CELL FORCED DRAFT COOLING TOWER WITH HIGH EFFICIENCY CELLULAR DRIFT ELIMINATOR

## PERMIT UNIT REQUIREMENTS

1. Permittee shall maintain and make available to the District upon request vendor supplied justification for the correction factor used to correlate blowdown TDS to drift TDS and correct for the amount of drift that stays suspended in the atmosphere. Correction factor is used in the equation below to calculate cooling tower PM10 emissions rate. [District Rule 2201] Federally Enforceable Through Title V Permit
2. No hexavalent chromium containing compounds shall be added to cooling tower circulating water. [District Rule 7012 and 40 CFR 63.402] Federally Enforceable Through Title V Permit
3. Drift eliminator drift rate shall not exceed 0.0005%. [District Rule 2201] Federally Enforceable Through Title V Permit
4. PM10 emission rate shall not exceed 11.1 lb/day. [District Rule 2201] Federally Enforceable Through Title V Permit
5. Compliance with the PM10 daily emission limit shall be demonstrated as follows: PM10 lb/day = circulating water recirculation rate * total dissolved solids concentration in the blowdown water * design drift rate * correction factor. [District Rule 2201] Federally Enforceable Through Title V Permit
6. Compliance with PM10 emission limit shall be determined by blowdown water sample analysis by independent laboratory at least weekly. [District Rule 1081] Federally Enforceable Through Title V Permit

**PERMIT UNIT:** S-3636-7-4 **EXPIRATION DATE:** 02/29/2016

**EQUIPMENT DESCRIPTION:**
814 HP CATERPILLAR MODEL G3512 SC TA NATURAL GAS FIRED IC ENGINE DRIVING AN EMERGENCY ELECTRICAL GENERATOR WITH THREE-WAY EXHAUST CATALYST

# PERMIT UNIT REQUIREMENTS

1. Particulate matter emissions shall not exceed 0.1 grains/dscf in concentration. [District Rule 4201] Federally Enforceable Through Title V Permit
2. The sulfur content of the natural gas fuel shall not exceed 0.75 grain/100 scf. [District Rule 2201 and PSD Permit (SJ 99-03) X.K] Federally Enforceable Through Title V Permit
3. Emissions from this IC engine shall not exceed any of the following limits: 1.84 lb NOx/hr, 3.62 lb CO/hr, 0.11 lb PM10/hr or 0.23 lb VOC/hr. [District Rules 2201] Federally Enforceable Through Title V Permit
4. This engine shall be equipped with either a positive crankcase ventilation (PCV) system that recirculates crankcase emissions into the air intake system for combustion, or a crankcase emissions control device of at least 90% control efficiency. [District Rule 2201] Federally Enforceable Through Title V Permit
5. This engine shall be equipped with a nonresettable elapsed operating time meter. [District Rules 4702 and 40 CFR 63 Subpart ZZZZ] Federally Enforceable Through Title V Permit
6. This engine shall be operated and maintained in proper operating condition as recommended by the engine manufacturer or emissions control system manufacturer. [District Rule 4702 and 40 CFR 63 Subpart ZZZZ] Federally Enforceable Through Title V Permit
7. This engine shall be operated only for maintenance, testing, and required regulatory purposes, and during emergency situations. Operation of the engine for maintenance, testing, and required regulatory purposes shall not exceed 100 hours per year, as determined by an operational nonresettable elapsed operating time meter. [District Rule 2201, 4702, PSD Permit (SJ 99-03) X.L.2, and 40 CFR 63 Subpart ZZZZ] Federally Enforceable Through Title V Permit
8. An emergency situation is an unscheduled electrical power outage caused by sudden and reasonably unforeseen natural disasters or sudden and reasonably unforeseen events beyond the control of the permittee. [District Rule 4702] Federally Enforceable Through Title V Permit
9. This engine shall not be used to produce power for the electrical distribution system, as part of a voluntary utility demand reduction program, or for an interruptible power contract. The engines shall not be used to increase the quantity of electricity generated for sale. [District Rule 4702 and PSD Permit (SJ 99-03) X.L.2] Federally Enforceable Through Title V Permit
10. During periods of maintenance, testing, and required regulatory purposes, the permittee shall monitor the operational characteristics of the engine as recommended by the manufacturer or emission control system supplier (e.g. oil pressure, exhaust gas temperature, etc.). [District Rule 4702] Federally Enforceable Through Title V Permit

PERMIT UNIT REQUIREMENTS CONTINUE ON NEXT PAGE

11. The permittee shall maintain records of hours of emergency and non-emergency operation. Records shall include the date, the number of hours of operation, the purpose of the operation (e.g., load testing, weekly testing, rolling blackout, general area power outage, etc.), the type of fuel used, and records of operational characteristics monitoring. Such records shall be retained on-site for a period of at least five years and made available for District inspection upon request. [District Rules 4702 and and 40 CFR 63 Subpart ZZZZ] Federally Enforceable Through Title V Permit
12. All records shall be maintained and retained on-site for a minimum of five (5) years, and shall be made available for District inspection upon request. [District Rule 4702] Federally Enforceable Through Title V Permit
13. This engine shall be equipped with a three-way catalyst. [PSD Permit (SJ 99-03) X.L.5] Federally Enforceable Through Title V Permit
14. The facility shall not operate the engine during start-up or shut-down of a turbine, except during emergency situations. [PSD Permit (SJ 99-03) X.L.3] Federally Enforceable Through Title V Permit
15. Effective October 19, 2013, The permittee shall change oil and filter every 500 hours of operation or annually, whichever comes first; inspect air cleaner every 1,000 hours of operation or annually, whichever comes first; and inspect all hoses and belts every 500 hours of operation or annually, whichever comes first, and replace as necessary. [40 CFR Part 63.6603(a)] Federally Enforceable Through Title V Permit

# San Joaquin Valley
# Air Pollution Control District

**PERMIT UNIT:** S-3636-12-1 **EXPIRATION DATE:** 02/29/2016

**EQUIPMENT DESCRIPTION:**

360 HP JOHN DEERE COMPANY MODEL JW6H-UF-60 DIESEL-FIRED EMERGENCY IC ENGINE POWERING A FIRE WATER PUMP

## PERMIT UNIT REQUIREMENTS

1. 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]
2. Particulate matter emissions shall not exceed 0.1 grains/dscf in concentration. [District Rule 4201] Federally Enforceable Through Title V Permit
3. Only CARB certified diesel fuel containing not more than 0.0015% sulfur by weight is to be used. [District Rules 2201 and 4801, and 17 CCR 93115] Federally Enforceable Through Title V Permit
4. Emissions from this engine shall not exceed any of the following limits: 5.6 g-NOx/hp-hr, 0.29 g-CO/hp-hr or 0.11 g-VOC/hp-hr. [District Rule 2201] Federally Enforceable Through Title V Permit
5. The PM10 emissions rate shall not exceed 0.07 g/hp-hr based on US EPA certification using ISO 8178 test procedure. [District Rule 2201 and District Rule 4102] Federally Enforceable Through Title V Permit
6. This engine shall be equipped with an operational non-resettable elapsed time meter or other APCO approved alternative. [District Rule 4702] Federally Enforceable Through Title V Permit
7. This engine shall be operated and maintained in proper operating condition as recommended by the engine manufacturer or emissions control system supplier. [District Rule 4702 and 40 CFR 63 Subpart ZZZZ] Federally Enforceable Through Title V Permit
8. This engine shall be operated only for testing and maintenance of the engine, required regulatory purposes, and during emergency situations. For testing purposes, the engine shall only be operated the number of hours necessary to comply with the testing requirements of the National Fire Protection Association (NFPA) 25 - "Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems", 1998 edition. Total hours of operation for all maintenance, testing, and required regulatory purposes shall not exceed 100 hours per calendar year. [District Rule 4702, 17 CCR 93115, PSD Permit (SJ 99-03) X.L.2, and 40 CFR 63 Subpart ZZZZ] Federally Enforceable Through Title V Permit
9. An emergency situation is an unscheduled event caused by sudden and reasonably unforeseen natural disasters or sudden and reasonably unforeseen events beyond the control of the permittee. [District Rule 4702] Federally Enforceable Through Title V Permit
10. The permittee shall maintain monthly records of emergency and non-emergency operation. Records shall include the number of hours of emergency operation, the date and number of hours of all testing and maintenance operations, and the purpose of the operation (for example: load testing, weekly testing, emergency fire fighting, etc.). For units with automated testing systems, the operator may, as an alternative to keeping records of actual operation for testing purposes, maintain a readily accessible written record of the automated testing schedule. [District Rule 4702, 17 CCR 93115, and 40 CFR 63 Subpart ZZZZ] Federally Enforceable Through Title V Permit

PERMIT UNIT REQUIREMENTS CONTINUE ON NEXT PAGE

11. All records shall be maintained and retained on-site for a minimum of five (5) years, and shall be made available for District inspection upon request. [District Rule 4702 and 17 CCR 93115] Federally Enforceable Through Title V Permit

12. The diesel fire pump engine shall be equipped with a turbocharger and intercooler/aftercooler. [PSD Permit (SJ 99-03) X.L.4] Federally Enforceable Through Title V Permit

13. The facility shall not operate the engine during start-up or shut-down of a turbine, except during emergency situations. [PSD Permit (SJ 99-03) X.L.3] Federally Enforceable Through Title V Permit

14. Effective May 3, 2013, The permittee shall change oil and filter every 500 hours of operation or annually, whichever comes first; inspect air cleaner every 1,000 hours of operation or annually, whichever comes first; and inspect all hoses and belts every 500 hours of operation or annually, whichever comes first, and replace as necessary. [40 CFR Part 63.6603(a)] Federally Enforceable Through Title V Permit

# San Joaquin Valley
# Air Pollution Control District

**PERMIT UNIT:** S-3636-13-1 **EXPIRATION DATE:** 02/29/2016

**EQUIPMENT DESCRIPTION:**
CONFINED ABRASIVE BLASTING OPERATION WITH A 50 LB ECONOLINE ABRASIVE PRODUCTS RA 60 X 48 CB BLASTING UNIT SERVED BY A ECONOLINE ABRASIVE PRODUCTS RA 400-60 DUST COLLECTOR

## PERMIT UNIT REQUIREMENTS

1. The blasting operations shall be carried out in a manner to prevent any nuisances. [District Rule 4102]
2. All abrasive blasting shall be conducted in accordance with California Code of Regulations Title 17, Subchapter 6, Sections 92000 through 92540. [92000 through 92540 CCR]
3. A used certified abrasive shall not be considered certified for reuse unless the abrasive conforms to its original cut-point fineness. [92530 CCR]
4. Abrasive blasting operations conducted within a permanent building shall not discharge air contaminants into the atmosphere for a period or periods aggregating more than three minutes in any one hour which is as dark or darker than Ringelmann 1 or equivalent to 20% opacity. [92200 CCR]

APPENDIX 3.1B

# Ambient Air Quality Modeling Analysis

**APPENDIX 3.1B**

# Ambient Air Quality Modeling Analysis

The following tables and figures are provided in this appendix:

## One-Hour Average $NO_2$ Modeling Procedures

The comparison of modeled one-hour average $NO_2$ impacts with the federal standard was done in accordance with Appendix W of Part 51 of Title 40 of the CFR "Guideline on Air Quality Models," the tiered process developed by "Modeling Compliance of the Federal 1-Hour $NO_2$ NAAQS" (CAPCOA guidance document, 2011),[1] and recent EPA guidance.[2]

Appendix W of Part 51 of Title 40 of the CFR "Guideline on Air Quality Models" has codified three methods that can be used to estimate $NO_2$ concentration (Tier 1 - Total Conversion, Tier 2 - Ambient Ratio Method or ARM, Tier 3 - Ozone Limiting Method or OLM). According to U.S. EPA guidance,

> *Appendix W discusses the use of OLM and PVMRM as Tier 3 methods for point sources and though much of the historical documentation for these Tier 3 methods mentions only point sources, the EPA supports the usage of both Tier 3 methods for non-point sources, as discussed below and in U.S. EPA, 2011.*[3]

The in-stack $NO_2$/NOx ratios are discussed in Section 3.1.2.7 (for construction equipment) and Section 3.1.2.8 (for the gas turbines and auxiliary boilers). Background ozone and existing $NO_2$ concentrations in the project area were represented by five years of data (2009-2013) collected at the Edison monitoring station.[4] The Edison ozone and $NO_2$ monitor is 43 km from the project and provides the most representative and current data for the ambient conditions at the project site.

For demonstrating compliance with the statistically based federal one-hour $NO_2$ standard, CAPCOA's 2011 guidance document provides 11 progressively more sophisticated methods for combining modeled $NO_2$ concentrations with background (or monitored) $NO_2$. These methods, outlined below, were developed to allow demonstration of compliance using the lowest amount of resources necessary. Each tier is a progressively more sophisticated and comprehensive analysis that reduces the level of conservatism without reducing the assurance of compliance.

1. Significant Impact Level (SIL) – no background required
2. Max modeled value + max monitored value
3. Max modeled value + $98^{th}$ pctl monitored value
4. $8^{th}$ highest modeled value + max monitored value

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[1] "This modeling protocol is meant to define the stepwise approach necessary to satisfy the requirements in General Guidance for Implementing the 1-Hour $NO_2$ National Ambient Air Quality Standard in Prevention of Significant Deterioration Permits, Including an Interim $NO_2$ Significant Impact Level and the Applicability of Appendix W Modeling Guidance for 1-Hour $NO_2$ National Ambient Air Quality Standard. Nothing in this protocol should be taken as overriding guidance contained in those two memoranda, or Appendix W of Part 51 of Title 40 of the Code of Federal Regulations (40 CFR 51, Appendix W)." (SJVAPCD, 2010b).

[2] "Clarification on the Use of AERMOD Dispersion Modeling for Demonstrating Compliance with the $NO_2$ National Ambient Air Quality Standard," (September, 2014) [*http://www.epa.gov/scram001/guidance/clarification/NO2_Clarification_Memo-20140930.pdf*] The Plume Volume Molar Ratio Method (PVMRM) is considered by EPA to be a Tier 3 screening method, similar to OLM.

[3] Ibid.

[4] The selection of the representative monitoring location for ozone and $NO_2$ is discussed in Air Quality Section 3.1.1.4.

5. 8th highest modeled value + 98th pctl monitored value
6. (5 yr avg of 98th pctl modeled value) + max monitored value
7. (5 yr avg of 98th pctl of modeled value) + 98th pctl monitored value
8. 5 yr avg of 98th pctl of (modeled value + monthly hour-of-day – 1st high)
9. 5 yr avg of 98th pctl of (modeled value + seasonal hour-of-day – 3rd high)
10. 5 yr average of 98th pctl of (modeled value + annual hour-of-day - 8th high)
11. Paired-Sum: 5 yr avg of 98th pctl of (modeled value + background)

Applicable definitions are provided below.

- **Significant Impact Level (SIL)** is defined as a de minimis impact level below which a source is presumed not to cause or contribute to an exceedance of a NAAQS (see Table 3.1-1).
- **Max modeled value** is defined as the maximum concentration predicted by the model at any given receptor in any given year modeled.
- **8th highest modeled value** is defined as the highest 8th highest concentration derived by the model at any given receptor in any given year modeled.
- **5 yr avg of the 98th pctl** is defined as the highest of the average 8th highest (98th percentile) concentrations derived by the model across all receptors based on the length of the meteorological data period, or the X years average of 98th percentile of the annual distribution of daily maximum one-hour concentrations across all receptors, where X is the number of years modeled. (In Appendix W, EPA recommends using five years of meteorological data from a representative National Weather Service site or one year of on-site data.)
- **Monthly hour-of-day** is defined as the three-year average of the 1st highest concentrations (Maximum Hourly) for each hour of the day.[5]
- **Seasonal Hour-Of-Day** is defined as the three-year average of the 3rd highest concentrations for each hour of the day and season.
- **Annual hour-of-day** is defined as the three-year average of the 8th highest concentration for each hour of the day.
- **Paired-Sum (**5 yr avg of the 98th pctl) is the merging of the modeled concentration with the monitored values paired together by month, day, and hour. The sum of the paired values are then processed to determine the X years average of 98th percentile of the annual distribution of daily maximum one-hour concentrations across all receptors, where X is the number of years modeled.[6]

The monthly hour-of-day and paired-sum tiers were used in this analysis. The paired-sum approach is the least conservative procedure and was used as a refined modeling technique only

[5] The monthly hour-of-day approach used in this analysis uses 5 years (2009-2013) of average monthly hour-of-day ozone data (for OLM correction) and 3 years (2011-2013) of average monthly hour-of-day $NO_2$ (for $NO_2$ background), all from the Edison monitoring station.

