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**Sutter Energy Center (97-AFC-2)**
**Staff Analysis**
**Request to Amend Air Quality Conditions of Certification**
**Joseph M. Loyer**
**April 22, 2003**

## AMENDMENT REQUEST

The Calpine Corporation (Calpine) has requested several amendments to the Conditions of Certification for the Sutter Energy Center (Sutter). These amendment requests fall into three general categories. Calpine requests to modify the shutdown emission limits and the length of time allowed for startup. Calpine also requests a singe set of emission limits for all operational scenarios, except startup and shutdown. Finally, Calpine requests language changes to reconcile minor ambiguities between the Feather River Air Quality Management District (District) Permit to Operate (PTO), the United States Environmental Protection Agency (EPA) Prevention of Significant Deterioration Permit (PSD) and the Commission Decision.

## BACKGROUND

The Sutter facility is a 500 MW power plant consisting of 2 Westinghouse 501FC combustion turbines (170 MW each) with heat recovery steam generators and separate exhaust stacks. Additionally the Sutter facility has a 160 MW steam generator, a dry cooling tower, a water treatment plant and a 230 kV switching station. The linear facilities constructed for the Sutter facility included 12 miles of 16-inch natural gas pipeline and 4 miles of 230 kV transmission line. The Sutter facility controls emissions through the exclusive use of natural gas for combustion purposes, dry-low NOx combustors, ammonia injection selective catalytic reduction (SCR) and an oxidation catalyst.

The Commission licensed the Sutter facility on April 14, 1999 at the then current BACT levels of 2.5-ppm NOx, 4 ppm CO and 1 ppm VOC. The Sutter facility became operational on July 2, 2001, following an amendment (12/6/2000) that eliminated separate hot and cold startup requirements and made a minor language adjustment to the ammonia emission limit. Calpine has completed several emissions source tests for the Sutter facility (the latest one was performed on October 15, 2002) and has submitted several emission reports for approval to the Commission in compliance with the Conditions of Certification.

The current petition brings forth several difficulties that Calpine is currently experiencing. Specifically, Calpine is finding that the Westinghouse turbines and HRSGs in combination with the steam turbine, dry-cooling system and required noise restrictions create a significant back pressure that is difficult to overcome when attempting to start the facility from a cold state. For this purpose, Calpine is petitioning the Commission to increase the startup time from 3 hours to 6 hours. To account for the increase in time to startup, Calpine is also petitioning the Commission for an increase in startup emission limits. Additionally, Calpine

cites recent source testing at both the Sutter and Delta Energy Centers that demonstrates that they require an increase in some of the startup and shutdown emission limits for the Sutter facility. However, Calpine further states that they will not require an increase in either daily, quarterly or annual emission limits, and thus should not be required to provide additional mitigation for the proposed emission increases during startup and shutdown.

The current emission limits are based on a variety of facility operational scenarios. Calpine is proposing to eliminate this level of refinement in their emission limits in favor of a more simplified limit for all operations. Calpine does not propose modifying the Sutter daily, quarterly or annual emission limits.

Finally, Calpine has found that there are several ambiguities between the District, EPA and Commission permits or licenses. Calpine is petitioning the District, EPA and the Commission to reconcile these ambiguities. These ambiguities include the definition of startup and shutdown, as well as the simplification of the hourly, daily and annual emission limits for the Sutter facility.

Calpine has petitioned EPA and the District concurrently with the Commission for similar changes to the Sutter PSD and PTO permits. The District has processed the Calpine petition and has issued a Permit to Operate that includes the Commission staff comments in the final language. EPA is currently reviewing the Calpine petition and has not indicated a specific time frame for issuing the revised PSD permit. In general, the Calpine petition is to modify the Commission Decision and District PTO to reflect the language in the EPA PSD permit. Therefore, it is staff's opinion that proceeding with the Calpine petition at the Commission will not be hampered by the timing restrictions from the Calpine petition at EPA.

**LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)**
No laws, ordinances, regulations or standards are affected by the petitioned amendment requests.

**ANALYSIS**

**Changes to Emission Limitations**

**Changes to Startup and Shutdown Limitations**
Calpine proposes to increase the shutdown emission limits and extend the allowable time for startup to allow the Sutter facility more flexibility to reliably startup and shutdown. AIR QUALITY Table 1 shows the current limitations for shutdown and startup and the modifications that Calpine is proposing.

**AIR QUALITY Table 1**
**Proposed Modifications to Shutdown and Startup Limitations**

| | Current Limit | Proposed Limit | Source Test Results |
|---|---|---|---|
| **Startup** Duration | 3 Hours | **6 hours** | 69 minutes[1] |
| NOx | 175 lbs/hour<br>510 lbs/event | No change<br>**680 lbs/event** | 78.05 lbs/hour[1]<br>89.76 lbs/event[1,3] |
| CO | 902 lbs/hour<br>2,514 lbs/event | No change<br>No change | 58.96 lbs/hour[1]<br>67.80 lbs/event[1] |
| VOC | 1.5 lbs/hour<br>4.5 lbs/event | **16 lbs/hour**<br>**59 lbs/event** | 16.1 lbs/hour[2]<br>See note 3 below |
| SO2 | 3.7 lbs/hour<br>8.1 lbs/event | No change<br>**22.2 lbs/event** | --<br>See note 4 below |
| PM10 | 9 lbs/hour<br>27 lbs/event | No change<br>**54.0 lbs/event** | --<br>See note 4 below |
| **Shutdown** Duration | 1 hour | No change | 26 minutes[1] |
| NOx | 12.1 lbs/event | **80 lbs/event** | 73.48 lbs/hour[1]<br>29.39 lbs/event[1] |
| CO | 12.6 lbs/event | **100 lbs/event** | 125.62 lbs/hour[1]<br>50.25 lbs/event[1] |
| VOC | 1.1 lbs/event | **16 lbs/event** | 8.8 lbs/hour[2] |
| SO2 | 2.7 lbs/event | **3.7 lbs/event** | See note 5 below |
| PM10 | 9 lbs/event | No change | |

Notes
1 Emission source test results dated March 5, 2002.
2 Revised Report for Startup and Shutdown Emission Tests, Delta Energy Center, Pittsburg, California. September 2002.
3 Emission limit is agreed on by staff, District and Calpine.
4 Emission limit is increased to account for the proposed increased time during startup.
5 The Calpine proposed SO2 emission limit during shutdown is to be increased from 2.7 to 3.7 lbs/hour, but the averaging period is to be decreased from 3 hours to 1 hour. Therefore, the proposed emission limit is effectively a more restrictive limitation.

As can be seen, Calpine is requesting that the startup emissions generally be increased only to account for the increased time for startup (except for VOC). Calpine is also requesting to increase the shutdown emissions for all pollutants except PM10. The basis for these requests are generally from the emission source test results presented in AIR QUALITY Table 1. As can be seen, the NOx and CO results show that Calpine is in violation of the shutdown emission limits (for which they have a temporary variance from the District). For startup NOx and CO emissions, Calpine has demonstrated that the Sutter facility is capable of maintaining compliance with the maximum hourly limits and thus only needs to account for the increase in time.

Calpine is proposing to increase the startup hourly VOC emission limit from 1.5 to 16 lbs/hour. By way of explanation, Calpine operates several other power projects that use the Westinghouse 501F turbines as their prime mover that were licensed at 16 lbs of VOC per hour during startup. One of these is the Delta Energy Center, where source testing confirms that the Westinghouse 501F turbines emit significantly more than 1.5 lbs of VOC per hour. Furthermore, the current VOC limit of 1.5 lbs/hour for Sutter under startup was based on

inaccurate vendor data that has since been revised. However, the total VOC emissions per startup event are limited to 59 lbs, obviously less than 16 lbs/hour for 6 hours (which is 96 lbs) for each turbine. This is to ensure that the Sutter VOC emissions will not exceed the daily limit (158 lbs/day for both turbines). The 59 lbs/event limit was found to be acceptable by both District and Commission staff as well as Calpine. Given this limitation on VOC emissions during startup and the source tests results for VOC during normal operations, staff expects that Calpine can start the Sutter turbines from a cold state and operate them for the remainder of the day while staying within their daily limits.

