CALIFORNIA ENERGY COMMISSION
1516 NINTH STREET
SACRAMENTO, CA 95814-5512
www.energy.ca.gov

DOCKET
84-AFC-6C
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DATE: October 13, 2011

TO: Interested Parties

FROM: Mary Dyas, Compliance Project Manager

SUBJECT: SYCAMORE COGENERATION PROJECT (84-AFC-6C)
Staff Analysis of Proposed Modifications to Operate the Combustion Gas Turbine Unites in an Extended Startup Mode

On July 14, 2011, the Sycamore Cogeneration Company filed a petition with the California Energy Commission (Energy Commission) to amend the Energy Commission's Final Decision (Decision) for the Sycamore Cogeneration project. Staff prepared an analysis of this proposed change and a copy is enclosed for your information and review.

The Sycamore Cogeneration project is a 300 megawatt cogeneration power plant located approximately five miles north of the City of Bakersfield, and five miles east of State Route 99 in the Kern River oilfields in Kern County, California. The project was certified by the Energy Commission in December 1986 and began commercial operation 1988.

The proposed modifications will allow Sycamore Cogeneration Company to operate all four of the combustion gas turbine units in an extended start-up period for the purpose of tuning[1] the units following removal and replacement of combustion hardware.

Energy Commission staff has reviewed the petition and assessed the impacts of this proposal on environmental quality, public health and safety, and proposes revisions to existing conditions of certification for Air Quality. It is staff's opinion that, with the implementation of revised conditions, the project will remain in compliance with applicable laws, ordinances, regulations, and standards and that the proposed modifications will not result in a significant adverse direct or cumulative impact to the environment (Title 20, California Code of Regulations, Section 1769).

The amendment petition and staff's analysis has been posted on the Energy Commission's webpage at http://www.energy.ca.gov/sitingcases_pre-1999/index.html. The Energy Commission's Order (if approved) will also be posted on the webpage. Energy Commission staff intends to recommend approval of the petition at the November 16, 2011**,** Business Meeting of the Energy Commission.

[1] Tuning is the dynamic performance testing and corresponding operating optimization set point adjustments of the combustion system.

If you have comments on this proposed modification, please submit them to me at the address below prior to November 11, 2011**.**

Mary Dyas, Compliance Project Manager
California Energy Commission
1516 9th Street, MS-2000
Sacramento, CA 95814

Comments may be submitted by fax to (916) 654-3882, or by e-mail to mdyas@energy.state.ca.us. If you have any questions, please contact me at (916) 651-8891.

For further information on how to participate in this proceeding, please contact the Energy Commission Public Adviser's Office, at (916) 654-4489, or toll free in California at (800) 822-6228, or by e-mail at publicadviser@energy.state.ca.us. News media inquiries should be directed to the Energy Commission Media Office at (916) 654-4989, or by e-mail at mediaoffice@energy.state.ca.us.

Enclosure

SYCAMORE COGENERATION COMPANY (84-AFC-6C)

Petition to Amend Commission Decision
AIR QUALITY
Joseph Hughes

INTRODUCTION

The Sycamore Cogeneration Company (Sycamore) is a cogeneration facility located in the Kern River oilfield near Bakersfield, CA. The facility consists of four 75 MW (nominal) natural-gas fired General Electric Frame 7EA combustion turbines equipped with enhanced Dry Low NOx (DLN1+) combustors, four unfired heat recovery steam generators (HRSGs), each capable of generating up to 450,000 pounds per hour (lb/hr) of steam for delivery to the adjacent oilfield operator for use in enhanced oil recovery and ancillary equipment.

The petition requests that Sycamore be permitted to operate all four of the combustion gas turbine units in an extended startup period for the purpose of conducting tuning of the units following occasional removal and replacement of combustion hardware.

With this petition to amend staff would also be incorporating some hourly and daily emission limits to create consistency with the San Joaquin Valley Air Pollution Control District (SJVAPCD) Authority to Construct (ATC) permit.

LAWS, ORDINANCES, REGULATION, AND STANDARDS (LORS) - COMPLIANCE

The District issued an ATC permit August 30, 2011 approving the requested modifications that determined the project would comply with all laws, ordinances, regulations and standards (LORS). **Air Quality Table 1** summarizes the applicable LORS for the facility as analyzed in the ATC. The environmental impacts assessment presented herein, shows there will be no significant environmental impacts associated with the requested modifications in the petition to amend, and the project as modified would comply with all applicable LORS.

Air Quality Table 1
Laws, Ordinances, Regulations, and Standards

Applicable LORS	Description
Federal	
42 U.S.C. §7401 et eq.	Federal Clean Air Act: New Source Review
40 CFR 60 Subpart GG	Standards of Performance for Stationary Gas Turbines.
State	
Health and Safety Code §41700	"... no person shall discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to 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."
Local	
Rule 2201	New and Modified Stationary Review
Rule 2520	Federally Mandated Operating Permits
Rule 2540	Acid Rain Program
Rule 4001	New Source Performance Standards
Rule 4101	Visible Emissions
Rule 4102	Nuisance
Rule 4201	Particulate Matter Concentrations
Rule 4301	Fuel Burning Equipment
Rule 4703	Stationary Gas Turbines
Rule 4801	Sulfur Compounds

SETTING

The project setting would not be affected by the requested modification since there would be no increase in permitted emission limits.