[6] The paired sum approach used in this analysis uses 5 years (2009-2013) of concurrent ambient ozone and $NO_2$ data from the Edison monitoring station.

for demonstrating compliance with the federal one-hour $NO_2$ standard when all three gas turbines are in startup during a single hour.

### 24-Hour Average $PM_{2.5}$ Modeling

The District's draft October 2011 guidance and EPA's May 2014 guidance was followed for modeling $PM_{2.5}$ impacts of the proposed project.[7] The existing PEF is a major $PM_{2.5}$ source—that is, permitted $PM_{2.5}$ emissions exceed 100 tons per year. Because the proposed project results in a $PM_{2.5}$ emissions increase of less than 10 tons per year, it is a minor $PM_{2.5}$ modification and only primary $PM_{2.5}$ is required to be modeled.

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[7] District guidance available at http://www.valleyair.org/busind/pto/Tox_Resources/DraftPM25ModelingProcedures10-4-11.pdf; EPA guidance available at http://www.epa.gov/scram001/guidance/guide/Guidance_for_PM25_Permit_Modeling.pdf.

**Table 3.1B-1**
**PEF Amendment**
**Dimensions of On-Site Structures**

| Feature | Height (feet) | Length (feet) | Width (feet) | Diameter (feet) |
|---|---|---|---|---|
| **New Structures** | | | | |
| Auxiliary Boilers (2 units) | 13.0 | 53.0 | 28.0 | -- |
| Auxiliary Boiler Stacks (2 units) | 60.0 | -- | -- | 4.4 |
| Deaerator | 24.0 | 18.0 | 9.0 | -- |
| **Existing Structures** | | | | |
| Existing CTGs (3 units) | | | | |
| Combustion turbines & generators (base unit) | 20.0 | 231.9 | 69.5 | -- |
| HRSGs | 78.0 | 66.9 | 65.9 | -- |
| CTG stacks | 150.0 | -- | -- | 18.0 |
| Cooling Tower (east) | 42.0 | 419.1 | 71.1 | -- |
| Cooling Tower (west) | 42.0 | 214.2 | 69.5 | -- |
| Steam Turbine (3 units) | 40.0 | 100.6 | 36.3 | -- |
| Water Treatment Bldg | 38.0 | 117.8 | 80.9 | -- |
| Electrical Equipment Bldg | 38.0 | 107.9 | 63.3 | |
| Administration Bldg | 38.0 | 148.9 | 98.6 | -- |
| STG/Cooling Tower Electrical Eqt Bldg (2) | 20.0 | 62.8 | 29.0 | |
| ZLD Building | 20.0 | 78.3 | 69.0 | -- |
| Ammonia Storage Tanks | 10.0 | 83.0 | 32.7 | -- |
| CEMS Enclosures | 10.0 | 36.3 | 15.6 | -- |
| Tanks | | | | |
| Demineralized Water Tank | 40.0 | -- | -- | 59.1 |
| Raw Water Tank | 37.0 | -- | -- | 65.4 |
| Equalization Tank | 40.0 | -- | -- | 46.7 |
| HERO Waste Tank | 40.0 | -- | -- | 46.7 |
| NaZ Tank | 26.0 | -- | -- | 46.7 |
| WAC Waste Tank | 24.0 | -- | -- | 46.7 |
| Reactor/Clarifier | 20.0 | -- | -- | 91.3 |
| Clearwell | 20.0 | -- | -- | 41.5 |

**Table 3.1B-2**
**PEF Amendment**
**Emission Rates and Stack Parameters for the Modified Facility**

| | Stack Diam, m | Stack Height, m | Exh Temp, Deg K | Exhaust Flow, m3/s | Exhaust Velocity, m/s | Emission Rates, g/s | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | NOx | SO2 | CO | PM10 |
| One-Hour Averaging Period: normal operations | | | | | | | | | |
| Aux Boiler 1 | 1.346 | 18.288 | 421.889 | 13.43 | 9.434 | 0.069 | 0.024 | 0.428 | -- |
| Aux Boiler 2 | 1.346 | 18.288 | 421.889 | 13.43 | 9.434 | 0.069 | 0.024 | 0.428 | -- |
| Turbine 1/HRSG | 5.486 | 45.720 | 364.278 | 520.09 | 21.999 | 2.146 | 0.440 | 3.140 | -- |
| Turbine 2/HRSG | 5.486 | 45.720 | 364.278 | 520.09 | 21.999 | 2.146 | 0.440 | 3.140 | -- |
| Turbine 3/HRSG | 5.486 | 45.720 | 364.278 | 520.09 | 21.999 | 2.146 | 0.440 | 3.140 | -- |
| Emergency Gen. | 0.305 | 7.620 | 660.889 | 2.00 | 27.39 | 0.232 | 0.002 | 0.456 | -- |
| Fire Pump Engine | 0.152 | 6.096 | 727.589 | 0.93 | 50.921 | 0.560 | 0.017 | 0.029 | -- |
| Three-Hour Averaging Period | | | | | | | | | |
| Aux Boiler 1 | 1.346 | 18.288 | 421.889 | 13.43 | 9.434 | -- | 0.024 | -- | -- |
| Aux Boiler 2 | 1.346 | 18.288 | 421.889 | 13.43 | 9.434 | -- | 0.024 | -- | -- |
| Turbine 1/HRSG | 5.486 | 45.720 | 364.278 | 520.09 | 21.999 | -- | 0.440 | -- | -- |
| Turbine 2/HRSG | 5.486 | 45.720 | 364.278 | 520.09 | 21.999 | -- | 0.440 | -- | -- |
| Turbine 3/HRSG | 5.486 | 45.720 | 364.278 | 520.09 | 21.999 | -- | 0.440 | -- | -- |
| Emergency Gen. | 0.305 | 7.620 | 660.889 | 2.00 | 27.392 | -- | 5.880E-04 | -- | -- |
| Fire Pump Engine | 0.152 | 6.096 | 727.589 | 0.93 | 50.921 | -- | 5.700E-03 | -- | -- |
| Eight-Hour Averaging Period: normal operations (includes boiler startup) | | | | | | | | | |
| Aux Boiler 1 | 1.346 | 18.288 | 421.889 | 13.43 | 9.434 | -- | -- | 0.428 | -- |
| Aux Boiler 2 | 1.346 | 18.288 | 421.889 | 13.43 | 9.434 | -- | -- | 0.428 | -- |
| Turbine 1/HRSG | 5.486 | 45.720 | 364.278 | 520.09 | 21.999 | -- | -- | 3.140 | -- |
| Turbine 2/HRSG | 5.486 | 45.720 | 364.278 | 520.09 | 21.999 | -- | -- | 3.140 | -- |
| Turbine 3/HRSG | 5.486 | 45.720 | 364.278 | 520.09 | 21.999 | -- | -- | 3.140 | -- |
| Emergency Gen. | 0.305 | 7.620 | 660.889 | 2.00 | 27.392 | -- | -- | 4.561E-01 | -- |
| Fire Pump Engine | 0.152 | 6.096 | 727.589 | 0.93 | 50.921 | -- | -- | 2.900E-02 | -- |
| 24-Hour Averaging Period | | | | | | | | | |
| Aux Boiler 1 | 1.346 | 18.288 | 421.889 | 13.43 | 9.434 | -- | 0.024 | -- | 0.081 |
| Aux Boiler 2 | 1.346 | 18.288 | 421.889 | 13.43 | 9.434 | -- | 0.024 | -- | 0.081 |
| Turbine 1/HRSG | 5.486 | 45.720 | 364.278 | 520.09 | 21.999 | -- | 0.440 | -- | 1.134 |
| Turbine 2/HRSG | 5.486 | 45.720 | 364.278 | 520.09 | 21.999 | -- | 0.440 | -- | 1.134 |
| Turbine 3/HRSG | 5.486 | 45.720 | 364.278 | 520.09 | 21.999 | -- | 0.440 | -- | 1.134 |
| Emergency Gen. | 0.305 | 7.620 | 660.889 | 2.00 | 27.392 | -- | 7.350E-05 | -- | 6.300E-05 |
| Fire Pump Engine | 0.152 | 6.096 | 727.589 | 0.93 | 50.921 | -- | 7.125E-04 | -- | 2.917E-04 |
| 4-Cell Cooling Tower | 9.144 | 19.507 | 301.678 | 387.94 | 5.907 | -- | -- | -- | 1.460E-02 |
| 8-Cell Cooling Tower | 9.144 | 19.507 | 301.678 | 387.94 | 5.907 | -- | -- | -- | 1.449E-02 |
| Annual Averaging Period | | | | | | | | | |
| Aux Boiler 1 | 1.346 | 18.288 | 421.889 | 13.43 | 9.434 | 0.204 | 0.024 | -- | 0.081 |
| Aux Boiler 2 | 1.346 | 18.288 | 421.889 | 13.43 | 9.434 | 0.204 | 0.024 | -- | 0.081 |
| Turbine 1/HRSG | 5.486 | 45.720 | 364.278 | 520.09 | 21.999 | 1.652 | 0.406 | -- | 1.076 |
| Turbine 2/HRSG | 5.486 | 45.720 | 364.278 | 520.09 | 21.999 | 1.652 | 0.406 | -- | 1.076 |
| Turbine 3/HRSG | 5.486 | 45.720 | 364.278 | 520.09 | 21.999 | 1.652 | 0.406 | -- | 1.076 |
| Emergency Gen. | 0.305 | 7.620 | 660.889 | 2.00 | 27.392 | 5.293E-03 | 4.027E-05 | -- | 3.452E-05 |
| Fire Pump Engine | 0.152 | 6.096 | 727.589 | 0.93 | 50.921 | 6.393E-03 | 1.952E-04 | -- | 7.991E-05 |
| 4-Cell Cooling Tower | 9.144 | 19.507 | 301.678 | 387.94 | 5.907 | -- | -- | -- | 1.46E-02 |
| 8-Cell Cooling Tower | 9.144 | 19.507 | 301.678 | 387.94 | 5.907 | -- | -- | -- | 1.45E-02 |

**Table 3.1B-3**
**PEF Amendment**
**Emission Rates and Stack Parameters for Modeling Startup Impacts**

| | Stack Diam, m | Stack Height, m | Exh Temp, Deg K | Exhaust Flow, m3/s | Exhaust Velocity, m/s | Em Rates, g/s | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | NOx | CO 1-hr | CO 8-hr |
| **One-Hour Average, Gas Turbine Startups** | | | | | | | | |
| Aux Boiler 1 | 1.346 | 18.29 | 421.9 | 13.4 | 9.434 | 0.069 | 0.43 | 0.43 |
| Aux Boiler 2 | 1.346 | 18.29 | 421.9 | 13.4 | 9.434 | 0.069 | 0.43 | 0.43 |
| Turbine 1/HRSG | 5.486 | 45.72 | 351.6 | 323.3 | 13.675 | 16.38 | 155.61 | 60.32 |
| Turbine 2/HRSG | 5.486 | 45.72 | 351.6 | 323.3 | 13.675 | 16.38 | 155.61 | 60.32 |
| Turbine 3/HRSG | 5.486 | 45.72 | 351.6 | 323.3 | 13.675 | 16.38 | 155.61 | 60.32 |
| **One-Hour Average, auxiliary boiler startups** | | | | | | | | |
| Aux Boiler 1 | 1.346 | 18.29 | 421.9 | 6.7 | 4.717 | 1.152 | 0.43 | 0.43 |
| Aux Boiler 2 | 1.346 | 18.29 | 421.9 | 6.7 | 4.717 | 1.152 | 0.43 | 0.43 |
| Turbine 1/HRSG | 5.486 | 45.72 | 364.3 | 520.1 | 21.999 | 2.15 | 3.14 | 3.14 |
| Turbine 2/HRSG | 5.486 | 45.72 | 364.3 | 520.1 | 21.999 | 2.15 | 3.14 | 3.14 |
| Turbine 3/HRSG | 5.486 | 45.72 | 364.3 | 520.1 | 21.999 | 2.15 | 3.14 | 3.14 |

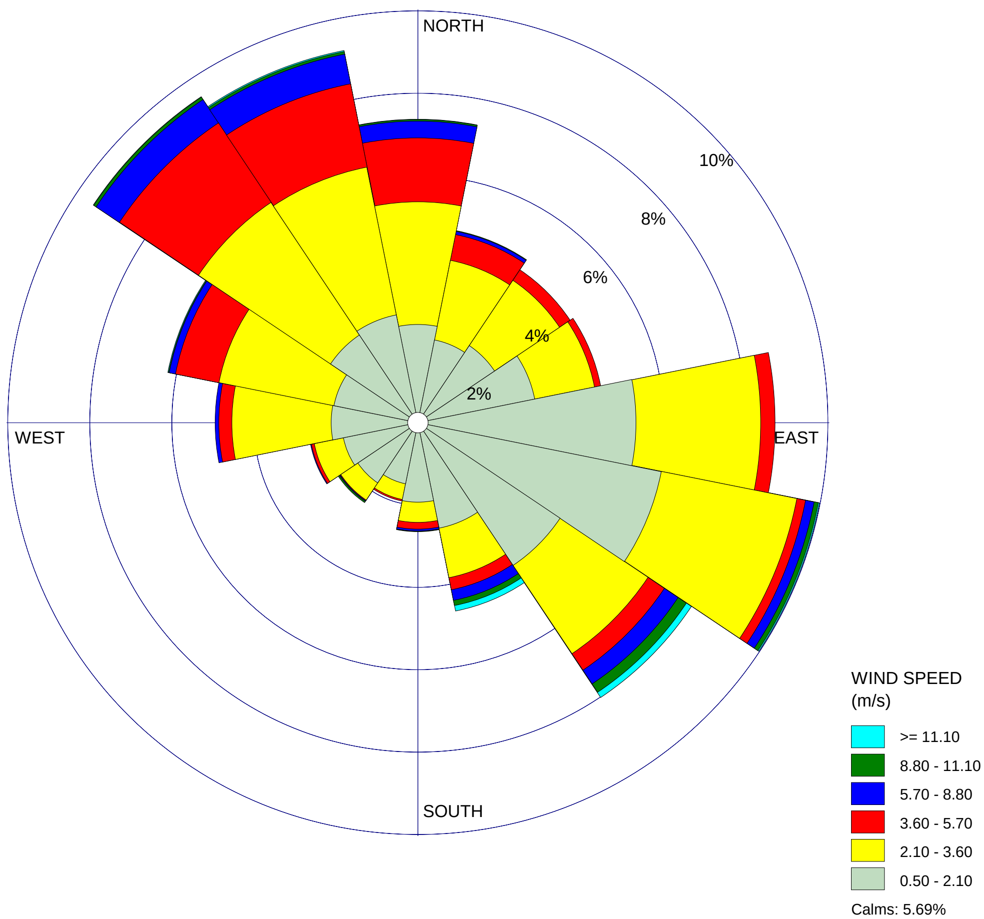
**Table 3.1B-4**
**PEF Amendment**
**Emission Rates and Stack Parameters for Modeling Commissioning Impacts**

| | Stack Diam, m | Stack Height, m | Exh Temp, Deg K | Exhaust Flow, m3/s | Exhaust Velocity, m/s | Em Rates, g/s | |
|---|---|---|---|---|---|---|---|
| | | | | | | NOx | CO |
| **One-Hour Average, Gas Turbines in Startup and Auxiliary Boilers in Commissioning** | | | | | | | |
| Aux Boiler 1 | 1.346 | 18.29 | 421.9 | 6.7 | 4.717 | 1.152 | 0.829 |
| Aux Boiler 2 | 1.346 | 18.29 | 421.9 | 6.7 | 4.717 | 1.152 | 0.829 |
| Turbine 1/HRSG | 5.486 | 45.72 | 351.6 | 323.3 | 13.675 | 16.38 | 155.61 |
| Turbine 2/HRSG | 5.486 | 45.72 | 351.6 | 323.3 | 13.675 | 16.38 | 155.61 |
| Turbine 3/HRSG | 5.486 | 45.72 | 351.6 | 323.3 | 13.675 | 16.38 | 155.61 |
| **Eight-Hour Average, Gas Turbines in Startup and Auxiliary Boilers in Commissioning** | | | | | | | |
| Aux Boiler 1 | 1.346 | 18.29 | 421.9 | 6.7 | 4.717 | -- | 0.829 |
| Aux Boiler 1 | 1.346 | 18.29 | 421.9 | 6.7 | 4.717 | -- | 0.829 |
| Turbine 1/HRSG | 5.486 | 45.72 | 351.6 | 323.3 | 13.675 | -- | 60.32 |
| Turbine 2/HRSG | 5.486 | 45.72 | 351.6 | 323.3 | 13.675 | -- | 60.32 |
| Turbine 3/HRSG | 5.486 | 45.72 | 351.6 | 323.3 | 13.675 | -- | 60.32 |