**Changes to PM10 Emission Limits**

As can be seen in AIR QUALITY Table 2, the current hourly emission limits were based on a variety of facility operational scenarios. Calpine is proposing to eliminate this level of refinement in their emission limits in favor of a more simplified hourly limit for all operations. The current daily, quarterly and annual emission limits are already based on an hourly emission limit of11.5 lbs/hour and assume continuous operation (i.e., 24 hours per day, 7 days per week, 52 weeks per year). Therefore, these limits are not proposed to be changed and staff finds it unlikely that Sutter will violate the daily, quarterly and annual emission limits if it complies with the hourly limit.

**AIR QUALITY Table 2**
**Proposed Modifications to PM10 Emission Limits**

| | | Current Emission Limit | Proposed Emission Limit |
|---|---|---|---|
| **Hourly** | CTG | 9 lbs/hour | **11.5 lbs/hour** |
| | CTG + Duct Burner | 11.5 lbs/hour | |
| | CTG + Duct Burner + Steam Injection | 11.5 lbs/hour | |
| | CTG + Steam Injection | 9 lbs/hour | |
| **Daily** | total for Facility | 541 lbs/day | No Change |
| **Quarterly** | total for Facility | 46,200 lbs/quarter | No Change |
| **Annual** | total for Facility | 92.4 tons/year | No Change |

Calpine also requests eliminating the CTG specific daily and annual emission limits in favor of the facility wide emission limits to allow for greater flexibility during operations. This request is not only in connection with PM10, but NOx, CO, VOC and SOx as well. Since these emissions are limited on an hourly basis per CTG, staff can find no additional impact associated with the elimination of CTG specific daily and annual emission limits in favor of facility wide daily and annual emission limits.

**Reconciliation of Expected Operational Emissions and Emission Limits**

The combination of proposed changes to the startup and operation emission limits of the Sutter facility will alter the facility's expected daily, quarterly and

annual emissions levels. However, Calpine has agreed to comply with the current daily, quarterly and annual emission permit limits. Therefore, the question before staff is to determine if the Sutter facility can comply with those current limits given their new emissions levels. In order to answer that question, staff considered recent relevant source testing at the Sutter facility and the existing or proposed emissions limits.

The current and proposed quarterly and annual emission limits are based on full load daily operation including a limited number of hours of startups of the Sutter facility. Therefore, if the Sutter facility can comply with the current daily emission limits, staff will be satisfied that it will also comply with the quarterly and annual emission limits.

In this case based on source testing and the existing emission limits (see Appendix A), staff has determined that the Sutter facility can comply with the existing daily emission limits given compliance with the proposed new and existing limits in AIR QUALITY Tables 1 and 2.

**Elimination of Semi-Annual Emission Reporting**

Condition of Certification AQ-42 requires that Calpine submit a semi-annual emissions report to the Compliance Project Manager (CPM). This was originally intended to be the only emissions report required of Calpine for Sutter (with the exception of source testing requirements). This Condition was proposed very early in the licensing process, prior to the District issuing their Preliminary Determination of Compliance (PDOC). The PDOC (and subsequently the FDOC) included a requirement for quarterly emission reporting. Unfortunately, the semi-annual emission reporting requirement was never eliminated in support of the quarterly emission reporting requirement. Thus, Calpine has been unduly burdened with both emission reporting requirements. Therefore, staff proposes to delete the semi-annual emission reporting requirement (AQ-42) and make minor adjustments to Conditions of Certification that may be referencing it.

**Reconciliation to EPA PSD Permit Definitions**

Calpine requests that several minor changes to the Conditions of Certification be made in order to be more consistent with District and EPA phrasing and requirements.

**Change of Definition of Startups and Shutdowns (Condition of Certification AQ-32)**

Calpine proposes to incorporate the compliance with the CO concentration limit (4 ppm) in the definition of the end of startup and the beginning of shutdown. Staff has no objection to this non-standard approach.

**Change of Averaging Time for Emission Limits (Conditions of Certification AQ-32 and -33)**

Calpine is proposing to modify the averaging time of the concentration and mass emission limits for CO, VOC SO2 and PM10 from daily averages to 3-hour rolling averages. Staff has no objection since this will be more restrictive.

**Minor Clarifications (Conditions of Certification AQ-34, -35, -40)**

Calpine has suggested clarifying language to Conditions of Certification requiring source testing and continuous emissions monitors (CEMs), as well as requesting the elimination of conditions regarding initial commissioning or initial startup. Staff has no objection to modifications that will not substantively change the Conditions requirements. However, it has been our policy to maintain conditions that have been complied with for the historic record. Therefore, staff agrees to the proposed modification of these Conditions and rejects the proposed elimination of any Conditions.

**Minor General Corrections**

Staff has discovered several minor errors that need to be corrected. They involve any Conditions referencing Condition AQ-43, which does not exist. It was originally intended that these Conditions refer to AQ-42, the semi-annual emissions reporting requirement. Since staff intends to eliminate Condition AQ-42 in favor of Condition AQ-40 (Quarterly Emission Reports), staff will revise all Conditions referencing Condition AQ-43 to reference AQ-40. There are other similar minor corrections that also need to be made that will not change the intent of the Conditions. Primarily, these changes are the elimination of references to the District licenses (Authority to Construct, Permit to Operate and the Final Determination of Compliance). These references are not necessary for enforcement or compliance purposes, and would require annual amendments to maintain. Therefore, staff recommends their elimination.

**Changes to Mitigation Measures**

Calpine was required to surrender emission reduction credits (ERCs) in specific amounts provided for in a table referred to in original Condition of Certification AQ-41. However this Table was based on assumptions made early in the licensing phase of the project and assumed that Calpine would surrender specific ERC certificates and provide a certain amount of road paving (for PM10). However, Calpine changed several of the ERCs to different certificates and eliminated the road paving option. Thus, the table referred to in original Condition of Certification AQ-41 should have been previously amended.

The District proposed, and Calpine has accepted, that the AQ-41 table be changed from a single table to a series of tables, one for VOC, NOx and PM10, which include the exact ERC certificates, the offset ratio used and the interpollutant-trading ratio used for each certificate. This series of tables appears in proposed Condition of Certification AQ-41. Prior to operation, Calpine surrendered the ERCs shown in the tables.

## CONCLUSIONS AND RECOMMENDATIONS

Staff has analyzed the proposed changes and concludes that there will be no new or additional significant impacts associated with approval of the petition and will remain in compliance with all applicable LORS. Staff concludes that the proposed changes are based on information that was not available during the original licensing procedures. Staff concludes that the proposed language retains that intent of the original Commission Decision and Conditions of Certification.

## PROPOSED CHANGES TO CONDITIONS OF CERTIFICATION

**AQ-7** The facility shall not ~~discharge~~ emit into the atmosphere from any source whatsoever such quantities of air contaminants or other material~~s~~ which ~~that~~ cause injury, detriment,~~a public~~ nuisance, or annoyance to any considerable number of persons or the public, or which endanger the comfort, repose, health or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property. ~~(District General ATC Permit Condition a).~~

**Verification:** As part of the ~~semiannual~~ quarterly Air Quality Reports (as required by AQ-4~~3~~0), the project owner shall include the date and time when any accidental release of air contaminants or other materials occur. The Air Quality Report shall also include the reason for the accidental release and measures taken to correct it.

**AQ-8** The facility shall not emit into the atmosphere particulate emissions from any single source which exceed an opacity equal to or greater than twenty percent (20%) for a period aggregating more than three (3) minutes in any one (1) hour, excluding uncombined water vapor. ~~(District General ATC Permit Condition b).~~

**Verification:** As part of the ~~semiannual~~ quarterly Air Quality Reports (as required by AQ-4~~3~~0), the project owner shall include an explanation and the date, time, and duration of any violation of this Condition.

**AQ-9** The facility shall not ~~discharge~~ emit into the atmosphere into the atmosphere from any source particulate matter in excess of 0.3 grains per cubic foot of gas at standard conditions. When the source involves a

combustion process, the concentration must be calculated to 12 per cent carbon dioxide (CO 2). ~~(District General ATC Permit Condition c).~~

**Verification:** As part of the annual Air Quality Reports, the project owner shall submit to the District and CPM the annual source test and specify the level of particulate matter in grains per cubic foot of gas at standard conditions.

**AQ-10** The facility shall not ~~discharge~~ emit into the atmosphere in any one hour from any source whatsoever fumes in total quantities in excess of the amounts as prescribed for and shown in District's Rule 3.3 Table of Allowable Rate of Emission Based on Process Weight Rate. ~~(District General ATC Permit Condition d).~~

**Verification:** As part of the ~~semiannual~~ quarterly Air Quality Reports (as required by AQ-4~~3~~0), the project owner shall indicate the date, time, and duration of any violation of this Condition.