**Figure 3.1B-1**
**Composite Quarterly and Annual Wind Roses for Bakersfield, CA**
**First Quarter, 2009 – 2013**

WIND ROSE PLOT:
**Bakersfield, 2009~2013**
**First Quarter**

DISPLAY:
**Wind Speed**
**Direction (blowing from)**




COMMENTS:

DATA PERIOD:
**Start Date: 1/1/2009 - 00:00**
**End Date: 3/31/2013 - 23:00**

COMPANY NAME:

MODELER:

CALM WINDS:
**5.69%**

TOTAL COUNT:
**10764 hrs.**

AVG. WIND SPEED:
**2.38 m/s**

DATE:
**10/22/2014**

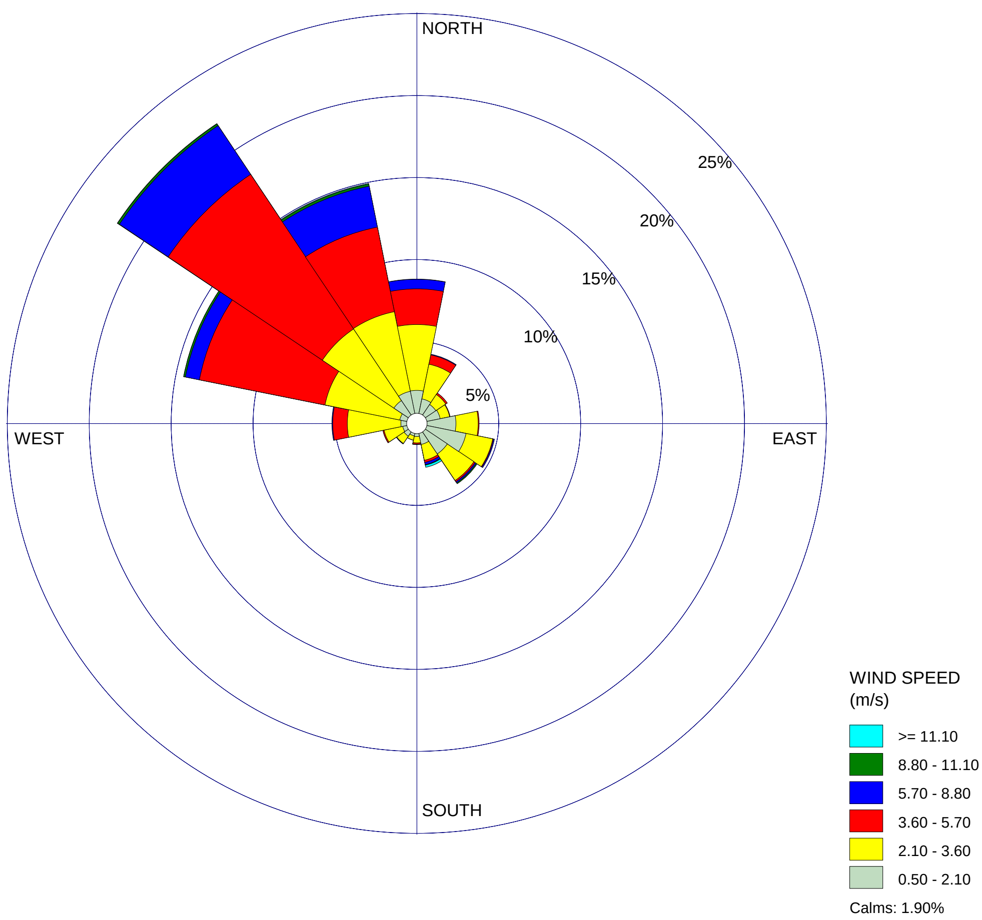
PROJECT NO.:

WRPLOT View - Lakes Environmental Software

**Figure 3.1B-2**
**Composite Quarterly and Annual Wind Roses for Bakersfield, CA**
**Second Quarter, 2009 – 2013**

WIND ROSE PLOT:
**Bakersfield, 2009~2013**
**Second Quarter**

DISPLAY:
**Wind Speed**
**Direction (blowing from)**



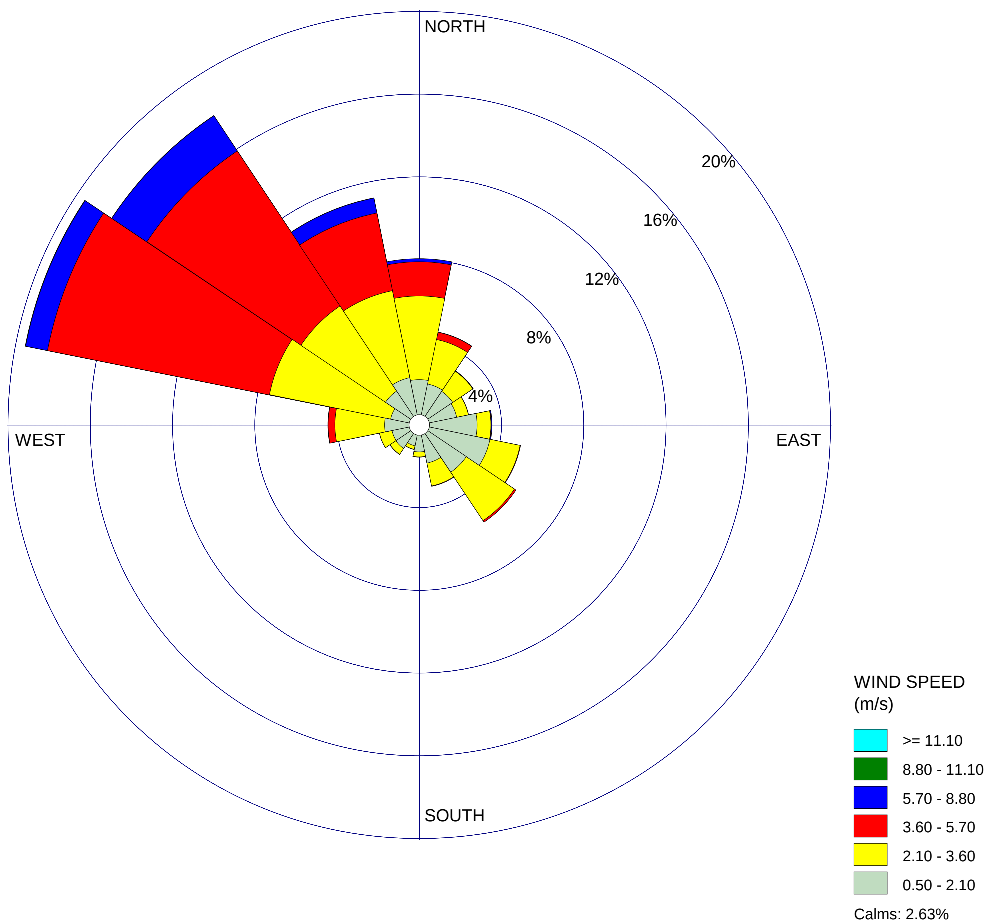

| | | | |
|---|---|---|---|
| COMMENTS: | DATA PERIOD:<br>**Start Date: 4/1/2009 - 00:00**<br>**End Date: 6/30/2013 - 23:00** | COMPANY NAME: | |
| | | MODELER: | |
| | CALM WINDS:<br>**1.90%** | TOTAL COUNT:<br>**10826 hrs.** | |
| | AVG. WIND SPEED:<br>**3.29 m/s** | DATE:<br>**10/22/2014** | PROJECT NO.: |

WRPLOT View - Lakes Environmental Software

**Figure 3.1B-3**
**Composite Quarterly and Annual Wind Roses for Bakersfield, CA**
**Third Quarter, 2009 – 2013**

WIND ROSE PLOT:
**Bakersfield, 2009~2013**
**Third Quarter**

DISPLAY:
**Wind Speed**
**Direction (blowing from)**



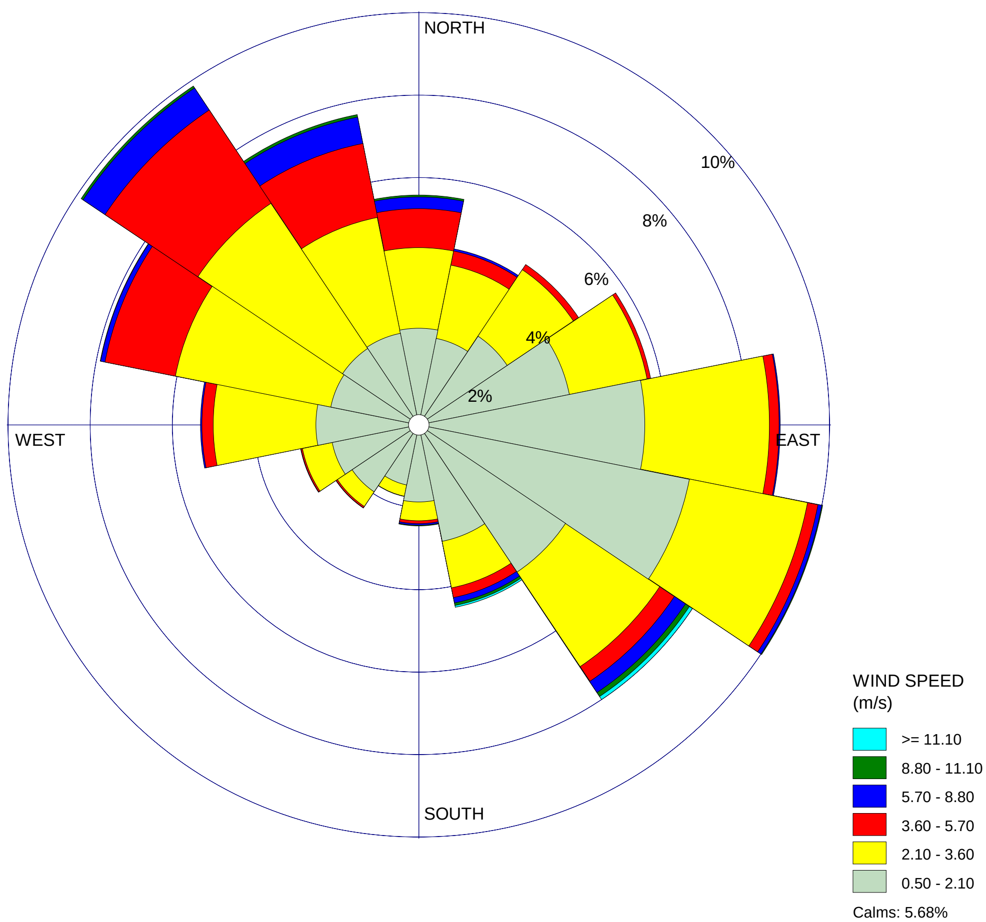

| | | | |
|---|---|---|---|
| COMMENTS: | DATA PERIOD:<br>**Start Date: 7/1/2009 - 00:00**<br>**End Date: 9/30/2013 - 23:00** | COMPANY NAME: | |
| | | MODELER: | |
| | CALM WINDS:<br>**2.63%** | TOTAL COUNT:<br>**10996 hrs.** | |
| | AVG. WIND SPEED:<br>**2.91 m/s** | DATE:<br>**10/22/2014** | PROJECT NO.: |

WRPLOT View - Lakes Environmental Software

**Figure 3.1B-4**
**Composite Quarterly and Annual Wind Roses for Bakersfield, CA**
**Fourth Quarter, 2009 – 2013**

WIND ROSE PLOT:
**Bakersfield, 2009~2013**
**Fourth Quarter**

DISPLAY:
**Wind Speed**
**Direction (blowing from)**




COMMENTS:

DATA PERIOD:
**Start Date: 10/1/2009 - 00:00**
**End Date: 12/31/2013 - 16:00**

COMPANY NAME:

MODELER:

CALM WINDS:
**5.68%**

TOTAL COUNT:
**10955 hrs.**

AVG. WIND SPEED:
**2.24 m/s**

DATE:
**10/22/2014**

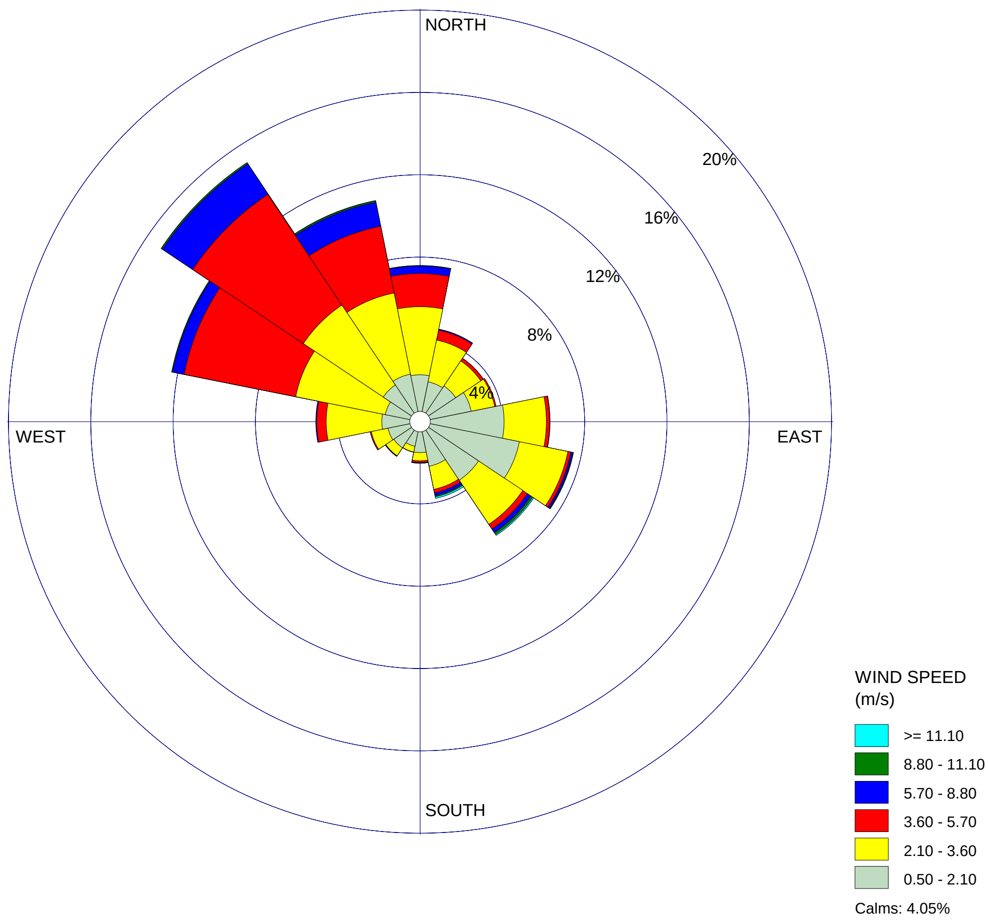
PROJECT NO.:

WRPLOT View - Lakes Environmental Software

**Figure 3.1B-5**
**Composite Quarterly and Annual Wind Roses for Bakersfield, CA**
**Annual, 2009 – 2013**

WIND ROSE PLOT:
**Bakersfield, 2009~2013**
**Annual**

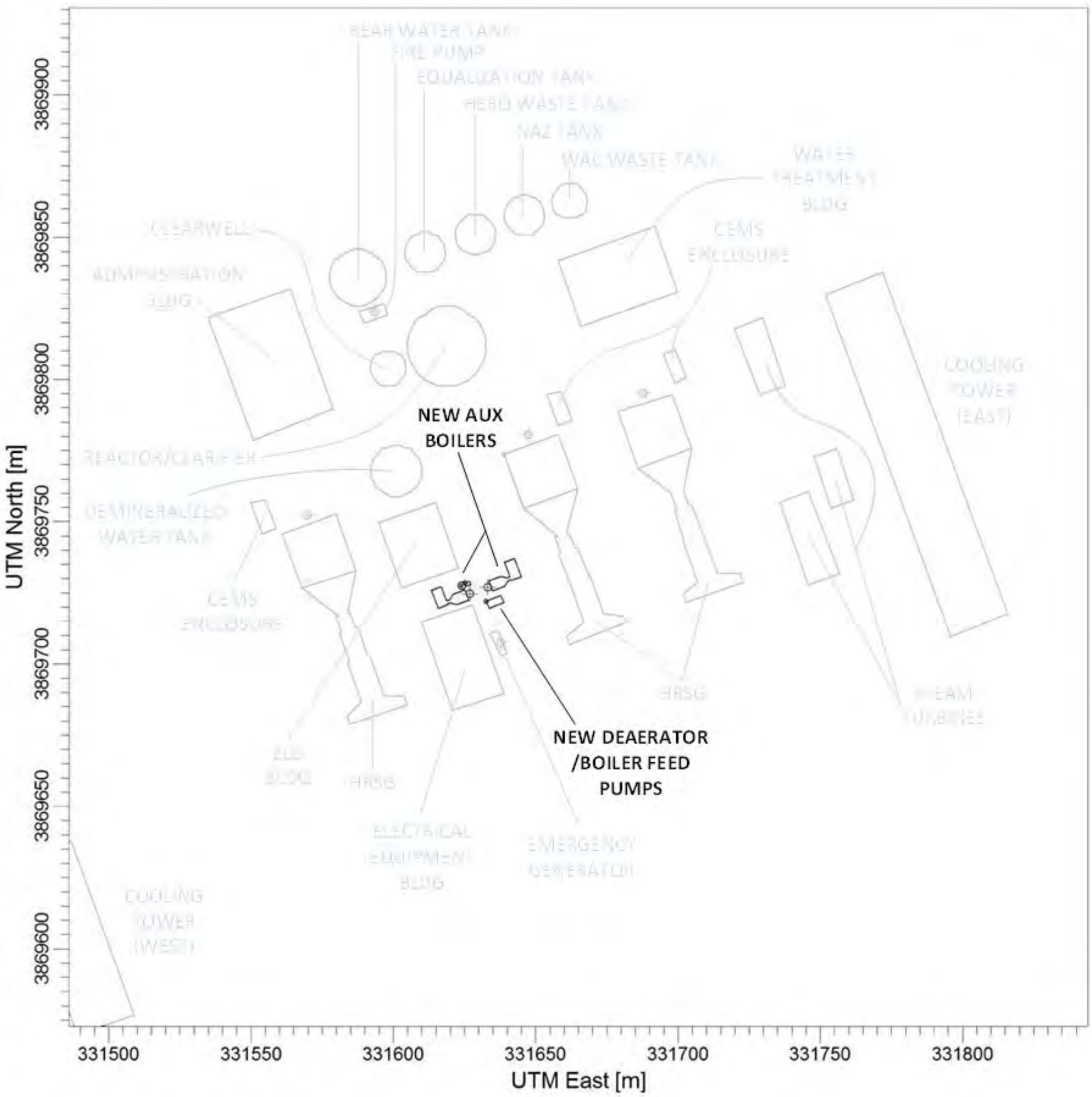
DISPLAY:
**Wind Speed**
**Direction (blowing from)**




| | | | |
|---|---|---|---|
| COMMENTS: | DATA PERIOD:<br>**Start Date: 1/1/2009 - 00:00**<br>**End Date: 12/31/2013 - 16:00** | COMPANY NAME: | |
| | | MODELER: | |
| | CALM WINDS:<br>**4.05%** | TOTAL COUNT:<br>**43541 hrs.** | |
| | AVG. WIND SPEED:<br>**2.70 m/s** | DATE:<br>**10/22/2014** | PROJECT NO.: |

WRPLOT View - Lakes Environmental Software

**Figure 3.1B-6**
**Building Layout for GEP Analysis**



APPENDIX 3.1C

# Construction Impacts

APPENDIX 3.1C

# Construction Impacts

## 3.1C.1 Onsite Construction

The construction of the proposed modifications at PEF is expected to last approximately 7 months. Construction activities will occur in the following main phases:

- Site preparation;
- Foundation work; and
- Construction/installation of auxiliary boilers.

**Construction Activities**

The construction of the proposed modifications will begin with site preparation activities, which include installation of drainage systems, underground utilities and conduits, grading and backfilling operations, and installation of pilings. After site preparation is finished, the construction of the foundations and structures is expected to begin. Once the foundations and structures are finished, installation and assembly of the mechanical and electrical equipment are scheduled to commence.

Fugitive dust emissions from the construction of the project will result from:

- Dust entrained during site preparation and concrete removal at the construction site;
- Dust entrained during onsite travel on paved and unpaved surfaces; and
- Dust entrained during aggregate and soil loading and unloading operations.

Combustion emissions during construction will result from:

- Exhaust from the diesel construction equipment used for site preparation, grading, excavation, trenching, and construction of onsite structures;
- Exhaust from water trucks used to control construction dust emissions;
- Exhaust from portable welding machines;
- Exhaust from pickup trucks and diesel trucks used to transport workers and materials around the construction site;
- Exhaust from diesel trucks used to deliver concrete, fuel, and construction supplies to the construction site; and
- Exhaust from automobiles used by workers to commute to the construction site.

To determine the potential worst-case daily construction impacts, exhaust and dust emission rates have been evaluated for each source of emissions. Maximum short-term impacts are calculated based on the equipment mix expected during Month 1 of the construction schedule.[8] Annual emissions are the total of all emissions during the construction period.

[8] See calculations in Attachment 3.1C-1.

**Linear Facilities**
There are no new offsite linear facilities associated with the proposed project.

### 3.1C.2 Available Mitigation Measures

The following typical mitigation measures are proposed to control exhaust emissions from the diesel heavy equipment and potential emissions of fugitive dust during the construction period.

- Disturbed areas in the project construction site will be watered as frequently as necessary to prevent fugitive dust plumes. The frequency of watering can be reduced or eliminated during periods of precipitation.
- The vehicle speed limit will be 15 miles per hour within the construction site.
- The construction site entrances shall be posted with visible speed limit signs.
- Construction equipment vehicle tires will be inspected and washed as necessary to be cleaned free of dirt prior to entering public roadways.
- Gravel ramps of at least 20 feet in length will be provided at the tire washing/cleaning station.
- Unpaved exits from the construction site will be graveled or treated to prevent track-out to public roadways.
- Construction vehicles will enter the construction site through the treated entrance roadways, unless an alternative route has been submitted to and approved by the Compliance Project Manager.
- Construction areas adjacent to any paved roadway will be provided with sandbags or other measures as specified in the Storm Water Pollution Prevention Plan (SWPPP) to prevent run-off to roadways.
- Paved roads within the construction area will be swept at least twice daily (or less during periods of precipitation) on days when construction activity occurs to prevent the accumulation of dirt and debris.
- At least the first 500 feet of any public roadway exiting from the construction site shall be swept at least twice daily (or less during periods of precipitation) on days when construction activity occurs or on any other day when dirt or runoff from the construction site is visible on public roadways.
- Disturbed areas that remain inactive for longer than 10 days will be covered or treated with appropriate dust suppressant compounds.
- Vehicles used to transport solid bulk material on public roadways and having the potential to cause visible emissions will be provided with a cover, or the materials will be sufficiently wetted and loaded onto the trucks in a manner to provide at least one foot of freeboard.
- Wind erosion control techniques (such as windbreaks, water, chemical dust suppressants, and/or vegetation) will be used on all construction areas that may be disturbed. Any windbreaks installed to comply with this condition shall remain in place until the soil is stabilized or permanently covered with vegetation.

An on-site Air Quality Construction Mitigation Manager will be responsible for directing and documenting compliance with construction-related mitigation conditions.

### 3.1C.3 Estimates of Emissions with Mitigation Measures - Onsite Construction

Tables 3.1C-1 and 3.1C-2 show the estimated maximum daily and total heavy equipment exhaust and fugitive dust emissions for the construction period, with recommended mitigation measures for onsite construction activities.[9] Detailed emission calculations are included as Attachment 3.1C-1.

**Table 3.1C-1**
**Maximum Daily Construction Emissions, Pounds Per Day**

| | NOx | CO | VOC | SOx | $PM_{10}$ | $PM_{2.5}$ |
|---|---|---|---|---|---|---|
| Onsite | | | | | | |
| Construction Equipment | 23.0 | 47.5 | 1.3 | 0.1 | 0.14 | 0.14 |
| Fugitive Dust | -- | -- | -- | -- | <0.01 | <0.01 |
| Offsite | | | | | | |
| Worker Travel, Truck Deliveries[a] | 14.3 | 55.0 | 2.4 | 0.1 | 7.8 | 2.3 |
| Total Emissions | | | | | | |
| Total | 37.3 | 102.5 | 3.8 | 0.2 | 8.0 | 2.4 |

Note:

a. Offsite emissions.

**Table 3.1C-2**
**Total Emissions During the Construction Period, Tons[a]**

| | NOx | CO | VOC | SOx | $PM_{10}$ | $PM_{2.5}$ |
|---|---|---|---|---|---|---|
| Onsite | | | | | | |
| Construction Equipment | 1.0 | 2.4 | 0.06 | <0.01 | 0.01 | 0.01 |
| Fugitive Dust | -- | -- | -- | -- | <0.01 | <0.01 |
| Offsite | | | | | | |
| Worker Travel, Truck Deliveries[b] | 0.9 | 2.2 | 0.12 | 0.01 | 0.35 | 0.11 |
| Total Emissions | | | | | | |
| Total | 1.9 | 4.6 | 0.17 | 0.01 | 0.36 | 0.12 |

Note:

a. Because the construction period is shorter that a full year, total emissions are the same as annual emissions.

b. Offsite emissions.

[9] Because the construction period is shorter than one year, emissions for the annual averaging period are equal to total emissions during project construction.

### 3.1C.4 Analysis of Ambient Impacts from Onsite Construction

Ambient air quality impacts from emissions during construction of the project were estimated using an air quality dispersion modeling analysis. The modeling analysis considers the construction site location, the surrounding topography, and the sources of emissions during construction, including vehicle and equipment exhaust emissions and fugitive dust.

#### Dispersion Model

A dispersion modeling analysis was conducted based on the emissions discussed above using the approach discussed in Section 3.1.2. The EPA guideline AERMOD model was used to estimate ambient impacts from construction activities.

The construction impacts modeling analysis receptor set excluded the areas under the applicant's control, including the existing PEF property and the laydown and parking areas that will be fenced and used for equipment and worker vehicles during the construction period.

To determine the construction impacts on short-term ambient standards (24 hours and less), the worst-case daily onsite construction emission levels shown in Table 3.1C-1 were used. For pollutants with annual average ambient standards, the total emissions shown in Table 3.1C-2 were used.

As for the operational impacts modeling analysis discussed in Section 3.1.4, the construction impact modeling was performed using the 2009 to 2013 Bakersfield monitoring station model-ready meteorological data set provided by the SJVAPCD.

#### Modeling Results

Based on the emission rates of NOx, $SO_2$, CO, and $PM_{10}$ and the meteorological data, the AERMOD model calculates hourly and annual ambient impacts for each pollutant. As mentioned above, the modeled 1-hour, 3-hour, 8-hour, and 24-hour ambient impacts are based on the worst-case daily emission rates of NOx, $SO_2$, CO, and $PM_{10}$. The annual impacts are based on the total project emissions.

The AERMOD "OLMGROUP ALL" option was used to estimate ambient impacts from construction emissions. One-hour average $NO_2$ impacts were modeled following the procedures described in Appendix 3.1B. An 11% $NO_2$/NOx fraction for diesel construction equipment was assumed. Annual average $NO_2$ impact was calculated using the ambient ratio method (ARM) with the national default value of 0.75 for the annual average $NO_2$/NOx ratio. Modeled $NO_2$ concentrations were combined with background concentrations using the monthly hour of day approach (see the discussion of one-hour $NO_2$ modeling techniques in Appendix 3.1B) with 5 years of concurrent ozone and $NO_2$ data from Edison.

The modeling analysis results are shown in Table 3.1C-3. Construction impacts alone for all modeled pollutants are expected to be below the most stringent state and national standards. With the exception of the 24-hour and annual average $PM_{10}$ standards, construction activities are not expected to cause an exceedance of state or federal ambient air quality standards. However, the state 24-hour and annual $PM_{10}$ standards are exceeded in the absence of the construction emissions for the project. The best available emission control techniques will be used to minimize emissions during construction. The project construction impacts are not unusual in comparison to most construction sites; construction sites that use good dust suppression techniques and low-emitting vehicles typically do not cause violations of air quality standards.

**Table 3.1C-3**
**Modeled Maximum Onsite Construction Impacts**

| Pollutant | Averaging Period | Maximum Construction Impact (μg/m³) | Maximum Background Concentration (μg/m³) | Total Concentration (μg/m³) | Federal Standards (μg/m³) | State Standards (μg/m³) |
|---|---|---|---|---|---|---|
| $NO_2$ | 1-hr | 156.1 | 68.2 | 192.2[1] | -- | 339 |
| | 98th pctl | --[2] | 68.2 | --[2] | 188 | -- |
| | Annual | 1.2[3] | 13.2 | 14.4 | 100 | 57 |
| $SO_2$ | 1-hr | 1.7 | 41.9 | 43.6 | 196 | 655 |
| | 3-hr | 1.0 | 26 | 27 | 1300 | -- |
| | 24-hr | 0.17 | 13.1 | 13.3 | -- | 105 |
| CO | 1-hr | 931 | 4,375 | 5,306 | 40,000 | 23,000 |
| | 8-hr | 202 | 2,411 | 2,613 | 10,000 | 20.000 |
| $PM_{10}$ | 24-hr (state) | 0.3 | 120 | 120.3 | 150 | -- |
| | 24-hr (federal) | 0.3 | 154 | 154.3 | -- | 50 |
| | Annual | 0.01 | 44.2 | 44.2 | -- | 20 |
| $PM_{2.5}$ | 24-hr | 0.3 | 96.7 | 97.0 | 35 | -- |
| | Annual | 0.01 | 22.7 | 22.7 | 15.0 | 12 |

Notes:

[1] Monthly hour-of-day method used to calculate total concentration for each hour, so maximum total concentration is not equal to maximum predicted concentration plus maximum background concentration because conditions do not occur simultaneously. See Appendix 3.1B.

[2] Compliance with the federal 1-hour $NO_2$ standard is not evaluated for construction activities because the standard is based on a three-year averaging period and construction will last for only 7 months.

[3] Annual $NO_2$ calculated from modeled annual NOx using default ARM conversion of 75%.

An assessment of health risk from diesel particulate matter (DPM) emitted during the construction period was performed using the HARP2 model. At the point of maximum impact, the maximum cancer risk is approximately 0.70 in one million. This is well below the 10 in one million risk level typically used by the CEC to assess cancer risk. The maximum modeled chronic HHI is 0.001, well below the CEC significance threshold of 1.