**AQ-11** The facility shall not discharge into the atmosphere, from any single source of emission whatsoever, any sulfur oxides in excess of 0.2 percent by volume (2,000 ppm) collectively calculated as sulfur dioxide (SO2). ~~(District General ATC Permit Condition e).~~

**Verification:** As part of the annual Air Quality Reports, the project owner shall submit to the District and CPM the annual source test and specify the level of sulfur oxides in percent by volume of gas at standard conditions.

**AQ-12** Project owner shall not build, erect, install, or use any article, machine, equipment or other contrivance to conceal an emission which would otherwise constitute a violation of the Health and Safety Code of the State of California or of these Rules and Regulations.

**Verification:** Refer to AQ-33 through AQ-36. The project owner shall obtain approval from the District and the CPM prior to installing any new equipment that results in releasing air contaminants.

**AQ-13** Project owner shall take every reasonable precaution not to cause or allow the emissions of fugitive dust from being airborne beyond the property line from which the emission originates, from any construction, handling or storage activity, or any wrecking, excavation, grading, clearing of land or solid waste disposal operation. Reasonable precautions shall include, but are not limited to: use, where possible, of water or chemicals for control of dust in the demolition of existing buildings or structures, construction operations, construction of roadways, or the clearing of land; application of asphalt, oil, water, or suitable chemical on dirt roads, material stockpiles, and other surfaces which can give rise to airborne

dusts; other means approved by the Air Pollution Control Officer. ~~(FRAQMD General ATC Permit Condition g).~~

**Verification:** Refer to conditions AQ-1 through AQ-6.

**AQ-14** In the case of shut-down or re-startup of air pollution control equipment for necessary scheduled maintenance, the intent to shut down such equipment shall be reported to the Air Pollution Control Officer at least twenty-four (24) hours prior to the planned shutdown. Such prior notice may include, but is not limited to, the following:

a. Identification of the specific equipment to be taken out of service as well as its location and permit number;
b. The expected length of time that the air pollution control equipment will be out of service;
c. The nature and quantity of emissions of air contaminants likely to occur during the shut-down period;
d. Measures such as the use of off-shift labor and equipment that will be taken to minimize the length of the shutdown period.
e. The reasons that it would be impossible or impractical to shut down the source operation during the maintenance period.

~~(FRAQMD General ATC Permit Condition h).~~

**Verification:** As part of the ~~semiannual~~quarterly Air Quality Report (as required by AQ-4~~3~~0), the project owner shall include the dates of the equipment maintenance schedule including when each piece of equipment will be shut-down and when it will start-up.

**AQ-15** In the event that any emission source, air pollution control equipment, or related facility breaks down in such a manner which may cause the emission of air contaminants in violation of any permit condition or applicable rules or regulations, other than as exempted herein, the licensee shall immediately notify the Air Pollution Control Officer of such failure or breakdown and subsequently provide a written statement giving all pertinent facts, including the estimated duration of the breakdown. The Air Pollution Control Officer shall be notified when the condition causing the failure or breakdown has been corrected and the equipment is again in operation. ~~(FRAQMD General ATC Permit Condition i).~~

**Verification:** As part of the ~~semiannual~~ quarterly Air Quality Report (as required by AQ-4~~3~~0), the project owner shall include the date and duration of all equipment breakdowns, the cause of the breakdown, how it was corrected, and the measures that will be used to prevent the problem from occurring again.

**AQ-16** Project owner shall submit an application for a Federal Operating Permit Title- V within 12 months after operational startup. ~~(FRAQMD General ATC Permit Condition j).~~

**Verification:** The project owner shall submit to the CPM a copy of the report at the time of filing with the District.

**AQ-17** Project owner shall prepare and submit to the District a Toxic Hot Spots emission inventory by the first month of August following the first full calendar year of facility operational history. ~~(FRAQMD General ATC Permit Condition k).~~

**Verification:** ~~As part of the semiannual Air Quality Report (as required by AQ-43), t~~The project owner shall submit to the District and the CPM an inventory of all Toxic Hot Spots emissions.

**AQ-18** A PSD permit must be obtained from the USEPA before commencement of facility operations. ~~(FRAQMD General ATC Permit Condition l).~~

**Verification:** At least 90 days prior to commencement of facility operations, the project owner shall submit to the CPM a copy of the PSD permit from the US EPA.

**AQ-19** The equipment is subject to the federal NSPS codified at 40 CFR Part 60, Subparts A (General Provisions), Db (Standards of Performance for Industrial- Commercial-Institutional Steam Generating Systems), and GG (Standards of Performance for Stationary Gas Turbines), Compliance with all applicable provisions of these regulations is required. ~~(FRAQMD General ATC Permit Condition m).~~

**Verification:** As part of the first ~~semi-annual~~quarterly Air Quality Report (as required by AQ-40), the project owner shall submit to the District and CPM a copy of a statement of compliance with the above federal applicable provisions and regulations.

**AQ-20** Project owner shall meet the provisions of the Federal Acid Rain Program Title-IV by filing an Acid Rain permit 24 months before operational startup and by certifying CEMS for NOx and O2 within 90 days after operational startup. ~~(FRAQMD General ATC Permit Condition n).~~

**Verification:** The project owner shall provide the District and the CPM with a copy of the Acid Rain permit within 90 days after the permit is approved. Refer to AQ-33 for verification.

**AQ-21** Project owner shall file an RMP with the Sutter County office in charge of the prevention of accidental releases prior to operational startup. ~~(FRAQMD General ATC Permit Condition o).~~

**Verification:** Refer to Hazardous Materials condition and verification HazMat-2.

**AQ-22** The Authority To Construct (ATC) is not transferable from one location to another, or from one person to another without the written approval of the APCO. ~~(FRAQMD General ATC Permit Condition p).~~

**Verification:** At least sixty days in advance, the project owner shall notify, in writing, the District and the CPM of any intended transfer of ownership or location and obtain written approval prior to any transfer.

**AQ-23** District personnel shall be allowed access to the plant site and pertinent records at all reasonable times for the purposes of inspections, surveys, collecting samples, obtaining data, reviewing and copying air contaminant emission records and otherwise conducting all necessary functions related to this permit. ~~(FRAQMD General ATC Permit Condition q).~~

**Verification:** During site inspection, the project owner/operator shall make the plant logs available to the District, California Air Resources Board (CARB), and Commission staff.

**AQ-24** Project owner shall maintain a copy of all District permits at the facility. ~~(FRAQMD General ATC Permit Condition r).~~

**Verification:** During site inspection, the project owner/operator shall make all plant permits available to the District, California Air Resources Board (CARB), and Commission staff.

**AQ-25** Combustion turbine exhaust stacks shall exhaust at a height of 145 feet and the maximum diameter shall not exceed 18 feet. ~~(FRAQMD General ATC Permit Condition s).~~

**Verification:** The project owner/operator shall make the site available for inspection to the District, California Air Resources Board (CARB), and Commission staff.

**AQ-26** Project owner shall submit to the District and the Energy Commission ERC option contracts or final signed contracts for the project's ERC liability, except for PM10, as listed in condition AQ-4~~2~~1 prior to the Energy Commission's Final Decision on the project. ~~(FRAQMD General ATC Permit Condition t).~~

**Verification:** At least 10 days prior to the Commission adoption of the final decision on the project, the Project owner shall have provided copies of all option contracts or signed contracts required by this Condition.

**AQ-27** Calpine has produced evidence indicating that it has an enforceable right to ERCs located in another District. These ERCs cannot be used until the District Board adopts an approving resolution and enters into an MOU with the other District. The District intends to act on the resolution and MOU as soon as practicable after CEC completes an environmental analysis document and the criteria in Section 15253, Subdivision (b) of the CEQA Guidelines are met. ~~(FRAQMD General ATC Permit Condition v.)~~

**Verification:** At least 30 days prior to the start of construction, Project owner shall provide a copy of the signed MOU to the CPM.

**AQ-28** Project owner may substitute interpollutant offsets of VOCs (ROCs) for NOx at a 2.0 to 1.0 interpollutant offset ratio pursuant to Rule 10.1, Section E.2, d. ~~(FRAQMD General ATC Permit Condition w).~~

**Verification:** The project owner shall submit to the District and the CPM a copy of the offsets calculations that satisfy AQ-4~~2~~1 if it chooses to use the interpollutant substitution offset ratio specified in this Condition.