# Attachment 3.1C-1

## Detailed Construction Emissions Calculations and CalEEMod Inputs

| | | |
|---|---|---|
| **Project Name** | Pastoria Flex Upgrade | |
| **District** | SJVAPCD | |
| **Wind Speed** | 2.7 | m/s |
| **Precipitation Frequency** | 45 | days/year |
| **Climate Zone** | 3 | |
| **Urbanization Level** | Rural | |
| | | |
| **Expected Operational Year** | 2016 | |
| | | |
| **Utility Company** | Southern California Edison | |
| **CO2 Intensity Factor** | 630.89 | |
| **CH4 Intensity Factor** | 0.029 | |
| **N2O Intensity Factor** | 0.006 | |

**For 7-month Construction Schedule**

| CalEEMod Phase Name | Phase Type | Start Date | End Date | # day/Week | Number of Days | Month | # of Days, Total 7-month |
|---|---|---|---|---|---|---|---|
| Site Preparation 1 | Site Preparation | 2015/06/01 | 2015/06/30 | 5 | 22 | 1 | |
| Construction 2 | Building Construction | 2015/07/01 | 2015/07/31 | 5 | 23 | 2 | |
| Construction 3 | Building Construction | 2015/08/01 | 2015/08/31 | 5 | 21 | 3 | |
| Construction 4 | Building Construction | 2015/09/01 | 2015/09/30 | 5 | 22 | 4 | |
| Construction 5 | Building Construction | 2015/10/01 | 2015/10/31 | 5 | 22 | 5 | |
| Construction 6 | Building Construction | 2015/11/01 | 2015/11/30 | 5 | 21 | 6 | |
| Construction 7 | Building Construction | 2015/12/01 | 2015/12/31 | 5 | 23 | 7 | 154 |

| | | | | | | 2015 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Jun | July | Aug | Sep | Oct | Nov | Dec |
| **Onsite Equipment** | **CalEEMod Equipment Type** | **Fuel Type** | **hr/day** | **HP** | **Load Factor** | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| Knuckle Boom 120' Manlift | Aerial Lifts | Diesel | 4 | 75 | 0.5 | 2 | 4 | 4 | 8 | 8 | 8 | 4 |
| Air Compressor, Ingersoll-Rand | Air Compressors | Diesel | 4.5 | 23.5 | 0.48 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Crane, 150-Ton, Manitowoc | Cranes | Diesel | 4 | 347 | 0.43 | 1 | 0 | 0 | 0 | 2 | 2 | 0 |
| Crane, 20-Ton Grove | Cranes | Diesel | 5 | 130 | 0.43 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Crane, 225-Ton, Manitowoc | Cranes | Diesel | 4 | 340 | 0.43 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Crane, 40-Ton, Grove | Cranes | Diesel | 5 | 173 | 0.43 | 0 | 2 | 2 | 2 | 0 | 0 | 0 |
| Blade, Cat | Crushing/Proc. Equipment | Diesel | 6 | 210 | 0.59 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Excavator, Cat | Excavators | Diesel | 8 | 325 | 0.57 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Scissor Lift | Forklifts | Diesel | 4 | 3 | 0.6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10,000 lb Forklift | Forklifts | Diesel | 7 | 102 | 0.6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 30,000 lb Forklift | Forklifts | Diesel | 2 | 150 | 0.47 | 0 | 2 | 2 | 2 | 2 | 2 | 0 |
| Water Wagon | Other Material Handling Equipment | Diesel | 10 | 450 | 0.62 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Asphalt Paver, Cat | Pavers | Diesel | 6 | 174 | 0.62 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| Compactor, Cat | Plate Compactors | Diesel | 5 | 410 | 0.62 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| Truck, Concrete Pump, Reed | Pumps | Diesel | 4 | 350 | 0.62 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Dozer, Cat | Rubber Tired Dozers | Diesel | 8 | 410 | 0.59 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Loader, Cat, | Rubber Tired Loaders | Diesel | 8 | 216 | 0.55 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Scrapers, Cat | Scrapers | Diesel | 5 | 450 | 0.72 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Backhoe, Cat, | Tractors/Loaders/Backhoes | Diesel | 5 | 97 | 0.55 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Welder, Multiquip, BLW-300SS | Welders | Diesel | 6 | 19.5 | 0.45 | 0 | 2 | 4 | 4 | 4 | 4 | 0 |
| Welder, Multiquip, GA 3800 | | Gasoline | 6.5 | 19.5 | 0.45 | 0 | 4 | 4 | 4 | 4 | 4 | 4 |
| **Number of Onsite Power Plant Construction Motor Vehicles** | | | | | | | | | | | | |
| Onsite Pick up Truck | | Diesel | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Onsite Fuel/Lube Truck | | Diesel | | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Onsite Dump Truck | | Diesel | | | | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Onsite Water Truck | Off Highway Trucks | Diesel | 8 | 400 | 0.38 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| Onsite Welding Truck | | Diesel | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Onsite Cement Truck | | Diesel | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Onsite Flatbed Truck | | Diesel | | | | 1 | 1 | 1 | 1 | 1 | 0 | 0 |
| | | | | | | **4** | **3** | **2** | **2** | **2** | **1** | **1** |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Knuckle Boom 120' Manlift | Aerial Lifts | Diesel | 4 | 75 | 0.5 | 2 | 4 | 4 | 8 | 8 | 8 | 4 |
| Crane, 40-Ton, Grove | Cranes | Diesel | 5 | 173 | 0.43 | 0 | 2 | 2 | 2 | 0 | 0 | 0 |
| Crane, 150-Ton, Manitowoc | Cranes | Diesel | 4 | 347 | 0.43 | 1 | 0 | 0 | 0 | 2 | 2 | 0 |
| Excavator, Cat | Excavators | Diesel | 8 | 325 | 0.57 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 30,000 lb Forklift | Forklifts | Diesel | 2 | 150 | 0.47 | 0 | 2 | 2 | 2 | 2 | 2 | 0 |
| | Off Highway Trucks | | | | | 4 | 3 | 2 | 2 | 2 | 1 | 1 |
| Asphalt Paver, Cat | Pavers | Diesel | 6 | 174 | 0.62 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| Compactor, Cat | Plate Compactors | Diesel | 5 | 410 | 0.62 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| Welder, Multiquip, BLW-300SS | Welders | Diesel | 6 | 19.5 | 0.45 | 0 | 2 | 4 | 4 | 4 | 4 | 0 |

| | | 2015 | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Calendar Month** | | **Jun** | **July** | **Aug** | **Sep** | **Oct** | **Nov** | **Dec** |
| **Project Month** | **Hours per day** | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| Boilermakers | 10 | 6 | 0 | 11 | 25 | 25 | 10 | 6 |
| Carpenters | 10 | 1 | 1 | 2 | 3 | 3 | 2 | 1 |
| Electricians | 10 | 0 | 0 | 11 | 15 | 15 | 15 | 10 |
| Ironworkers | 10 | 0 | 0 | 3 | 8 | 8 | 3 | 0 |
| Laborers | 10 | 2 | 5 | 20 | 25 | 25 | 25 | 17 |
| Pipefitters | 10 | 0 | 15 | 10 | 21 | 25 | 25 | 15 |
| Painters/insulation | 10 | 0 | 0 | 10 | 15 | 25 | 20 | 10 |
| Bricklayers | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Millwrights | 10 | 0 | 0 | 2 | 2 | 2 | 3 | 3 |
| Operating Engineers | 10 | 1 | 1 | 5 | 8 | 7 | 7 | 5 |
| Contractor Staff | 10 | 1 | 1 | 1 | 4 | 4 | 5 | 5 |
| **Staff** | | | | | | | | |
| CM STAFF | 10 | 1 | 1 | 1 | 2 | 2 | 2 | 2 |
| TA | 10 | 1 | 1 | 1 | 2 | 2 | 2 | 2 |
| **CalEEMod Input** | | | | | | | | |
| Worker Trip (trips/day) | | 13 | 25 | 77 | 130 | 143 | 119 | 76 |
| Work Trip Length (miles) | | 70.0 | 70.0 | 70.0 | 70.0 | 70.0 | 70.0 | 70.0 |
| **Estimated Truck Deliveries** | | | | | | | | |
| Vendor Trip (trips/day) | | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Vender Trip Length (miles) | | 70.0 | 70.0 | 70.0 | 70.0 | 70.0 | 70.0 | 70.0 |
| Total Hauling Trip | | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Hauling Trip Length (miles) | | 20 | 20 | 20 | 20 | 20 | 20 | 20 |

## Annual Emissions Calculations

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| | **ROG** | | | | | | |
| (tons/month) | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.00 |
| (tons/month) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| (tons/month) | 5.98E-03 | 6.26E-03 | 5.71E-03 | 5.98E-03 | 5.98E-03 | 5.71E-03 | 6.26E-03 |
| (tons/month) | 1.65E-03 | 3.31E-03 | 9.30E-03 | 1.65E-02 | 1.81E-02 | 1.44E-02 | 1.01E-02 |
| 7-month total (tons/year) | | | | | | | 0.06 |
| 7-month total (tons/year) | | | | | | | 0.00 |
| 7-month total (tons/year) | | | | | | | 0.04 |
| 7-month total (tons/year) | | | | | | | 0.07 |
| | **NOx** | | | | | | |
| (tons/month) | 0.253 | 0.215 | 0.127 | 0.137 | 0.136 | 0.093 | 0.044 |
| (tons/month) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| (tons/month) | 0.101 | 0.105 | 0.096 | 0.101 | 0.101 | 0.096 | 0.105 |
| (tons/month) | 0.005 | 0.009 | 0.026 | 0.045 | 0.050 | 0.040 | 0.028 |
| 7-month total (tons/year) | | | | | | | 1.00 |
| 7-month total (tons/year) | | | | | | | 0.00 |
| 7-month total (tons/year) | | | | | | | 0.70 |
| 7-month total (tons/year) | | | | | | | 0.20 |
| | **CO** | | | | | | |
| (tons/month) | 0.523 | 0.454 | 0.286 | 0.353 | 0.362 | 0.272 | 0.136 |
| (tons/month) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| (tons/month) | 0.044 | 0.046 | 0.042 | 0.044 | 0.044 | 0.042 | 0.046 |
| (tons/month) | 0.043 | 0.086 | 0.241 | 0.425 | 0.468 | 0.372 | 0.260 |
| 7-month total (tons/year) | | | | | | | 2.39 |
| 7-month total (tons/year) | | | | | | | 0.00 |
| 7-month total (tons/year) | | | | | | | 0.31 |
| 7-month total (tons/year) | | | | | | | 1.89 |
| | **SO2** | | | | | | |
| (tons/month) | 9.40E-04 | 7.50E-04 | 4.90E-04 | 5.90E-04 | 6.40E-04 | 4.70E-04 | 2.30E-04 |
| (tons/month) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| (tons/month) | 2.30E-04 | 2.40E-04 | 2.20E-04 | 2.30E-04 | 2.30E-04 | 2.20E-04 | 2.40E-04 |
| (tons/month) | 9.00E-05 | 1.80E-04 | 4.90E-04 | 8.70E-04 | 9.60E-04 | 7.60E-04 | 5.30E-04 |
| 7-month total (tons/year) | | | | | | | 0.00 |
| 7-month total (tons/year) | | | | | | | 0.00 |
| 7-month total (tons/year) | | | | | | | 0.00 |
| 7-month total (tons/year) | | | | | | | 0.00 |
| | **PM10** | | | | | | |
| (tons/month) | 0.0E+00 | | | | | | |
| (tons/month) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| (tons/month) | 6.40E-03 | 6.69E-03 | 6.10E-03 | 6.40E-03 | 6.40E-03 | 6.10E-03 | 6.69E-03 |
| (tons/month) | 6.82E-03 | 1.37E-02 | 3.86E-02 | 6.83E-02 | 7.51E-02 | 5.96E-02 | 4.17E-02 |
| 7-month total (tons/year) | | | | | | | 0.00 |
| 7-month total (tons/year) | | | | | | | 0.00 |
| 7-month total (tons/year) | | | | | | | 0.04 |
| 7-month total (tons/year) | | | | | | | 0.30 |
| (tons/month) | 0.002 | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 | 0.000 |
| (tons/month) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| (tons/month) | 2.08E-03 | 2.18E-03 | 1.99E-03 | 2.08E-03 | 2.08E-03 | 1.99E-03 | 2.18E-03 |
| (tons/month) | 5.00E-05 | 1.10E-04 | 3.10E-04 | 5.50E-04 | 6.00E-04 | 4.80E-04 | 3.30E-04 |
| 7-month total (tons/year) | | | | | | | 0.01 |
| 7-month total (tons/year) | | | | | | | 0.00 |
| 7-month total (tons/year) | | | | | | | 0.01 |
| 7-month total (tons/year) | | | | | | | 0.00 |

| Project Month | | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|
| | | **PM2.5** | | | | | | |
| Fugitive | (tons/month) | 0.000 | | | | | | |
| Fugitive - Hauling | (tons/month) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Fugitive - Truck | (tons/month) | 1.85E-03 | 1.93E-03 | 1.76E-03 | 1.85E-03 | 1.85E-03 | 1.76E-03 | 1.93E-03 |
| Fugitive - Worker Travel | (tons/month) | 1.82E-03 | 3.67E-03 | 1.03E-02 | 1.83E-02 | 2.01E-02 | 1.59E-02 | 1.12E-02 |
| Fugitive | 7-month total (tons/year) | | | | | | | 0.00 |
| Fugitive - Hauling | 7-month total (tons/year) | | | | | | | 0.00 |
| Fugitive - Truck | 7-month total (tons/year) | | | | | | | 0.01 |
| Fugitive - Worker Travel | 7-month total (tons/year) | | | | | | | 0.08 |
| Off-Road Equipment | (tons/month) | 0.002 | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 | 0.000 |
| Hauling Emission | (tons/month) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Truck Emission | (tons/month) | 1.92E-03 | 2.00E-03 | 1.83E-03 | 1.92E-03 | 1.92E-03 | 1.83E-03 | 2.00E-03 |
| Worker Travel | (tons/month) | 5.00E-05 | 1.00E-04 | 2.80E-04 | 5.00E-04 | 5.50E-04 | 4.30E-04 | 3.00E-04 |
| Off-Road Equipment | 7-month total (tons/year) | | | | | | | 0.01 |
| Hauling Emission | 7-month total (tons/year) | | | | | | | 0.00 |
| Truck Emission | 7-month total (tons/year) | | | | | | | 0.01 |
| Worker Travel | 7-month total (tons/year) | | | | | | | 0.00 |
| | | **CO2** | | | | | | |
| Off-Road Equipment | (MT/month) | 89.20 | 71.41 | 46.30 | 55.26 | 60.27 | 44.35 | 21.49 |
| Hauling Emission | (MT/month) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Truck Emission | (MT/month) | 21.53 | 22.51 | 20.55 | 21.53 | 21.53 | 20.55 | 22.51 |
| Worker Travel | (MT/month) | 6.73 | 13.53 | 38.06 | 67.31 | 74.04 | 58.81 | 41.14 |
| Off-Road Equipment | 7-month total (MT/year) | | | | | | | 388 |
| Hauling Emission | 7-month total (MT/year) | | | | | | | 0 |
| Truck Emission | 7-month total (MT/year) | | | | | | | 151 |
| Worker Travel | 7-month total (MT/year) | | | | | | | 300 |
| | | **CH4** | | | | | | |
| Off-Road Equipment | (MT/month) | 0.027 | 0.021 | 0.013 | 0.016 | 0.018 | 0.013 | 0.006 |
| Hauling Emission | (MT/month) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Truck Emission | (MT/month) | 1.80E-04 | 1.90E-04 | 1.80E-04 | 1.80E-04 | 1.80E-04 | 1.80E-04 | 1.90E-04 |
| Worker Travel | (MT/month) | 3.70E-04 | 7.40E-04 | 2.08E-03 | 3.68E-03 | 4.05E-03 | 3.22E-03 | 2.25E-03 |
| Off-Road Equipment | 7-month total (MT/year) | | | | | | | 0.11 |
| Hauling Emission | 7-month total (MT/year) | | | | | | | 0.00E+00 |
| Truck Emission | 7-month total (MT/year) | | | | | | | 1.28E-03 |
| Worker Travel | 7-month total (MT/year) | | | | | | | 1.64E-02 |
| | | **N2O** | | | | | | |
| Off-Road Equipment | (MT/month) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Hauling Emission | (MT/month) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Truck Emission | (MT/month) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Worker Travel | (MT/month) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Off-Road Equipment | 7-month total (MT/year) | | | | | | | 0.00 |
| Hauling Emission | 7-month total (MT/year) | | | | | | | 0.00 |
| Truck Emission | 7-month total (MT/year) | | | | | | | 0.00 |
| Worker Travel | 7-month total (MT/year) | | | | | | | 0.00 |
| | | **CO2e** | | | | | | |
| Off-Road Equipment | (MT/month) | 89.86 | 71.94 | 46.64 | 55.66 | 60.71 | 44.68 | 21.65 |
| Hauling Emission | (MT/month) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Truck Emission | (MT/month) | 21.53 | 22.51 | 20.55 | 21.53 | 21.53 | 20.55 | 22.51 |
| Worker Travel | (MT/month) | 6.74 | 13.55 | 38.11 | 67.40 | 74.14 | 58.89 | 41.19 |
| Off-Road Equipment | 7-month total (MT/year) | | | | | | | 391 |
| Hauling Emission | 7-month total (MT/year) | | | | | | | 0 |
| Truck Emission | 7-month total (MT/year) | | | | | | | 151 |
| Worker Travel | 7-month total (MT/year) | | | | | | | 300 |

Mitigation Measures Construction

- Use Cleaner Engines for Construction Equipment: Any vehicle with a HP < 75 set to Tier 4, others set to Tier 4i
- Water Exposed Area: Implement watering 3 times a day for industrial unpaved road, 61% PM10 Control Efficiency
- Reduce Vehicle Speed on Unpaved Roads: Limit maximum speed on unpaved roads to 15 miles per hour
- Clean Paved Roads: Streets to be swept by PM10 efficient vacuum units (once per month frequency), 9% PM10 Control Efficiency

## Daily Emissions Calculations

| Project Month | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| | **ROG (lbs/day)** | | | | | | |
| Off-Road Equipment | 1.35 | 0.94 | 0.64 | 0.72 | 0.84 | 0.62 | 0.29 |
| Hauling Emission | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Truck Emission | 0.53 | 0.53 | 0.53 | 0.53 | 0.53 | 0.53 | 0.53 |
| Worker Travel | 0.17 | 0.32 | 0.99 | 1.67 | 1.84 | 1.53 | 0.98 |
| | **NOx (lbs/day)** | | | | | | |
| Off-Road Equipment | 22.99 | 18.65 | 12.12 | 12.47 | 12.34 | 8.88 | 3.80 |
| Hauling Emission | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Truck Emission | 8.70 | 8.70 | 8.70 | 8.70 | 8.70 | 8.70 | 8.70 |
| Worker Travel | 0.38 | 0.73 | 2.24 | 3.78 | 4.16 | 3.46 | 2.21 |
| | **CO (lbs/day)** | | | | | | |
| Off-Road Equipment | 47.52 | 39.45 | 27.20 | 32.10 | 32.87 | 25.90 | 11.86 |
| Hauling Emission | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Truck Emission | 3.68 | 3.68 | 3.68 | 3.68 | 3.68 | 3.68 | 3.68 |
| Worker Travel | 4.60 | 8.84 | 27.24 | 45.99 | 50.58 | 42.09 | 26.88 |
| | **SO2 (lbs/day)** | | | | | | |
| Off-Road Equipment | 0.09 | 0.07 | 0.05 | 0.05 | 0.06 | 0.05 | 0.02 |
| Hauling Emission | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Truck Emission | 2.12E-02 | 2.12E-02 | 2.12E-02 | 2.12E-02 | 2.12E-02 | 2.12E-02 | 2.12E-02 |
| Worker Travel | 8.71E-03 | 1.68E-02 | 5.16E-02 | 8.71E-02 | 9.59E-02 | 7.98E-02 | 5.09E-02 |
| | **PM10 (lbs/day)** | | | | | | |
| Fugitive | 0.00 | | | | | | |
| Fugitive - Hauling | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Fugitive - Truck | 0.59 | 0.59 | 0.59 | 0.59 | 0.59 | 0.59 | 0.59 |
| Fugitive - Worker Travel | 0.64 | 1.23 | 3.77 | 6.37 | 7.01 | 5.83 | 3.73 |
| Off-Road Equipment | 0.14 | 0.10 | 0.07 | 0.08 | 0.09 | 0.07 | 0.03 |
| Hauling Emission | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Truck Emission | 0.19 | 0.19 | 0.19 | 0.19 | 0.19 | 0.19 | 0.19 |
| Worker Travel | 4.96E-03 | 9.53E-03 | 2.94E-02 | 4.96E-02 | 5.45E-02 | 4.54E-02 | 2.90E-02 |
| | **PM2.5 (lbs/day)** | | | | | | |
| Fugitive | 0.00 | | | | | | |
| Fugitive - Hauling | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Fugitive - Truck | 1.71E-01 | 1.71E-01 | 1.71E-01 | 1.71E-01 | 1.71E-01 | 1.71E-01 | 1.71E-01 |
| Fugitive - Worker Travel | 0.17 | 0.33 | 1.01 | 1.70 | 1.87 | 1.56 | 0.99 |
| Off-Road Equipment | 0.14 | 0.10 | 0.07 | 0.08 | 0.09 | 0.07 | 0.03 |
| Hauling Emission | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Truck Emission | 1.74E-01 | 1.74E-01 | 1.74E-01 | 1.74E-01 | 1.74E-01 | 1.74E-01 | 1.74E-01 |
| Worker Travel | 4.52E-03 | 8.69E-03 | 2.68E-02 | 4.52E-02 | 4.97E-02 | 4.14E-02 | 2.64E-02 |

| Project Month | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| | **$CO_2$ (lbs/day)** | | | | | | |
| Off-Road Equipment | 740 | 1,423 | 4,384 | 7,402 | 8,142 | 6,776 | 4,327 |
| Hauling Emission | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Truck Emission | 2,158 | 2,158 | 2,158 | 2,158 | 2,158 | 2,158 | 2,158 |
| Worker Travel | 740 | 1,423 | 4,384 | 7,402 | 8,142 | 6,776 | 4,327 |
| | **$CH_4$ (lbs/day)** | | | | | | |
| Off-Road Equipment | 0.04 | 0.07 | 0.22 | 0.37 | 0.41 | 0.34 | 0.22 |
| Hauling Emission | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Truck Emission | 1.84E-02 | 1.84E-02 | 1.84E-02 | 1.84E-02 | 1.84E-02 | 1.84E-02 | 1.84E-02 |
| Worker Travel | 0.04 | 0.07 | 0.22 | 0.37 | 0.41 | 0.34 | 0.22 |
| | **$N_2O$ (lbs/day)** | | | | | | |
| Off-Road Equipment | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Hauling Emission | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Truck Emission | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Worker Travel | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | **$CO_2e$ (lbs/day)** | | | | | | |
| Off-Road Equipment | 741 | 1,425 | 4,390 | 7,411 | 8,153 | 6,784 | 4,333 |
| Hauling Emission | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Truck Emission | 2,159 | 2,159 | 2,159 | 2,159 | 2,159 | 2,159 | 2,159 |
| Worker Travel | 741 | 1,425 | 4,390 | 7,411 | 8,153 | 6,784 | 4,333 |

## Emissions for Modeling

| **Short Term Impacts (24 hours and less)** | | | | | |
|---|---|---|---|---|---|
| Daily working hours (hrs/day) | 10 | | | | |
| | NOx | CO | SOx | PM10 | PM2.5 |
| TOTAL | | | | | |
| Off Road Equipment (Combustion) (lbs/day) | 23.0 | 47.5 | 0.09 | 0.14 | 0.14 |
| Off Road Equipment (Combustion) (lbs/hr) | 2.30 | 4.75 | 0.01 | 0.01 | 0.01 |
| Off Road Equipment (Combustion) (g/sec) | 0.29 | 0.60 | 0.001 | 0.002 | 0.002 |
| Number of sources | 2 | 2 | 2 | 2 | 2 |
| Emissions per volume source (g/s) | 1.45E-01 | 2.99E-01 | 5.37E-04 | 8.77E-04 | 8.77E-04 |
| | | | | | |
| Construction (Fugitive Dust) (lbs/day) | | | | 2.41E-03 | 6.03E-04 |
| Construction (Fugitive Dust) (lbs/hr) | | | | 2.41E-04 | 6.03E-05 |
| Construction (Fugitive Dust) (g/sec) | | | | 3.04E-05 | 7.60E-06 |

| **Long Term Impacts (annual)** | | | | | |
|---|---|---|---|---|---|
| Annual Number of Work Days, 7-month total (days) | 154 | | | | |
| Daily working hours (hrs/day) | 10 | | | | |
| | NOx | CO | SOx | PM10 | PM2.5 |
| TOTAL | | | | | |
| Off Road Equipment (Combustion) (tons/yr) | 1.00 | 2.39 | 0.004 | 0.006 | 0.006 |
| Off Road Equipment (Combustion) (lbs/hr) | 1.30 | 3.10 | 0.005 | 0.008 | 0.008 |
| Off Road Equipment (Combustion) (g/sec) | 0.16 | 0.39 | 0.001 | 0.001 | 0.001 |
| Number of sources | 2 | 2 | 2 | 2 | 2 |
| Emissions per volume source (g/s) | 8.22E-02 | 1.95E-01 | 3.36E-04 | 5.29E-04 | 5.29E-04 |
| | | | | | |
| Construction (Fugitive Dust) (tons/yr) | | | | 9.98E-05 | 2.49E-05 |
| Construction (Fugitive Dust) (lbs/hr) | | | | 1.30E-04 | 3.24E-05 |
| Construction (Fugitive Dust) (g/sec) | | | | 1.63E-05 | 4.08E-06 |

APPENDIX 3.1D

# Cumulative Impacts Assessment

# Cumulative Impacts Assessment

Cumulative air quality impacts from the PEF and other reasonably foreseeable projects will be both regional and localized in nature. Regional air quality impacts are possible for pollutants such as ozone, which is formed through a photochemical process that can take hours to occur. Carbon monoxide impacts, and sometimes NOx and SOx impacts, are localized in the area in which they are emitted. $PM_{10}$ can create a local air quality problem in the vicinity of its emission source, but can also be a regional issue when it is formed in the atmosphere from VOC, SOx, and NOx.

The cumulative impacts analysis considers the potential for both regional and localized impacts due to emissions from the proposed operation of new auxiliary boilers at PEF. Regional impacts are evaluated by comparing maximum daily and annual emissions from PEF after the addition of the new auxiliary boilers with emissions of ozone and $PM_{10}$ precursors in both Kern County and the entire San Joaquin Valley. Localized impacts are evaluated by looking at other local sources of pollutants that are not included in the background air quality data to determine whether these sources in combination with the modified PEF would be expected to cause significant cumulative air quality impacts.

# Regional Impacts

Regional impacts are evaluated by assessing the modified project's contribution to regional emissions. Although the relative importance of VOC and NOx emissions in ozone formation differs from region to region and from day to day, state law requires reductions in emissions of both precursors to reduce overall ozone levels. The change in the sum of emissions of these pollutants, equally weighted, provides a rough estimate of the impact of PEF on regional ozone levels.[10] Similarly, a comparison of the emissions of $PM_{10}$ precursor emissions from PEF with regional $PM_{10}$ precursor emissions provides an estimate of the impact of PEF on regional $PM_{10}$ levels.

Under SJVAPCD regulations, PEF will be required to provide offsets for increases in NOx, VOC, $SO_2$, and $PM_{10}$ emissions from the project. Regulatory offset requirements are calculated based on quarterly emissions, but the regional inventories are expressed in tons per day of emissions. Comparisons are shown on both a daily and annual basis.

Table 3.1D-1 summarizes these comparisons. Total emissions from the modified facility are compared with regional emissions in 2015. Kern County and SJVAPCD emissions projections for 2015 were obtained from the Air Resources Board's web-based emission inventory projection software, available at *http://www.arb.ca.gov/app/emsinv/cepam_emssumcat_query.php.*

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[10] PEF is proposing to use direct, and not interpollutant, offsets for ozone precursors, so all NOx emissions from the project will be offset using NOx ERCs while all VOC emissions will be offset using VOC ERCs.

**Table 3.1D-1**
**PEF Amendment**
**Emissions Projections by Summary Category for Regional Cumulative Impacts**

| | Emissions, tons/day | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | NOx | SOx | VOC | PM10 | PM2.5 | Ozone Precursors | PM10 Precursors | PM2.5 Precursors |
| SJVAPCD Emissions, 2015 | | | | | | | | |
| Stationary Sources | 73.8 | 22.1 | 85.1 | 26.3 | 18.3 | 159 | 207 | 199 |
| Areawide Sources | 17.3 | 1.1 | 160.7 | 258.5 | 67.9 | 178 | 438 | 247 |
| Mobile Sources | 307.0 | 2.2 | 100.5 | 18.5 | 15.0 | 407 | 428 | 425 |
| Total | | | | | | 744 | 1,073 | 871 |
| Kern County Emissions, 2015 | | | | | | | | |
| Stationary Sources | 50.7 | 8.5 | 40.8 | 15.6 | 9.5 | 92 | 116 | 110 |
| Areawide Sources | 2.2 | 0.1 | 22.0 | 58.5 | 11.8 | 24 | 83 | 36 |
| Mobile Sources | 108.2 | 0.7 | 26.5 | 8.1 | 7.1 | 135 | 144 | 143 |
| Total | | | | | | 251 | 342 | 288 |
| Total Project Emissions | 0.039 | 0.005 | 0.009 | 0.015 | 0.015 | 0.048 | 0.068 | 0.068 |
| Project Emissions as % of Basin Inventory | | | | | | 0.006% | 0.006% | 0.008% |
| Project Emissions as % of County Inventory | | | | | | 0.019% | 0.020% | 0.024% |

| | Emissions, tons/yr | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | NOx | SOx | VOC | PM10 | PM2.5 | Ozone Precursors | PM10 Precursors | PM2.5 Precursors |
| SJVAPCD Emissions, 2015 | | | | | | | | |
| Stationary Sources | 26,938 | 8,063 | 31,076 | 9,606 | 6,684 | 58,014 | 75,683 | 72,761 |
| Areawide Sources | 6,321 | 410 | 58,649 | 94,364 | 24,794 | 64,970 | 159,743 | 90,173 |
| Mobile Sources | 112,047 | 787 | 36,687 | 6,760 | 5,488 | 148,734 | 156,281 | 155,009 |
| Total | | | | | | 271,718 | 391,708 | 317,943 |
| Kern County Emissions, 2015 | | | | | | | | |
| Stationary Sources | 18,523 | 3,103 | 14,885 | 5,694 | 3,468 | 33,408 | 42,205 | 39,978 |
| Areawide Sources | 812 | 31 | 8,043 | 21,341 | 4,301 | 8,855 | 30,226 | 13,186 |
| Mobile Sources | 39,496 | 258 | 9,675 | 2,964 | 2,594 | 49,171 | 52,392 | 52,023 |
| Total | | | | | | 91,433 | 124,824 | 105,187 |
| Total Project Emissions | 14.2 | 1.7 | 3.3 | 5.6 | 5.6 | 17.5 | 24.8 | 24.8 |
| Project Emissions as % of Basin Inventory | | | | | | 0.006% | 0.006% | 0.008% |
| Project Emissions as % of County Inventory | | | | | | 0.019% | 0.020% | 0.024% |

2015 emissions projections for SJVAPCD and Kern County from http://www.arb.ca.gov/app/emsinv/cepam_emssumcat_query.

# Localized Impacts

To evaluate potential cumulative impacts of PEF in combination with other projects in the area, projects within a radius of 10 km (6 miles) of the project were used for the cumulative impacts analysis.

Within this search area, three categories of projects with combustion sources were used as criteria for identification:

- Existing projects that have been in operation since at least 2013;
- Projects for which air pollution permits to construct have been issued and that began operation after January 1, 2014; and

- Projects for which air pollution permits to construct have not been issued, but that are reasonably foreseeable.

Existing projects that have been in operation since at least 2013 are reflected in the ambient air quality data that have been used to represent background concentrations; consequently, no further analysis of the emissions from this category of facilities was performed. The cumulative impacts analysis adds the modeled impacts of selected facilities to the maximum measured background air quality levels, thus ensuring that these existing projects are taken into account.

Projects for which air pollution permits to construct have been issued but that were not operational in 2014 were identified through a request of permit records from the San Joaquin Valley APCD. The results of the cumulative impacts modeling analysis are summarized in Table 3.1D-2 below.