**AQ-29** The facility shall exclusively use California PUC pipeline quality natural gas as fuel. The fuel gas total sulfur and heat content will be determined and reported to the District by collecting and analyzing a sample on a monthly basis or by providing monthly certification of the natural gas total sulfur and/or heat content issued by the natural gas distributor. ~~(FRAQMD General ATC Permit Condition x).~~

**Verification:** As part of the ~~semi-annual~~quarterly Air Quality Report (as required by AQ-4~~3~~0), the project owner shall submit to the District and CPM a copy of the natural gas analysis or certification issued by the natural gas distributor to satisfy this Condition.

**AQ-30** All basic and control equipment is to be operated and maintained in accordance with vendors' recommended practices and procedures. ~~(FRAQMD General ATC Permit Condition y).~~

**Verification:** Refer to AQ-14 verification.

**AQ-31** The maximum heat input allowed to ~~each permitted internal and external combustion emissions unit~~ gas turbine and duct burner, expressed in MMBtu units on a High Heating Value basis (HHV), shall not exceed the limits indicated in the table below: ~~(FRAQMD specific ATC Permit Condition a).~~

| Emission Unit | MMBtu/hour | MMBtu/day (1) | MMBtu/year (2) |
|---|---|---|---|
| CTG-1 | 1,900 | 45,600 | 16,644,000 |
| CTG-2 | 1,900 | 45,600 | 16,644,000 |
| Duct Burner-1 | 170 | 4,080 | 928,200 |
| Duct Burner-2 | 170 | 4,080 | 928,200 |
| (1) Based on 24 hour-day<br>(2) Based on 365 days/year | | | |

**Verification:** As part of the ~~semi-annual~~quarterly Air Quality Reports (as required by AQ-4~~3~~0), the project owner shall document the date and time when the hourly fuel consumption exceeds the hourly limits included in this Condition. The reports shall include a summary of hourly and daily fuel consumption in MMBtu [high heating value (HHV)] for all the cases indicated in the table above. The January Air Quality Report shall also include information on the amount of fuel consumed, in MMBtu (HHV), in the prior calendar year.

**AQ-32** The following definitions and limitations shall apply: ~~(FRAQMD specific ATC Permit Condition b).~~

(1) CTG startups are defined as the time period commencing with the introduction of fuel flow to the gas turbine and ending at the start of the first hour period when the NOx concentrations do not exceed 2.5 ppmvd at 15% $O_2$ averaged over 1-hour and the CO concentrations do not exceed 4.0 ppm at 15% $O_2$ averaged over 1 hour.

(2) For each CTG, a startup shall not exceed ~~180~~360 consecutive minutes.

(3) Shutdowns are defined as the time period commencing with a 15 minute period during which the 15 minute average NOx concentrations exceed 2.5 ppmvd at 15% O2 or the 15 minute average CO concentration exceeds 4.0 ppm at 15% $O_2$ and ending when the fuel flow to the gas turbine is discontinued.

(4) For each CTG, a shutdown shall not exceed 60 consecutive minutes.

(5) The maximum duration of startups per CTG shall be 400 hours per year and 102 hours per calendar quarter.

(6) The maximum duration of shutdowns per CTG shall be 300 hours per year, and 76 hours per calendar quarter.

(7) Compliance with the above yearly limits shall be calculated based on a rolling 12-month average.

(8) All emissions during startups and shutdowns shall be included in all calculations of daily, quarterly and annual mass emissions required by this permit.

(9) For each ~~CTG the maximum number of~~ Duct Burner the total hours of combusting fuel ~~hours of operation~~ shall not exceed 5,460 per calendar year.

(10) For each CTG the ~~maximum number~~ total hours of Power Augmentation Steam Injection ~~hours~~ shall not exceed 2,000 hours per calendar year.

(11) ~~For each CTG t~~The maximum hourly emissions from each gas turbine/duct burner ~~rates (lbs/hr)~~ are given in the table below and shall be averaged over a~~ny~~ rolling three hour period, except for the NOx emissions, and all hourly startup emission rates, which ~~will~~shall be averaged over a one hour period. ~~The emission limits in the Total Startup column are shown as pounds per startup:~~Additionally excepting the total emissions per startup and total emissions per shutdown which are not averaged over any time frame.

| ~~Pollutant~~ | ~~CTG~~ | ~~CTG+ Duct Burner~~ | ~~CTG+ Duct Burner + Steam Injection~~ | ~~CTG+ Steam Injection~~ | ~~Startup~~ | ~~Total Startup lbs/event~~ | ~~Shutdown~~ |
|---|---|---|---|---|---|---|---|
| ~~NOx~~ | ~~16.8~~ | ~~18.2~~ | ~~19.1~~ | ~~17.7~~ | ~~175~~ | ~~510~~ | ~~12.1~~ |
| ~~CO~~ | ~~16.7~~ | ~~20.1~~ | ~~34.3~~ | ~~30.9~~ | ~~902~~ | ~~2514~~ | ~~12.6~~ |
| ~~VOC~~ | ~~1.5~~ | ~~3.5~~ | ~~3.51~~ | ~~1.51~~ | ~~1.5~~ | ~~4.5~~ | ~~1.1~~ |
| ~~SO2~~ | ~~3.7~~ | ~~3.71~~ | ~~4.02~~ | ~~4.01~~ | ~~3.7~~ | ~~8.1~~ | ~~2.7~~ |
| ~~PM10~~ | ~~9.0~~ | ~~11.5~~ | ~~11.5~~ | ~~9.0~~ | ~~9.0~~ | ~~27~~ | ~~9.0~~ |

| **Pollutant** | **Maximum Allowable Hourly Emissions from Each Gas Turbine/Duct Burner** (lb/hour) | | | |
|---|---|---|---|---|
| | In all modes of operation except startup and shutdown (lb/hour) | Start Up (lb/hour) | Start Up (lb/startup) | Shut Down (lb/shutdown) |
| NOx | 19.1 (1 hour average) | 175 | 680 | 80 |
| CO | 34.3 (3 hour average) | 902 | 2514 | 100 |
| VOC | 3.51 (3 hour average) | 16 | 59 | 16 |
| $SO_2$ | 4.02 (3 hour average) | 3.7 | 22.2 | 3.7 |
| $PM_{10}$ | 11.5 (3 hour average) | 9 | 54 | 9 |

(12) For maximum project daily emissions (lbs/day) are given in the table below:

| | ~~Total Emissions per CTG~~ | ~~Calpine Maximum SPP Daily Emissions~~ |
|---|---|---|
| ~~NOx~~ | ~~909~~ | ~~1817~~ |
| ~~CO~~ | ~~3264~~ | ~~6528~~ |
| ~~VOC~~ | ~~79~~ | ~~158~~ |
| ~~SO2~~ | ~~90~~ | ~~179~~ |
| ~~PM10~~ | ~~271~~ | ~~541~~ |

| **Pollutant** | **Maximum Allowable Daily Emissions from the Facility (A)** (lb/day) |
|---|---|
| NOx | 1,817 |
| CO | 6,528 |
| VOC | 158 |
| $SO_2$ | 179 |
| $PM_{10}$ | 541 |

(A) Includes both combustion turbines and both duct burners

(13) The maximum quarterly emissions for the facility are given in the table below:

| | ~~January-March lbs/quarter~~ | ~~April-June lbs/quarter~~ | ~~July-September lbs/quarter~~ | ~~October-December lbs/quarter~~ |
|---|---|---|---|---|
| ~~NOx~~ | ~~102,500~~ | ~~102,500~~ | ~~102,500~~ | ~~102,500~~ |
| ~~CO~~ | ~~241,600~~ | ~~241,600~~ | ~~241,600~~ | ~~241,600~~ |
| ~~VOC~~ | ~~11,850~~ | ~~11,850~~ | ~~11,850~~ | ~~11,850~~ |
| ~~SO2~~ | ~~15,750~~ | ~~15,750~~ | ~~15,750~~ | ~~15,750~~ |
| ~~PM10~~ | ~~46,200~~ | ~~46,200~~ | ~~46,200~~ | ~~46,200~~ |

| **Pollutant** | **Maximum Allowable Quarterly Emissions from the Facility (A)** | | | |
|---|---|---|---|---|
| | January-March (lb/quarter) | April-June (lb/quarter) | July-September (lb/quarter) | October-December (lb/quarter) |
| NOx | 102,500 | 102,500 | 102,500 | 102,500 |
| CO | 241,600 | 241,600 | 241,600 | 241,600 |
| VOC | 11,850 | 11,850 | 11,850 | 11,850 |
| $SO_2$ | 15,750 | 15,750 | 15,750 | 15,750 |
| $PM_{10}$ | 46,200 | 46,200 | 46,200 | 46,200 |