TABLE 3.1D-2
**Modeled Maximum Cumulative Impacts**

| Pollutant | Averaging Period | Maximum Predicted Impact ($\mu g/m^3$) | Maximum Background Concentration ($\mu g/m^3$) | Total Concentration ($\mu g/m^3$) | NAAQS ($\mu g/m^3$) | CAAQS ($\mu g/m^3$) |
|---|---|---|---|---|---|---|
| $NO_2$ | 1-hr | 156[a] | 86.1 | 196[a] | -- | 339 |
| | $98^{th}$ pctl | 144[a] | 65.0 | 181[a] | 188 | -- |
| | Annual[b] | 0.9 | 13.2 | 14.1 | 100 | 57 |
| $SO_2$ | 1-hr | 9.1 | 41.9 | 51 | 196 | 655 |
| | 3-hr | 5.2 | 26 | 31 | 1300 | -- |
| | 24-hr | 0.2 | 13.1 | 13 | -- | 105 |
| CO | 1-hr | 305 | 4,375 | 4,680 | 40,000 | 23,000 |
| | 8-hr | 70 | 2,411 | 2,481 | 10,000 | 10.000 |
| $PM_{10}$ | 24-hr (state) | 2.9 | 120 | 123 | 150 | -- |
| | 24-hr (federal) | 2.9 | 154 | 157 | -- | 50 |
| | Annual | 0.9 | 44.2 | 45 | -- | 20 |
| $PM_{2.5}$ | 24-hr[3] | 2.3 | 96.7 | 99 | 35 | -- |
| | Annual | 0.9 | 22.7 | 23.6 | 12.0 | 12 |

Notes:

[1] One-hour $NO_2$ concentrations calculated using OLM and paired sum method. Maximum total concentration is not equal to maximum predicted concentration plus maximum background concentration because conditions do not occur simultaneously. See Appendix 3.1B.

[2] Annual $NO_2$ calculated from modeled annual NOx using default ARM conversion of 75%.

[3] 24-hour $PM_{2.5}$ value shown is $98^{th}$ percentile, in accordance with the form of the federal standard.

A list of the sources included in the cumulative impacts analysis is provided in Table 3.1D-3, along with emission rates and stack parameters used in the modeling analysis. Because most of the sources included in the cumulative impact analysis are intermittent sources, the cumulative impacts modeling reflects normal operation of the Pastoria gas turbines and the auxiliary boilers (rather than worst case/startup operation).

Table 3.1D-3
Emission Rates and Stack Parameters for the Cumulative Impacts Assessment

| | | | | | | | | | | PL = Permit Limit | | | | Em Rate for Modeling | | | | | STACK DATA | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FACID | FNAME | FSTREET | FCITY | FZIP | FSIC | LAT | LONG | Equipment | Intermittent | NOx_PL (lb/yr) | SOx_PL (lb/yr) | PM10_PL (lb/yr) | CO_PL (lb/yr) | NOx (g/s) | SOx (g/s) | PM10 (g/s) | CO (g/s) | Distance to Pastoria Fenceline (m) | STKHT Stack Height (m) | STKDIAM Stack Diameter (m) | GT, Gas Temp (K) | GV, Gas Velocity (m/s) | NO2 Ratio | Footnote | Stack Name |
| 1336 | PLAINS PIPELINE, L.P. | TEJON PUMP STATION | LEBEC | | 4612 | 34.882373 | -118.897156 | 1,000 BHP CATERPILLAR MODEL D399 DIESEL-FIRED EMERGENCY IC ENGINE POWERING A FIREWATER PUMP | TRUE | 9708 | | | | 1.40E-01 | | | | 9,376 | 3.048 | 0.152 | 727.594 | 50.921 | 0.2 | A | PL1 |
| 1336 | PLAINS PIPELINE, L.P. | TEJON PUMP STATION | LEBEC | | 4612 | 34.882373 | -118.897156 | 125 BHP DIESEL-FIRED EMERGENCY IC ENGINE POWERING A FIREWATER PUMP | TRUE | 430 | | | | 6.18E-03 | | | | 9,376 | 3.048 | 0.152 | 727.594 | 50.921 | 0.2 | A | PL2 |
| 2058 | E & B NATURAL RESOURCES | LIGHT OIL CENTRAL | | | 1311 | 35.036782 | -118.889922 | 16.38 MMBTU/HR WASTE GAS-FIRED AIR ASSIST FLARE WITH AUTOMATIC IGNITION/RE-IGNITION AND OPERATIONAL WASTE GAS FLOW RATE INDICATOR (JOHNSON LEASE) | FALSE | 5857 | 222 | 1033 | 31871 | 8.42E-02 | 3.19E-03 | 1.49E-02 | 4.58E-01 | 9,734 | 3.048 | 0.152 | 727.594 | 50.921 | 0.2 | A | ENB |
| 3182 | DEPT WATER RESOURCES (CK 39) | CALIF AQUEDUCT CHECK 39 | BAKERSFIELD | 93388 | 4941 | 34.930952 | -118.872711 | 80 BHP FORD MODEL C5PF-6005-A S030C LPG-FIRED EMERGENCY STANDBY IC ENGINE POWERING AN ELECTRICAL GENERATOR (CALIFORNIA AQUEDUCT CHECK GATE 39) | TRUE | 65 | | | | 9.35E-04 | | | | 3,680 | 3.048 | 0.152 | 727.594 | 50.921 | 0.2 | A | DWE |
| 3843 | TEJON RANCH COMPANY | 4436 LEBEC RD | LEBEC | 93243 | 4931 | 34.875842 | -118.892031 | 197 BHP GENERAC MODEL 13.3GN RICH-BURN NATURAL GAS-FIRED EMERGENCY STANDBY IC ENGINE WITH NON-SELECTIVE CATALYTIC REDUCTION (NSCR) POWERING AN ELECTRICAL GENERATOR | TRUE | 325 | 0 | 3 | 534 | 4.67E-03 | 0.00E+00 | 4.31E-05 | 7.68E-03 | 9,897 | 3.048 | 0.6096 | 699.8167 | 27.392 | 0.1 | B | TEJ1 |
| 3843 | TEJON RANCH COMPANY | 4436 LEBEC RD | LEBEC | 93243 | 4931 | 34.875842 | -118.892031 | 74 BHP FORD MODEL ESG642 RICH-BURN NATURAL GAS-FIRED EMERGENCY STANDBY IC ENGINE WITH NON-SELECTIVE CATALYTIC REDUCTION (NSCR) POWERING AN ELECTRICAL GENERATOR | TRUE | 1 | 0 | 1 | 11 | 1.44E-05 | 0.00E+00 | 1.44E-05 | 1.58E-04 | 9,897 | 1.95072 | 0.0762 | 854.2612 | 33.4 | 0.1 | B | TEJ2 |
| 3843 | TEJON RANCH COMPANY | 4436 LEBEC RD | LEBEC | 93243 | 4931 | 34.875842 | -118.892031 | 202 BHP CUMMINS MODEL GTA8.3-LC-G1 RICH-BURN PROPANE-FIRED EMERGENCY STANDBY IC ENGINE (SN 46022825) SERVED BY A DCL MINE-X DQ16R THREE-WAY CATALYTIC CONVERTER POWERING AN ELECTRICAL GENERATOR | TRUE | 62 | 4 | 1 | 9 | 8.92E-04 | 5.75E-05 | 1.44E-05 | 1.29E-04 | 9,897 | 3.048 | 0.127 | 922.0389 | 48.97 | 0.1 | B | TEJ3 |
| 3852 | BRE/PAC OWNER LLC | 4049 INDUSTRIAL PARKWAY DR | LEBEC | 93243 | 4225 | 34.976768 | -118.946426 | 287 BHP CATERPILLAR MODEL 3306DITA DIESEL-FIRED EMERGENCY IC ENGINE POWERING A FIREWATER PUMP | TRUE | 799 | 16 | 22 | 171 | 1.15E-02 | 2.30E-04 | 3.16E-04 | 2.46E-03 | 9,431 | 3.048 | 0.152 | 727.594 | 50.921 | 0.2 | A | BRE |
| 3856 | IKEA PROPERTY | 4104 INDUSTRIAL PARKWAY DR | LEBEC | 93203 | 4225 | 34.975087 | -118.946142 | 755 BHP CUMMINS MODEL #KTA19G4 DIESEL-FIRED EMERGENCY STANDBY IC ENGINE POWERING AN ELECTRICAL GENERATOR | TRUE | 3280 | 50 | 33 | 420 | 4.72E-02 | 7.19E-04 | 4.75E-04 | 6.04E-03 | 9,354 | 3.048 | 0.152 | 727.594 | 50.921 | 0.2 | A | IK1 |
| 3856 | IKEA PROPERTY | 4104 INDUSTRIAL PARKWAY DR | LEBEC | 93203 | 4225 | 34.975087 | -118.946142 | 300 BHP CUMMINS MODEL #6CTA83 F3 DIESEL- FIRED EMERGENCY IC ENGINE POWERING A FIREWATER PUMP | TRUE | 189 | 4 | 5 | 50 | 2.72E-03 | 5.75E-05 | 7.19E-05 | 7.19E-04 | 9,354 | 3.048 | 0.152 | 727.594 | 50.921 | 0.2 | A | IK2 |
| 3856 | IKEA PROPERTY | 4104 INDUSTRIAL PARKWAY DR | LEBEC | 93203 | 4225 | 34.975087 | -118.946142 | 1114 BHP CATERPILLAR MODEL #3412CTA DIESEL-FIRED EMERGENCY STANDBY IC ENGINE POWERING AN ELECTRICAL GENERATOR | TRUE | 2898 | 84 | 49 | 344 | 4.17E-02 | 1.21E-03 | 7.05E-04 | 4.95E-03 | 9,354 | 3.048 | 0.152 | 727.594 | 50.921 | 0.2 | A | IK3 |
| 4000 | PROLOGIS NA3 | 4049 INDUSTRIAL PARKWAY DR | LEBEC | 93243 | 1541 | 34.976857 | -118.946904 | 462.6 BHP VOLVO MQ POWER MODEL TAD1240GE DIESEL-FIRED EMERGENCY STANDBY IC ENGINE POWERING AN ELECTRICAL GENERATOR | TRUE | 754 | 35 | 23 | 86 | 1.08E-02 | 5.03E-04 | 3.31E-04 | 1.24E-03 | 9,464 | 3.048 | 0.152 | 727.594 | 50.921 | 0.2 | A | PRO1 |
| 4000 | PROLOGIS NA3 | 4049 INDUSTRIAL PARKWAY DR | LEBEC | 93243 | 1541 | 34.976857 | -118.946904 | 462.6 BHP VOLVO MQ POWER MODEL TAD1240GE DIESEL-FIRED EMERGENCY STANDBY IC ENGINE POWERING AN ELECTRICAL GENERATOR | TRUE | 754 | 35 | 23 | 86 | 1.08E-02 | 5.03E-04 | 3.31E-04 | 1.24E-03 | 9,464 | 3.048 | 0.152 | 727.594 | 50.921 | 0.2 | A | PRO2 |
| 6652 | VERIZON WIRELESS (PRESTON) | 4387 DIGIER RD | LEBEC | 93243 | 4812 | 34.878837 | -118.903162 | 96 BHP JOHN DEERE MODEL 5030HF270B TIER 2 CERTIFIED DIESEL-FIRED EMERGENCY STANDBY IC ENGINE POWERING AN ELECTRICAL GENERATOR | TRUE | 52 | 0 | 1 | 0 | 7.48E-04 | 0.00E+00 | 1.44E-05 | 0.00E+00 | 10,012 | 3.048 | 0.152 | 727.594 | 50.921 | 0.2 | A | VERP |
| 6683 | TEJON-CASTAC WATER DISTRICT | 5453 NO. DENNIS MCCARTHY DR | LEBEC | 93243 | 4952 | 34.991069 | -118.947203 | 197 BHP INTERNATIONAL MODEL V549 NATURAL GAS-FIRED EMERGENCY STANDBY IC ENGINE POWERING AN ELECTRICAL GENERATOR | TRUE | 325 | 0 | 3 | 534 | 4.67E-03 | 0.00E+00 | 4.31E-05 | 7.68E-03 | 9,974 | 2.4384 | 0.0762 | 894.2612 | 27.392 | 0.1 | B | TEW |
| 7211 | VERIZON WIRELESS KERN I-5 | 7815 GRAPEVINE RD | LEBEC | 93243 | 4812 | 34.921722 | -118.925202 | 107 BHP GENERAC MODEL 6.8GN RICH-BURN LPG/PROPANE-FIRED EMERGENCY STANDBY IC ENGINE WITH NON-SELECTIVE CATALYTIC REDUCTION (NSCR) POWERING AN ELECTRICAL GENERATOR | TRUE | 17 | 0 | 4 | 34 | 2.45E-04 | 0.00E+00 | 5.75E-05 | 4.89E-04 | 8,171 | 1.77799 | 0.0635 | 838.7056 | 27.392 | 0.1 | B | VERK |
| 7546 | VERIZON WIRELESS (GRAPEVINE) | 4436 LEBEC RD | LEBEC | 93243 | 4812 | 34.875842 | -118.892031 | 96 BHP GENERAC/DEERE MODEL 5030HF285G TIER III CERTIFIED DIESEL-FIRED EMERGENCY STANDBY IC ENGINE POWERING AN ELECTRICAL GENERATOR | TRUE | 36 | 0 | 1 | 7 | 5.18E-04 | 0.00E+00 | 1.44E-05 | 1.01E-04 | 9,825 | 3.048 | 0.152 | 727.594 | 50.921 | 0.2 | A | VERG |
| 7614 | TIC EAST WASTEWATER TREATMENT FACILITY | LAVAL RD & INTERSTATE 5 | ARVIN | | 4952 | 34.975619 | -118.854351 | 175 BHP CATERPILLAR MODEL D125-6 TIER 3 CERTIFIED DIESEL-FIRED EMERGENCY STANDBY IC ENGINE POWERING AN ELECTRICAL GENERATOR | TRUE | 50 | 0 | 2 | 19 | 7.19E-04 | 0.00E+00 | 2.88E-05 | 2.73E-04 | 2,178 | 1.524 | 0.127 | 784.2612 | 50.921 | 0.2 | A | TIC |
| 8065 | SOUTHERN CALIFORNIA EDISON | EDMONSTON PUMPING PLANT RD | LEBEC | | 4911 | 34.936749 | -118.880696 | 79 BHP (INTERMITTENT) CUMMINS MODEL GM-5.0L RICH-BURN LPG/PROPANE-FIRED EMERGENCY STANDBY IC ENGINE WITH NON-SELECTIVE CATALYTIC REDUCTION (NSCR) POWERING AN ELECTRICAL GENERATOR | TRUE | 3 | 0 | 3 | 10 | 4.31E-05 | 0.00E+00 | 4.31E-05 | 1.44E-04 | 3,799 | 1.8288 | 0.1016 | 922.0389 | 21.95 | 0.1 | B | SCE |

Footnote:

A. The stack parameters for some of the sources were not available. For the engines without stack height data, a 10-foot stack height was assumed.

For the diesel engines without stack diameters, temperatures and/or exit velocities, the stack parameters for the diesel water pump at Pastoria facility were used.

The NO2 ratio for the diesel engines is assumed to be 0.2, according to http://www.valleyair.org/busind/pto/Tox_Resources/CAPCOANO2GuidanceDocument10-27-11.pdf.

B. The stack parameters for some of the sources were not available. For the engines without stack height data, a 10-foot stack height was assumed.

For the gas and propane engines without stack diameters, temperatures and/or exit velocities, the stack parameters for the Pastoria gas emergency engine were used.

The NO2 ratio for the gas and propane engines is assumed to be 0.1, according to http://www.valleyair.org/busind/pto/Tox_Resources/CAPCOANO2GuidanceDocument10-27-11.pdf.

# APPENDIX 3.1E

# Best Available Control Technology Assessment

## APPENDIX 3.1E

# Best Available Control Technology Assessment

The proposed project is required to use best available control technology for the new auxiliary boilers, in accordance with the requirements of the District new source review program.

The applicability of BACT requirements under District regulations is discussed in Section 3.1.4.3. The SJVAPCD defines BACT as:

> "the most stringent emission limitation or control technique of the following:

- Achieved in practice for such category and class of source;
- Contained in any State Implementation Plan approved by the Environmental Protection Agency for such category and class of source. A specific limitation or control technique shall not apply if the owner of the proposed emissions unit demonstrates to the satisfaction of the APCO that such a limitation or control technique is not presently achievable;
- Contained in an applicable federal New Source Performance Standard; or
- Any other emission limitation or control technique, including process and equipment changes of basic or control equipment, found by the APCO to be cost effective and technologically feasible for such class or category of sources or for a specific source." [Rule 2201, Section 3.9]

The District BACT requirement is applicable for all pollutants. The emission rates and control technologies determined to be BACT for this project are discussed in detail in the following sections.

## 3.1E.1 NOx Emissions

**Achievable Controlled Levels and Available Control Options**

NOx is formed during combustion through two mechanisms: (1) thermal NOx, which is the oxidation of elemental nitrogen in combustion air; and (2) fuel NOx, which is the oxidation of fuel-bound nitrogen. Since natural gas is relatively free of fuel-bound nitrogen, the contribution of this second mechanism to the formation of NOx emissions in natural gas-fired equipment is minimal and thermal NOx is the chief source of NOx emissions. Thermal NOx formation is a function of residence time, oxygen level, and flame temperature, and can be minimized by controlling these elements in the design of the combustion equipment.