(A) Includes both combustion turbines and both duct burners

(14) The maximum annual calendar year emissions (tons/year) for the facility are given in the table below:

| | ~~Total Emissions per CTG~~ | ~~Calpine Annual SPP Emissions~~ |
|---|---|---|
| ~~NOx~~ | ~~102~~ | ~~205.86~~ |
| ~~CO~~ | ~~242~~ | ~~483.18~~ |
| ~~VOC~~ | ~~11.9~~ | ~~24.41~~ |
| ~~SO2~~ | ~~15.7~~ | ~~31.5~~ |
| ~~PM10~~ | ~~43.2~~ | ~~92.5~~ |

| Pollutant | Maximum Allowable Calendar Year Emissions from the Facility (A) (tons/year) | |
|---|---|---|
| NOx | 205.0 | |
| CO | 483.2 | |
| VOC | 23.7 | |
| $SO_2$ | 31.5 | |
| $PM_{10}$ | 92.4 | |

(A) Includes both combustion turbines and both duct burners

**Verification:** As part of the ~~semi-annual~~quarterly Air Quality Report (as required by AQ-4~~3~~0), the project owner shall provide all data required in this Condition. In the ~~semi-annual~~quarterly Air Quality Reports (as required by AQ-4~~3~~0), the project owner shall indicate the date, time, and duration of any violation to the NOx, and VOC limits presented in this Condition. The project owner shall include in the ~~semi-annual~~quarterly Air Quality Reports (as required by AQ-4~~3~~0) daily and annual emissions as required in this Condition.

**AQ-33** BACT Emission Limits:

The BACT emission limits (including duct burner emissions) specified in Conditions (a), (b), (c), (d), and (e) apply ~~under all operating load rates~~ at all times, except during CTG startups and shutdowns, as defined in Condition AQ-3~~3~~2. ~~(FRAQMD specific ATC Permit Condition c).~~

(a) NOx emission concentrations shall be limited to 2.5 ppmvd @ 15% O2 on a 1 hour ~~rolling~~ average, clock hour basis ~~(based on readings taken at 15 minute intervals) and with a maximum of 10 ppmvd ammonia slip~~.

(b) CO emission concentrations shall be limited to 4.0 ppmvd @ 15% O2, on a ~~calendar day~~ 3-hour average, clock hour basis.

(c) VOC emission concentrations shall be limited to 1 ppmvd @ 15% O2, on a ~~calendar day~~3-hour average, clock hour basis.

(d) PM10 emissions shall be limited to 11.5 pounds per hour, on a ~~calendar day~~ 3-hour average, clock hour basis.

(e) SO2 emission concentrations shall be limited to 1 ppmvd @ 15% O2, on a ~~calendar day~~3-hour average, clock hour basis.

**Verification:** At least sixty (60) days before conducting a source test, the project owner shall submit to the District, EPA and the CPM for their

review and approval, a source test plan. ~~detailed performance annual source test procedure designed to satisfy the requirements of this Condition. The project owner shall incorporate the District's and Commission's comments on or modifications to the procedure if any are received.~~ The project owner shall ~~also~~ notify the District and the CPM within seven (7) working days before the project begins initial operation and/or plans to conduct a source test~~s as required by this Condition~~. All source test results shall be submitted to the CPM and District within ~~30~~60 days of the date of the tests.

**AQ-34** ~~Each CTG set exhaust vent stack shall be equipped with NOx and % oxygen (O2) CEMs in order to analyze and record exhaust gas flow rate and concentrations. CO, PM10, SO2, and VOC emissions shall be monitored by the CEMs, using source test derived algorithms as indicated in AQ-36 below. In the event that test results show that CO emission limits are exceeded, the APCO may require CEMs for recording concentrations of CO.~~

Prior to the date of startup and thereafter, the project owner shall install, maintain, and operate the following CEM systems in each CTG exhaust vent stack:

(1) A continuous monitoring system to measure stack gas NOx concentrations. The system shall meet EPA monitoring performance specifications (40 CFR 75);

(2) A continuous monitoring system to measure stack gas CO concentrations. The system shall meet EPA monitoring performance specifications (40 CFR 60, Appendix B);

(3) A continuous monitoring system to measure stack gas O2 concentrations. The system shall meet EPA monitoring performance specifications (40 CFR 75).

PM10, SO2, and VOC emissions shall be monitored by source test derived algorithms.

(a) The NOx CEMs shall have the capability of recording NOx concentrations during all operating conditions, including startups and shutdowns.

(b) The CO CEMs shall have the capability of recording CO concentrations during all operating conditions, including startups and shutdowns.

(~~b~~c) Relative accuracy (RA) testing for NOx and O2 shall be performed on the CEM~~s~~S ~~on a semi-annual basis or~~ as required by ~~the Acid Rain permit provisions in Title~~ 40, CFR, Part 75, Appendix B. RA testing for CO shall be performed as required by 40 CFR Part 60, Appendix F. ~~(FRAQMD specific ATC Permit Condition d).~~

**Verification:** At least one hundred and twenty (120) days before initial operation, the project owner shall submit to the District and the CPM a continuous emissions monitoring procedure. Within sixty (60) days of receipt of the procedure, the District and the CPM will advise the project owner of the acceptability of the procedure. ~~Based on the results of the source test identified in AQ-36, the District and CPM may require CEMs for recording concentrations of CO.~~

**AQ-35** Within ninety days after the start of commercial operation of the SPP, source testing shall be performed to determine the mass emission rates and concentrations of NOx, CO, VOC, and SO2 emissions at four different steadystate CTG load rates over the expected operating range of either combustion turbine, as required by 40 CFR 60.335.c (2). The source testing will be used to determine compliance with the permitted emission limits indicated in Specific ATC Permit Conditions AQ-3~~3~~2 and AQ-3~~4~~3. Source testing shall be conducted to determine PM10 mass emissions and concentrations while the CTG is operating at 100 percent load with and without the duct burners, firing at the maximum rated capacity or 170 MMBtu/hr (HHV), whichever is greater.

(a) ~~The s~~Source testing results shall be used to develop predictive emission algorithms to estimate mass emission rates for ~~CO,~~ VOC, and SO2, and PM10 emissions.

(b) Source testing to determine the mass emission rates and concentrations of NOx shall be conducted annually after the initial source test indicated in a) above.

(c) Source testing to determine the mass emission rates and concentrations of CO, VOC, SO2 and PM10 shall be conducted annually. Startup source tests for VOC shall be conducted once every seven years, beginning in the 2003 calendar year. The Air Pollution Control Officer and the CPM may waive annual source testing requirements if prior test results indicate an adequate compliance margin has been maintained. ~~(FRAQMD specific ATC Permit Condition e).~~

**Verification:** At least sixty (60) days before ~~the start of commercial operation of the project, the project owner shall submit to the District and the CPM for review a detailed performance test procedure necessary to comply with this Condition. The project owner shall incorporate the District and CPM's comments on or modifications to the procedure. At least sixty (60) days prior to any subsequent annual compliance source tests, the project owner shall submit to the District and the CPM for review any proposed changes to the original source test procedure. The project owner shall incorporate the District's and CPM's comments on or modifications to the annual source test procedure~~ conducting a source

test, the project owner shall submit to the District, CPM, and EPA for their review and approval, a source test plan.. The project owner shall ~~also~~ notify the District and the CPM within seven (7) working days before the project ~~begins initial operation and/or~~ plans to conduct source testing ~~as required by this Condition~~. All s~~S~~ource test results shall be submitted to the District and the CPM within ~~30~~60 days of the date of the tests.