There are two basic means of controlling NOx emissions from boilers: combustion controls and post-combustion controls. Combustion controls act to reduce the formation of NOx during the combustion process, while post-combustion controls remove NOx from the exhaust stream. Combustion control technologies for this type of boiler application include low-NOx burners, flue gas recirculation, and staged combustion. Post-combustion controls include SCR and selective non-catalytic reduction (SNCR). These are discussed below in order of most effective to least effective.

**Selective Catalytic Reduction**. The effectiveness of an SCR system requires the catalyst, and thus the treated exhaust stream, to be within a certain temperature range for the NOx reduction reaction to take place. The auxiliary boilers will be operated to support the gas turbine startup process, providing steam for steam turbine seals and sparging. PEF is proposing to install two 50% load boilers to allow the majority of boiler operations to be at loads where boiler operation will be efficient and exhaust gas temperatures are expected to be within the range needed for effective SCR control. Therefore, this technology is considered technically feasible for the auxiliary boilers in this application.

**Selective Noncatalytic Reduction (SNCR).** SNCR involves injection of ammonia or urea with proprietary conditioners into the exhaust gas stream without a catalyst. SNCR technology requires gas temperatures in the range of 1,200 to 2,000°F. The exhaust temperature for the proposed auxiliary boiler is 300°F, well below the minimum SNCR operating temperature. The location within the boilers where this temperature range might be found will move significantly with boiler load. Therefore, SNCR is not technically feasible for this application.

**Ultra-Low NOx Burners with Flue Gas Recirculation (FGR).** Low-NOx burners with FGR are commonly used on industrial-sized package boilers such as the PEF auxiliary boilers. These burners minimize the formation of thermal NOx and FGR reduces the oxygen in the combustion zone to further reduce NOx formation. Ultra-low NOx burners with FGR can achieve NOx emission rates of 7 to 9 ppmvd @ 3% $O_2$ without post-combustion controls. Low NOx burners and FGR are considered technologically feasible for this application.

### District BACT Determinations

The SJVAPCD has rescinded its published BACT determinations for boilers. However, its previous determinations for boilers in this size range with variable loads showed that less than 15 ppmc was considered achieved in practice while 9 ppm was considered technically feasible. In 2010, the SJVAPCD issued a determination for a 36.5 MMBtu/hr natural gas fired auxiliary boiler for the NCPA Lodi Energy Center project in which it determined that 7.0 ppmc was achieved in practice and 5.0 ppmc was technologically feasible. The District ultimately determined that 7.0 ppmc was BACT for the Lodi Energy Center auxiliary boiler because a cost-effectiveness analysis indicated that the addition of SCR, which was required to achieve the 5 ppmc emission level, was not cost-effective.

The BAAQMD has determined that 9 ppmc is achieved in practice while 7 ppmc is considered technologically feasible. The BAAQMD BACT guideline indicates that SCR is needed to achieve 7 ppmc.

### Other Recent BACT Determinations

Other recent BACT determinations for medium-sized auxiliary boilers in the SJVAPCD and elsewhere are summarized in Table 3.1E-1. The proposed NOx limit of 5 ppmc is consistent with or more stringent than recent BACT NOx limits for similar equipment.

### District Prohibitory Rules

SJVAPCD Rule 4320 will be applicable to the proposed auxiliary boilers and will require compliance with a NOx limit of 5 ppmvd @ 3% $O_2$. PEF has obtained a NOx emissions guarantee of 5 ppm with SCR, so the new auxiliary boilers will comply with the NOx limit in the prohibitory rule.

### Conclusions

BACT must be at least as stringent as the most stringent limit achieved in practice, federal NSPS, or district prohibitory rule. Based upon the results of this analysis, the proposed 5 ppm NOx limit represents BACT for this application.

**Table 3.1E-1**
**Recent NOx and CO BACT Determinations for Medium-Sized Auxiliary Boilers**
**(>10 to ~100 MMBtu/hr heat input)**

| Facility | District/State | Heat Input Rating (MMBtu/hr HHV) | NOx Limit | CO Limit | Date Permit Issued | Source |
|---|---|---|---|---|---|---|
| El Segundo | SCAQMD | 36 | 5 ppmc | 50 ppmc | August 2014 (FDOC) | CEC website |
| Sutter Energy Center | Feather River AQMD | 130.33 | 5 ppmc | 50 ppmc | April 2014 (FDOC) | CEC website |
| Interstate Power and Light, Marshalltown Generating Station | Iowa | 60.10 | 0.013 lb/MMBtu[a] | 0.0164 lb/MMBtu[b] | April 2014 | RBLC # IA-0107 |
| CPV Woodbridge Energy Center | New Jersey | 91.6 | 0.01 lb/MMBtu[c] | 3.44 lb/hr[d] | July 2012 | RBLC # NJ-0079 |
| Republic Steel | Ohio | 65 | 0.07 lb/MMBtu[e] | 0.04 lb/MMBtu[f] | July 2012 | RBLC # OH-0350 |
| Avenal Energy Center | SJVAPCD | 37.4 | 9.0 ppmc | 50 ppmc | June 2011 | RBLC # CA-1192 |
| Portland General Electric, Carty Plant | Oregon | 91 | 4.5 lb/hr[g] | n/a | December 2010 | RBLC # OR-0048 |
| NCPA Lodi Energy Center | SJVAPCD | 36.5 | 7 ppmc | 50 ppmc | January 22, 2010 | SJVAPCD permit |

Notes:

a. Equivalent to approximately 10.5 ppmc NOx.

b. Equivalent to approximately 22 ppmc CO; oxidation catalyst.

c. Equivalent to approximately 8 ppmc NOx; low-NOx burners.

d. Equivalent to approximately 50 ppmc CO.

e. Equivalent to approximately 58 ppmc NOx.

f. Equivalent to approximately 50 ppmc CO.

g. Equivalent to approximately 40 ppmc NOx.

### 3.1E.2 CO Emissions

**Achievable Controlled Levels and Available Control Options**

CO emissions during natural gas combustion result from incomplete combustion of the fuel. Use of good combustion practices to ensure complete combustion is generally considered BACT for CO.

**District BACT Determinations**

The SJVAPCD's BACT determination for boilers in this size range with variable loads shows that the use of natural gas fuel is considered to be BACT for CO.

The BAAQMD has determined that BACT for boilers in this size range is the use of good combustion practices for CO control.

**District Prohibitory Rules**

SJVAPCD Rule 4320 limits CO emissions from natural gas-fired boilers to 400 ppmvd @ 15% $O_2$.

**Other Recent BACT Determinations**

Other recent BACT determinations for medium-sized auxiliary boilers in the SJVAPCD and elsewhere are summarized in Table 3.1E-1 above. The proposed CO limit of 50 ppmc is consistent with or more stringent than recent CO limits for similar equipment. The only limit that is more stringent than the 50 ppmc limit proposed for this project is the Marshalltown Generating Station boiler that utilizes an oxidation catalyst with a CO limit of approximately 22 ppmc. However, this boiler has a higher NOx limit than the 7 ppmc proposed for the Pastoria project, with no add-on NOx controls. When the NOx and CO limits are considered together, the Pastoria project has more stringent controls overall.

**Conclusions**

BACT must be at least as stringent as the most stringent limit achieved in practice, federal NSPS, or district prohibitory rule. Based upon the results of this analysis, the proposed 50 ppm CO limit represents BACT for this application. The proposed limit is expected to be achievable through the use of good combustion practices.

### 3.1E.3 VOC Emissions

**Achievable Controlled Levels and Available Control Options**

VOC emissions during natural gas combustion result from incomplete combustion of the fuel gas. VOC emissions are minimized by combustion practices that promote high combustion temperatures, long residence times at those temperatures, and turbulent mixing of fuel and combustion air. Since those practices tend to increase NOx emissions, the effectiveness of the NOx control system may affect the ability of the boiler to achieve low VOC emission rates.

**District BACT Determinations**

The SJVAPCD's BACT determination for boilers in this size range with variable loads shows that the use of natural gas fuel is considered to be BACT for VOCs.

The BAAQMD has determined that BACT for boilers in this size range is the use of good combustion practices for VOC control.

**District Prohibitory Rules**

SJVAPCD Rule 4320 does not contain a VOC limit.

**Conclusions**
BACT must be at least as stringent as the most stringent limit achieved in practice, federal NSPS, or district prohibitory rule. Based upon the results of this analysis, the proposed 10 ppm VOC limit represents BACT for this application. The proposed limit is expected to be achievable through the use of good combustion practices.

### 3.1E.4 $SO_2$, $PM_{10}$ and $PM_{2.5}$ Emissions

**Achievable Controlled Levels and Available Control Options**
$SO_2$, $PM_{10}$ and $PM_{2.5}$ emissions from natural gas combustion result from sulfur and other impurities in the fuel. Emissions of these pollutants will be minimized through the use of low sulfur pipeline quality natural gas. There are no add-on control technologies that are effective in reducing $SO_2$ and $PM_{10}$ emissions from naturally low-emitting natural gas-fired boilers.

**District BACT Determinations**
The SJVAPCD and BAAQMD BACT guidelines both indicate that the use of natural gas fuel is considered BACT for boilers.

**Conclusions**
Use of pipeline quality natural gas is considered BACT for this boiler application. The proposed emissions limitations are expected to be achievable with natural gas firing.

# APPENDIX 3.1F

## Offsets

APPENDIX 3.1F

# Offsets

Under District Rule 2201, PEF must provide offsets for the portion of the facility emissions after modification that exceed the SJVAPCD offset thresholds. Because the proposed project is a modification to an existing stationary source, the calculation of the offset requirements must account for the emissions from the existing PEF power plant facility. Table 3.1F-1 shows the annual proposed potential to emit from the new auxiliary boilers, the annual potential to emit for the existing units, and the total emissions from the combined facility after modification, and compares these totals with the offset thresholds to determine the offsets required for the project.

**TABLE 3.1F-1**
Offset Requirements for PEF

| | Annual Emissions, tons | | | |
|---|---|---|---|---|
| | **NOx** | **SOx** | **VOC** | **$PM_{10}/PM_{2.5}$** |
| PTE for Existing Facility | 172.5 | 42.4 | 113.8 | 118.3 |
| Rule 2201 Offset Threshold | 10.0 | 27.4 | 10.0 | 14.6 |
| Exceed Offset Threshold? | yes | yes | yes | yes |
| Net Emissions Increase for New/Modified Sources (PTE for new auxiliary boilers) | 14.2 | 1.7 | 3.3 | 5.6 |
| Emissions Required to be Offset | 14.2 | 1.7 | 3.3 | 5.6 |

The quarterly calculation of required offsets, including offset ratios, is provided in Table 3.1F-2. This calculation demonstrates that more than sufficient offsets are being provided to achieve the no net increase provision of the District NSR rule (Rule 2201 §1.0).

Table 3.1F-3 provides documentation regarding the location and method of reduction for each ERC certificate proposed to be used for the project.

**Table 3.1F-2**
**PEF Amendment**
**Emission Reduction Credits**

| | Q1 (lbs) | Q2 (lbs) | Q3 (lbs) | Q4 (lbs) | Annual, lbs |
|---|---|---|---|---|---|
| | | | | | |
| **NOx** | 90 | 91 | 92 | 92 | 365 |
| Project Emissions (1) | 7,002 | 7,080 | 7,157 | 7,157 | 28,396 |
| Project Emissions Subject to Offset | 7,002 | 7,080 | 7,157 | 7,157 | 28,396 |
| Required Offsets (1.5 ratio) | 10,503 | 10,619 | 10,736 | 10,736 | 42,594 |
| ERC Cert S-3114-2 | 178,929 | 181,004 | 183,080 | 184,561 | 727,574 |
| Surplus NOx ERCs | 168,426 | 170,385 | 172,344 | 173,825 | 684,980 |
| | | | | | |
| **VOC** | | | | | |
| Project Emissions | 1,647 | 1,665 | 1,684 | 1,684 | 6,680 |
| Project Emissions Subject to Offset | 1,647 | 1,665 | 1,684 | 1,684 | 6,680 |
| Required Offsets (1.5 ratio) | 2,471 | 2,498 | 2,525 | 2,525 | 10,019 |
| ERC Cert S-3368-1 | 1,500 | 1,500 | 1,500 | 1,500 | 6,000 |
| ERC Cert S-3116-1 | 1,440 | 1,546 | 1,621 | 1,621 | 6,228 |
| Net Surplus VOC ERCs | 469 | 548 | 596 | 596 | 2,209 |
| | | | | | |
| **SOx** | | | | | |
| Project Emissions | 826 | 835 | 845 | 845 | 3,351 |
| Project Emissions Subject to Offset | 826 | 835 | 845 | 845 | 3,351 |
| Required Offsets (1.5 ratio) | 1,239 | 1,253 | 1,267 | 1,267 | 5,026 |
| ERC Cert S-3294-5 | 4,000 | 4,000 | 4,000 | 4,000 | 16,000 |
| Net Surplus SOx ERCs | 2,761 | 2,747 | 2,733 | 2,733 | 10,974 |
| | | | | | |
| **PM10** | | | | | |
| Project Emissions | 2,765 | 2,796 | 2,826 | 2,826 | 11,213 |
| Project Emissions Subject to Offset | 2,765 | 2,796 | 2,826 | 2,826 | 11,213 |
| Required Offsets (1.5 ratio) | 4,147 | 4,193 | 4,239 | 4,239 | 16,819 |
| ERC Cert S-1689-4 | 0 | 0 | 0 | 2,604 | 2,604 |
| ERC Cert S-1693-4 | 1,091 | 1,103 | 1,115 | 1,115 | 4,424 |
| ERC Cert S-3091-4 | 0 | 0 | 0 | 7,210 | 7,210 |
| ERC Cert S-3090-4 | 751 | 812 | 634 | 694 | 2,891 |
| Surplus PM10 ERCs by quarter | -2,305 | -2,278 | -2,490 | 7,384 | 311 |
| Use Q4 ERCs for Q1/Q2/Q3 shortfall | 2,305 | 2,278 | 2,490 | -7,073 | -- |
| Net Surplus PM10 ERCs | 0 | 0 | 0 | 311 | 311 |
| | | | | | |

Note:
1. Project Emissions equals PTE for new auxiliary boilers.

**Table 3.1F-3**
**PEF Amendment**
**Emission Reduction Credit Certificates to be Used for Project Offsets**

| ERC Certificate | Location of Emission Reduction | Date of Emission Reduction | Method of Emission Reduction | Owner |
|---|---|---|---|---|
| **NOx** | | | | |
| S-3114-2 | Section NE35, Township 30S, Range 23E<br>Elk Hills, Tupman | 12/05/90 | Retrofit IC engines with pre-combustion chambers | Pastoria Energy Facility |
| **VOC** | | | | |
| S-3368-1 | Rosedale Hwy; Section 28, Township 29S, Range 27E | 5/30/77 | Incineration of coker exhaust in CO boiler | Calpine Energy Services |
| S-3116-1 | South Coles Levee Gas Plant, Tupman<br>Section SW03, Township 31S, Range 25E | 5/24/93 | Gas plant equipment modifications and shutdowns | Calpine Corporation |
| **SOx** | | | | |
| S-3294-5 | Panama Ln & Weedpatch Hwy, Bakersfield 93307; Section 25, Township 30S, Range 28E | 10/4/07 | Reduction in refinery fuel gas $H_2S$ content prior to combustion | Calpine Energy Services |
| **$PM_{10}$** | | | | |
| S-1689-4 | 16351 Avenue 40, Earlimart; Section 12, Township 24S, Range 24E | 11/30/92 | Shutdown of Earlimart cotton gin | Calpine Corporation |
| S-1693-4 | Section 27, Township 29S, Range 27E | 4/1/87 | Shutdown of AIMCOR permit units | Calpine Corporation |
| S-3091-4 | Tulare | 11/15/91 | Shutdown of Tulare Growers cotton gin | Calpine Energy Services |
| S-3090-4 | 2201 East Brundage Lane, Bakersfield | 8/1/04 | Shutdown of wood furniture manufacturing operation | Calpine Energy Services |