**AQ-36** Source tests to determine ammonia slip shall be conducted within ninety days after commercial operation of the SPP and thereafter as required by the APCO and the CPM. ~~(FRAQMD specific ATC Permit Condition f).~~

**Verification:** Please refer to AQ-3~~6~~5 verification.

**AQ-37** The maximum allowable ammonia emission rate ~~to~~from each of the SCR systems shall ~~be~~ not exceed 25 pounds per hour based on a 3-hour average under normal operating condition. Ammonia (slip) emissions shall not exceed 10 ppmvd at 15% $O_2$ based on a 3-hour average. ~~This injection rate may be adjusted based on source tests results. (FRAQMD specific ATC Permit Condition g).~~

**Verification:** Please refer to AQ-3~~4~~5 verification.

**AQ-38** Within ninety days after beginning commercial operation of the SPP, startup, and shutdown source tests shall be conducted to determine the emissions of CO and NOx. The APCO and CPM may approve the use of the NOx CEMS readings in lieu of source testing if annual Relative Accuracy Testing Audits (RATA) testing is provided. ~~(FRAQMD specific ATC Permit Condition h).~~

**Verification:** Within ninety days after the start of commercial operation of the project, the project owner shall submit to the District and the CPM for review a detailed performance source test procedure designed to satisfy the requirements of this Condition. The project owner shall incorporate the District's and Commission's comments on or modifications to the procedure. The project owner shall also notify the District and the CPM within seven (7) working days before the project begins commercial operation and/or plans to conduct source test as required by this Condition. Source test results shall be submitted to the District within 30 days of the date of the tests.

**AQ-39** Records and logs of all data generated by CEMS and algorithms shall be maintained for a period of five (5) years. ~~(FRAQMD specific ATC Permit Condition i).~~

**Verification:** During site inspection, the project owner shall make all data generated by the CEMS and algorithm, and included in the plant logs for a

period of five years, available to the District, California Air Resources Board (CARB), and the Commission staff.

**PLEASE NOTE THAT THIS CONDITION IS BASED ON A DISTRICT CONDITION (RECORD KEEPING AND REPORTING CONDITION NUMBER 46) THAT WAS MODIFIED AS SHOWN BELOW, WITH THE EXCEPTION OF THE BOLDED LANGUAGE WHICH HAS BEEN ADDED BY COMMISSION STAFF.**

**AQ-40** ~~The project owner shall provide calendar quarterly reports to the District in a format determined in consultation with the District. The calendar quarterly reports shall include the following: CEMS and predictive algorithm emissions data; CTG and duct burner fuel use and operating hours; power augmentation steam injection rates and hours of operation; ammonia injection rates; emission control systems and CEMS hours of operation including the time, date, duration, and reason for any malfunctions of these systems; the number of startups and shutdowns; and the electrical and steam production rates. These data shall be averaged on a daily basis, except where required to demonstrate compliance with an emission limitation. (FRAQMD specific ATC Permit Condition j).~~

The project owner shall submit a written summary report to the District, CPM and U.S. EPA for every calendar quarter. The report shall include the following:

(1) The hourly and daily emissions for each gas turbine/duct burner.

(2) The facility-wide quarterly and yearly (fourth quarter report only) emissions.

(3) The magnitude of excess emissions, any conversion factors used and the date and time of commencement and completion of each time period of excess emissions.

(4) Specific identification of each period of excess emissions that occurs during startups, shutdowns and malfunctions of the emission control systems. The nature and cause of any malfunction (if known) and the corrective action taken or preventative measures adopted shall also be reported.

(5) The date and time identifying each period during which the CEM system was inoperative except for zero and span checks and the nature of the system repairs or adjustments.

(6) When no excess emissions have occurred or the CEM system has not been inoperative, repaired, or adjusted, such information shall be stated in the report.

(7) Gas turbine/duct burner hourly, daily and yearly (fourth quarter report only) fuel use in terms of mmBTU/hr (HHV).

(8) Gas turbine quarterly startup, shutdown and operating hours. Include duration of each startup and shutdown. Include rolling 12-month average for duration of startups and shutdowns. **Include an estimate of all emissions during startup and shutdown event**

**(lbs/hour and lbs/event) based on the most recent source testing (include source test reference).**

(9) Duct burner quarterly operating hours

(10) Power augmentation steam injection rates and quarterly hours of operation.

(11) Ammonia injection rates.

(12) Electrical and steam production rates.

**Verification:** Within 30 days of the end of the calendar quarter, the project owner shall provide to the District and CPM the data required in this Condition.

~~**AQ-41** Prior to the start of construction, the SPP facility must provide ERC certificates for NOx, ROC, and PM10, as indicated in the table below. The ERC sources are Atlantic Oil Company, Ranch A, Ranch B, Ranch C, Ranch D, Ranch E, Spreckles Sugar Company, Tri Union, and Rosboro Lumber. Alternative sources of offsets may be used if they meet the criteria applied to these sources and are approved by the District and CPM. (FRAQMD specific ATC Permit Condition k).~~

~~**Verification:** At least 30 days prior to the start of construction, the project owner must submit a copy of the required ERC certificates to the CPM and the District.~~

~~**AQ-42** The project owner must file a semi-annual air quality report with the CPM documenting the information required by these conditions and verifications.~~

~~**Verification:** The semi-annual Air Quality report (as required by AQ-43) must be submitted to the CPM within 30 days of the end of the 6-month reporting period.~~

| | ~~January-March (pounds)~~ | ~~April-June (pounds)~~ | ~~July-September (pounds)~~ | ~~October-December (pounds)~~ | ~~Total ERCs & Offsets~~ | |
|---|---|---|---|---|---|---|
| | | | | | ~~Total Pounds~~ | ~~Total Tons~~ |
| ~~Required NOx~~ | ~~106,950~~ | ~~106,950~~ | ~~106,950~~ | ~~106,950~~ | ~~427,800~~ | ~~213.9~~ |
| ~~Required VOC~~ | ~~69,300~~ | ~~69,300~~ | ~~69,300~~ | ~~69,300~~ | ~~277,200~~ | ~~138.6~~ |
| ~~Required PM10~~ | ~~66,000~~ | ~~66,000~~ | ~~66,000~~ | ~~66,000~~ | ~~264,000~~ | ~~132.0~~ |
| ~~These ERCs have not been discounted to reflect the appropriate offset distance ratio calculations.~~ | | | | | | |

**AQ-41** The following VOC ERCs have been provided to the Air Pollution Control Officer to comply with the requirements of Rule 10.1 - New Source Review:

| Emission Reduction Credit Certificate No. | Face Value of VOC ERC Certificates Surrendered lb/quarter | | | | Inter-Pollutant Trading Ratio | Offset Ratio | Value Applied to the Project VOC Emission Liability lb/quarter | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Qtr 1 | Qtr 2 | Qtr 3 | Qtr 4 | | | Qtr 1 | Qtr 2 | Qtr 3 | Qtr 4 |
| 98001-01P Bio Fuel | 4522 | 4582 | 2521 | 5054 | NA | 1.2 | 3768 | 3818 | 2100 | 4211 |
| 98001-02P Bio Fuel | 0 | 0 | 4413 | 0 | NA | 1.2 | 0 | 0 | 3677 | 0 |
| 98002-00P Bio Fuel | 2512 | 1625 | 7286 | 2807 | NA | 1.2 | 2093 | 1354 | 6071 | 2339 |
| 98003-00P Bio Fuel | 3320 | 4826 | 3 | 5711 | NA | 1.2 | 2766 | 4021 | 2 | 4759 |
| 98005-00P Bio Fuel | 2814 | 1821 | 0 | 650 | NA | 1.2 | 2345 | 1517 | 0 | 541 |
| 98010-00P Bio Fuel | 581 | 376 | 0 | 0 | NA | 1.2 | 484 | 313 | 0 | 0 |
| 98012-00P Bio Fuel | 0 | 993 | 0 | 0 | NA | 1.2 | 0 | 827 | 0 | 0 |
| 94-1-00P Rosboro | 473 | 0 | 0 | 0 | NA | 1.2 | 394 | 0 | 0 | 0 |
| | | | | | | Total | 11850 | 11850 | 11850 | 11850 |

The following NOx ERCs (or inter-pollutant traded VOC ERCs as noted) have been provided to the Air Pollution Control Officer to comply with the requirements of Rule 10.1 - New Source Review:

| Emission Reduction Credit Certificate No. | Face Value of NOx/VOC ERC Certificates Surrendered lb/quarter | | | | Inter-Pollutant Trading Ratio | Offset Ratio | Value Applied to the Project NOx Emission Liability lb/quarter | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Qtr 1 | Qtr 2 | Qtr 3 | Qtr 4 | | | Qtr 1 | Qtr 2 | Qtr 3 | Qtr 4 |
| 98001-01P NOx Bio Fuel | 3798 | 3282 | 1528 | 4245 | NA | 1.2 | 3165 | 2735 | 1273 | 3537 |
| 98001-02P NOx Bio Fuel | 0 | 0 | 2697 | 0 | NA | 1.2 | 0 | 0 | 2247 | 0 |
| 98002-00P NOx Bio Fuel | 2110 | 1365 | 5094 | 2358 | NA | 1.2 | 1758 | 1137 | 4245 | 1965 |
| 98002-00P VOC Bio Fuel **INTER-POLLUTANT** | 0 | 0 | 884 | 0 | 2.0 | 1.2 | 0 | 0 | 368 | 0 |
| 98003-00P NOx Bio Fuel | 6265 | 4054 | 1106 | 7002 | NA | 1.2 | 5220 | 3378 | 921 | 5835 |
| 98003-00P VOC Bio Fuel **INTER-POLLUTANT** | 4138 | 0 | 1313 | 0 | 2.0 | 1.2 | 1724 | 0 | 547 | 0 |
| 98005-00P NOx Bio Fuel | 2364 | 1529 | 417 | 2642 | NA | 1.2 | 1970 | 1274 | 347 | 2201 |
| 98005-00P VOC Bio Fuel **INTER-POLLUTANT** | 0 | 0 | 497 | 0 | 2.0 | 1.2 | 0 | 0 | 207 | 0 |
| 98010-00P NOx Bio Fuel | 488 | 316 | 86 | 546 | NA | 1.2 | 406 | 263 | 71 | 455 |

| Emission Reduction Credit Certificate No. | Face Value of NOx/VOC ERC Certificates Surrendered lb/quarter | | | | Inter-Pollutant Trading Ratio | Offset Ratio | Value Applied to the Project NOx Emission Liability lb/quarter | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Qtr 1 | Qtr 2 | Qtr 3 | Qtr 4 | | | Qtr 1 | Qtr 2 | Qtr 3 | Qtr 4 |
| 98010-00P VOC Bio Fuel **INTER-POLLUTANT** | 0 | 0 | 103 | 0 | 2.0 | 1.2 | 0 | 0 | 42 | 0 |
| 98012-00P NOx Bio Fuel | 3249 | 2103 | 573 | 3632 | NA | 1.2 | 2707 | 1752 | 477 | 3026 |
| 98012-00P VOC Bio Fuel **INTER-POLLUTANT** | 3868 | 0 | 683 | 0 | 2.0 | 1.2 | 1611 | 0 | 284 | 0 |
| 98021-00P NOx Bio Fuel | 1726 | 1117 | 305 | 1929 | NA | 1.2 | 1438 | 930 | 254 | 1607 |
| 98021-00P VOC Bio Fuel **INTER-POLLUTANT** | 2054 | 0 | 363 | 0 | 2.0 | 1.2 | 855 | 0 | 151 | 0 |
| 98022-00P NOx Bio Fuel | 3249 | 2103 | 573 | 3632 | NA | 1.2 | 2707 | 1752 | 477 | 3026 |
| 98022-00P VOC Bio Fuel **INTER-POLLUTANT** | 3868 | 0 | 683 | 0 | 2.0 | 1.2 | 1611 | 0 | 284 | 0 |
| 98023-00P NOx Bio Fuel | 3249 | 2103 | 573 | 3632 | NA | 1.2 | 2707 | 1752 | 477 | 3026 |
| 98023-00P VOC Bio Fuel **INTER-POLLUTANT** | 3868 | 0 | 683 | 0 | 2.0 | 1.2 | 1611 | 0 | 284 | 0 |
| 98024-00P NOx Bio Fuel | 3249 | 2103 | 573 | 3632 | NA | 1.2 | 2707 | 1752 | 477 | 3026 |
| 98024-00P VOC Bio Fuel **INTER-POLLUTANT** | 3868 | 0 | 683 | 0 | 2.0 | 1.2 | 1611 | 0 | 284 | 0 |
| 98025-00P NOx Bio Fuel | 3249 | 2103 | 573 | 3632 | NA | 1.2 | 2707 | 1752 | 477 | 3026 |
| 98025-00P VOC Bio Fuel **INTER-POLLUTANT** | 3868 | 0 | 683 | 0 | 2.0 | 1.2 | 1611 | 0 | 284 | 0 |
| 98027-00P NOx Bio Fuel | 912 | 590 | 161 | 1019 | NA | 1.2 | 760 | 491 | 134 | 849 |
| 98027-00P VOC Bio Fuel **INTER-POLLUTANT** | 1085 | 0 | 192 | 0 | 2.0 | 1.2 | 452 | 0 | 80 | 0 |
| 98028-00P NOx Bio Fuel | 1452 | 940 | 256 | 1623 | NA | 1.2 | 1210 | 783 | 213 | 1352 |
| 98028-00P VOC Bio Fuel **INTER-POLLUTANT** | 483 | 0 | 305 | 0 | 2.0 | 1.2 | 201 | 0 | 127 | 0 |
| 06-5-99-1 NOx Tri Union | 6280 | 6280 | 6280 | 6280 | NA | 1.2 | 5233 | 5233 | 5233 | 5233 |
| 06-5-99-1 VOC Tri Union **INTER-POLLUTANT** | 0 | 0 | 140 | 0 | 2.0 | 1.2 | 0 | 0 | 58 | 0 |
| 98-101-00P NOx Tri Union | 3334 | 3371 | 3408 | 3408 | NA | 1.2 | 2778 | 2809 | 2840 | 2840 |
| 992024-00P NOx Tri Union | 16986 | 16986 | 16986 | 16986 | NA | 1.2 | 14155 | 14155 | 14155 | 14155 |

| Emission Reduction Credit Certificate No. | Face Value of NOx/VOC ERC Certificates Surrendered lb/quarter | | | | Inter-Pollutant Trading Ratio | Offset Ratio | Value Applied to the Project NOx Emission Liability lb/quarter | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Qtr 1 | Qtr 2 | Qtr 3 | Qtr 4 | | | Qtr 1 | Qtr 2 | Qtr 3 | Qtr 4 |
| 992024-00P VOC Tri Union **INTER-POLLUTANT** | 0 | 0 | 261 | 0 | 2.0 | 1.2 | 0 | 0 | 108 | 0 |
| 95-1-00P NOx Atlantic Oil | 10955 | 10955 | 10955 | 10955 | NA | 1.2 | 9129 | 9129 | 9129 | 9129 |
| 95-1-00P VOC Atlantic Oil **INTER-POLLUTANT** | 0 | 0 | 2526 | 0 | 2.0 | 1.2 | 0 | 0 | 1052 | 0 |
| 9902005-00P NOx Atlantic Oil | 5683 | 5683 | 5683 | 5683 | NA | 1.2 | 4735 | 4735 | 4735 | 4735 |
| 9902005-00P VOC Atlantic Oil **INTER-POLLUTANT** | 0 | 0 | 53 | 0 | 2.0 | 1.2 | 0 | 0 | 22 | 0 |
| 9902029-00P NOx Atlantic Oil | 3648 | 3648 | 3648 | 3648 | NA | 1.2 | 3040 | 3040 | 3040 | 3040 |
| 9902029-00P VOC Atlantic Oil **INTER-POLLUTANT** | 0 | 0 | 39 | 0 | 2.0 | 1.2 | 0 | 0 | 16 | 0 |
| 9902030-00P NOx Atlantic Oil | 4536 | 4536 | 4536 | 4536 | NA | 1.2 | 3780 | 3780 | 3780 | 3780 |
| 9902030-00P VOC Atlantic Oil **INTER-POLLUTANT** | 0 | 0 | 65 | 0 | 2.0 | 1.2 | 0 | 0 | 27 | 0 |
| 94-1-00P NOx Rosboro | 21134 | 21134 | 21134 | 18850 | NA | 1.2 | 17611 | 17611 | 17611 | 15708 |
| 94-1-00P VOC Rosboro **INTER-POLLUTANT** | 1760 | 0 | 1920 | 0 | 2.0 | 1.2 | 733 | 0 | 800 | 0 |
| EC-0002 Spreckles YSAQMD | 0 | 0 | 24000 | 0 | NA | 1.5 | 0 | 0 | 16000 | 0 |
| EC-0058 Spreckles YSAQMD | 103 | 3632 | 0 | 0 | NA | 1.5 | 68 | 2421 | 0 | 0 |
| EC-0059 Spreckles YSAQMD | 279 | 23107 | 1205 | 8646 | NA | 1.5 | 186 | 15404 | 803 | 5764 |
| EC-0060 Spreckles YSAQMD | 328 | 6649 | 8698 | 7778 | NA | 1.5 | 218 | 4432 | 5798 | 5185 |
| EC-0061 Spreckles YSAQMD | 128 | 0 | 3392 | 0 | NA | 1.5 | 85 | 0 | 2261 | 0 |
| | | | | | | Total | 102500 | 102500 | 102500 | 102500 |

The following $PM_{10}$ ERCs have been provided to the Air Pollution Control Officer to comply with the requirements of Rule 10.1 - New Source Review:

| Emission Reduction Credit Certificate No. | Face Value of PM10 ERC Certificates Surrendered lb/quarter | | | | Inter-Pollutant Trading Ratio | Offset Ratio | Value Applied to the Project PM10 Emission Liability lb/quarter | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Qtr 1 | Qtr 2 | Qtr 3 | Qtr 4 | | | Qtr 1 | Qtr 2 | Qtr 3 | Qtr 4 |
| 98001-01P Bio Fuel | 5087 | 5683 | 3387 | 5685 | NA | 1.2 | 4239 | 4735 | 2822 | 4737 |
| 98001-02P Bio Fuel | 0 | 0 | 5884 | 0 | NA | 1.2 | 0 | 0 | 4903 | 0 |
| 98002-00P Bio Fuel | 2826 | 1828 | 10801 | 3158 | NA | 1.2 | 2355 | 1523 | 9000 | 2631 |
| 98003-00P Bio Fuel | 8390 | 5429 | 1481 | 9378 | NA | 1.2 | 6991 | 4524 | 1234 | 7815 |
| 98005-00P Bio Fuel | 3166 | 2048 | 559 | 3538 | NA | 1.2 | 2638 | 1706 | 465 | 2948 |
| 98010-00P Bio Fuel | 654 | 423 | 115 | 731 | NA | 1.2 | 545 | 352 | 95 | 609 |
| 98012-00P Bio Fuel | 4352 | 2816 | 768 | 4864 | NA | 1.2 | 3626 | 2346 | 640 | 4053 |
| 98021-00P Bio Fuel | 2311 | 1495 | 408 | 2583 | NA | 1.2 | 1925 | 1245 | 340 | 2152 |
| 98022-00P Bio Fuel | 4352 | 2816 | 768 | 4864 | NA | 1.2 | 3626 | 2346 | 640 | 4053 |
| 98023-00P Bio Fuel | 4352 | 2816 | 768 | 4864 | NA | 1.2 | 3626 | 2346 | 640 | 4053 |
| 98024-00P Bio Fuel | 4352 | 2816 | 768 | 4864 | NA | 1.2 | 3626 | 2346 | 640 | 4053 |
| 98025-00P Bio Fuel | 4352 | 2816 | 768 | 4864 | NA | 1.2 | 3626 | 2346 | 640 | 4053 |
| 98027-00P Bio Fuel | 1221 | 790 | 215 | 1365 | NA | 1.2 | 1017 | 658 | 179 | 1137 |
| 98028-00P Bio Fuel | 1945 | 1258 | 343 | 2174 | NA | 1.2 | 1620 | 1048 | 285 | 1811 |
| 06-5-99-1 Tri Union | 31 | 31 | 31 | 31 | NA | 1.2 | 25 | 25 | 25 | 25 |
| 94-1-00P Rosboro | 8058 | 14638 | 13561 | 2484 | NA | 1.2 | 6715 | 12198 | 11300 | 2070 |
| EC-0060 Spreckles YSAQMD | 0 | 9684 | 18528 | 0 | NA | 1.5 | 0 | 6456 | 12352 | 0 |
| | | | | | | Total | 46200 | 46200 | 46200 | 46200 |

**Verification:** At least 30 days prior to the start of construction, the project owner must submit a copy of the required ERC certificates to the CPM and the District.

## Appendix A

## Project Emission Assumptions and Calculations

Maximum Expected Daily NOx Emissions:

In order to keep from making unnecessarily restrictive assumptions, staff assumes that both of the Sutter turbines will undergo startup at the same time (i.e., contemporaneous startups). In actuality, the Sutter facility would not attempt this, however they might attempt sequential startups. That is, starting the second turbine prior to the first completing startup. Given that Calpine is requesting a 6-hour startup limit, this does not seem unreasonable. However, a sequential startup will result in fewer emissions in a day than a contemporaneous startup such as staff is assuming. Therefore, staff presents the following calculations, based on recent source tests, assuming a contemporaneous startup of the Sutter facility that clearly demonstrate that the facility is not expected to exceed its existing daily NOx emission limit.

| Operation: | Duration (hours) | Emission Rate (lbs/hr) | Emissions (lbs) | Comments |
|---|---|---|---|---|
| Startup | 6 | 78.05 | 468.3 | Startup source test of 11/30/01. |
| Full Load | 18 | 16.31 | 293.58 | Operational source test of 8/31/01 |
| Total | 24 | | 761.88 | |
| | | Times 2 turbine trains | **1,523.76** | |
| | | Daily NOx Emission Limit | **1,817** | |

Maximum Expected Daily CO Emissions:

Staff presents the following calculations for the CO emissions from the Sutter facility, assuming contemporaneous startups, which clearly demonstrate that the facility is not expected to exceed its existing daily CO emission limit.

| Operation: | Duration (hours) | Emission Rate (lbs/hr) | Emissions (lbs) | Comments |
|---|---|---|---|---|
| Startup | 6 | 58.96 | 353.76 | Startup source test of 11/30/01. |
| Full Load | 18 | 1.21 | 21.78 | Operational source test of 8/31/01 |
| Total | 24 | | 375.54 | |
| | | Times 2 turbine trains | **751.08** | |
| | | Daily CO Emission Limit | **6,528** | |

Maximum Expected Daily SOx Emissions:

Staff presents the following calculations for the SOx emissions from the Sutter facility, assuming contemporaneous startups, which clearly demonstrate that the facility is not expected to exceed its existing daily SOx emission limit.

| Operation: | Duration (hours) | Emission Rate (lbs/hr) | Emissions (lbs) | Comments |
|---|---|---|---|---|
| Startup | 6 | 3.7 | 22.2 | Proposed emission limit |
| Full Load | 18 | 0.97 | 17.46 | Operational source test of 6/25/01 |
| Total | 24 | | 39.66 | |
| | | Times 2 turbine trains | **79.32** | |
| | | Daily SOx Emission Limit | **179** | |

Maximum Expected Daily PM10 Emissions:

Staff presents the following calculations for the PM10 emissions from the Sutter facility, assuming contemporaneous startups, which clearly demonstrate that the facility is not expected to exceed its existing daily PM10 emission limit.

| Operation: | Duration (hours) | Emission Rate (lbs/hr) | Emissions (lbs) | Comments |
|---|---|---|---|---|
| Startup | 6 | 9 | 54 | Proposed Emission Limit |
| Full Load | 18 | 2.661 | 47.90 | Operational source test of 6/26/01 |
| Total | 24 | | 101.90 | |
| | | Times 2 turbine trains | **203.8** | |
| | | Daily PM10 Emission Limit | **432** | Proposed Emission Limit |

Maximum Expected Daily VOC Emissions:

Staff presents the following calculations for the VOC emissions from the Sutter facility, assuming contemporaneous startups, which clearly demonstrate that, without a more restrictive emissions limit, the facility **is** expected to exceed its existing daily VOC emission limit.

| Operation: | Duration (hours) | Emission Rate (lbs/hr) | Emissions (lbs) | Comments |
|---|---|---|---|---|
| Startup | 6 | 16 | **96** | Originally proposed emission limits |
| Full Load | 18 | 1.08 | 19.44 | Operational source test of 8/31/01 |
| Total | 24 | | 115.44 | |
| | | Times 2 turbine trains | **230.88** | EXCEEDS EMISSION LIMIT |
| | | Daily VOC Emission Limit | **158** | |

Therefore staff recommends, and Calpine has accepted, that the Sutter facility be limited to **59** pounds of VOC per startup event rather than 96.

| Operation: | Duration (hours) | Emission Rate (lbs/hr) | Emissions (lbs) | Comments |
|---|---|---|---|---|
| Startup | 6 | 16 | 59 | Proposed emission limit |
| Full Load | 18 | 1.08 | 19.44 | Operational source test of 8/31/01 |
| Total | 24 | | 78.44 | |
| | | Times 2 turbine trains | **156.9** | Complies with Limit |
| | | Daily VOC Emission Limit | **158** | |