ANALYSIS

Sycamore is requesting a modification to the California Energy Commission's (Energy Commission) Final Decision to include a 12 hour tuning start up period in accordance with District Rule 4703, Section 5.3.3. The proposed change involves the need for tuning of the units following removal and replacement of combustion hardware, expected to occur infrequently. Combustion hardware is installed during routine replacement to ensure compliance with more stringent emission limits as continuously required by the Air Pollution Control Districts as technologies become available. After installation of the new equipment and hardware, there will be slight changes in the tolerances of the assembly that will result in a change to the emissions profile. This emissions profile variation requires the unit to undergo dynamic performance testing

and corresponding operating optimization set point adjustments of the combustion system, referred to as tuning. The tuning of the unit is conducted to achieve the optimum emissions profile and ensure the safety and parts longevity of the unit. The period of time required for tuning a unit is 12 hours. These tuning periods are required after the completion of a maintenance outage, however additional tuning may be required depending upon the results of the initial post-outage tuning period. Tuning may also be recommended as a repair option if emissions performance begins to decline.

As the turbines are currently permitted, tuning will exceed the units' emissions limits during normal operation and will exceed the allowable time frame for startups. To date, Sycamore has petitioned the SJVAPCD hearing board for variances to tune the units. However, Sycamore was informed by the SJVAPCD compliance staff that they would like to reduce the number of variances granted by the District. This petition to amend would include a 12 hour tuning start up period required to achieve an optimum emissions profile and alleviate the need for variances from the SJVAPCD.

The 12 hour tuning startup period would not change any emission limits. The tuning startup period would be subject to the already existing and analyzed startup emission limits. The incorporation of the tuning startup period would not apply to regular startups, which shall not exceed a time period of two continuous hours. The daily and annual emission limits would remain the same, even on days when combustion tuning is performed.

CONCLUSIONS AND RECOMMENDATIONS

Staff recommends approval of the requested changes for the Sycamore Cogeneration Company. The tuning startup period would allow Sycamore to install newer, more efficient combustion system hardware as technologies become available and execute the required performance testing to achieve the optimum emissions profile. The modification would not change any permitted emissions limits and the project would continue to comply with all applicable LORS.

PROPOSED MODIFICATIONS TO CONDITIONS OF CERTIFICATION

The following Conditions of Certification would be amended in the Energy Commission's Final Decision for the Sycamore Cogeneration Company to ensure compliance with all LORS. ~~Strikethrough~~ is used to indicate deleted language and bold **underline** for new language.

AQ-18

a. Startup or ~~planned~~ shutdown of a CTG shall not exceed a time period of two (2) continuous hours**, except tuning startup periods as defined here in**.

b. For all CTGs the following emission limits shall apply during times of startup or shutdown **or tuning startup** and shall be averaged over the time period specified below:

NO2 140.0 lbm/hr (2-hour average)
CO 200 lbm/hr (1-hour average), and 140.0 lbm/hr (2-hour average)

Dynamic performance testing and corresponding operating optimization set point adjustments of the combustion system of the CTG shall be defined as a tuning start-up used to tune the CTG combustion system to meet permitted emission limits. A tuning start-up period shall not exceed a time period of 12 consecutive hours per occurrence.

Verification: Sycamore Cogeneration Company shall maintain records necessary to submit quarterly reports to show start up**,** ~~or planned~~ shutdown **or tuning startup** days and daily emissions for those days. This information shall be included in the quarterly reports already submitted to the CEC and SJVUAPCD.

AQ-19 ~~Pollutant emissions from each combustion turbine prior to being retrofitted with the DLN combustors shall not exceed the following limits, except during times of startup or shutdown, as defined in Condition AQ-18 or transitional periods as defined here in:~~

~~Gas Fired Case:~~

~~Particulates~~	~~5.0 lbm/hr as PM10~~
~~Sulfur Compounds~~	~~0.5 lbm/hr as SO2~~
	~~0.6 lbm/hr as SO4~~
~~Hydrocarbons~~	~~2.5 lbm/hr (Non-meth)~~
~~Carbon Monoxide~~	~~392 lbm/day~~

Pollutant emissions from each DLN**1+** CTG shall not exceed the following limits, except during times of startup**,** ~~or~~ shutdown~~,~~ **or tuning startup,** as defined in Condition AQ-18:

Gas Fired Case:

Particulates	5.0 lbm/hr as PM10
	120.0 lbm/day as PM10
Sulfur Compounds	0.5 lbm/hr as SO2
	0.6 lbm/hr as SO4
	21.6 lbm/day as SO2
Hydrocarbons	2.5 lbm/hr (Non-methane)
	60.0 lbm/day
Carbon Monoxide	1056 lbm/day and 25 ppmv at 15% O2
	44.0 lbm/hr on 3-hr avg.

~~After April 30, 2008, the emissions of oxides of nitrogen from each combustion turbine shall not exceed the following limits (these limits are to supersede the NOx emission limits shown above):~~

Oxides of Nitrogen	552.8 lbm/day and 12.4 lbm/hr as NO2 and 3 ppmv at 15% O2 calculated on a 3 hour rolling average.

For nitrogen dioxide, the Sycamore Cogeneration Company (SCC) shall identify the following for each day of operation, except during times of startup**,** ~~or~~ shutdown **or tuning startup**, as defined in Condition AQ-18:

(1) The daily maximum hourly mass emission rate (lbs/hr),

(2) The daily maximum rolling 3-hour average mass emission rate (lbs/hr) and

(3) The total daily mass emissions (lbs/day).

For carbon monoxide, SCC shall identify the total daily mass emissions (lbs/day) for each day of operation, except during times of startup**,** ~~or~~ shutdown **or tuning startup**, as defined in Condition AQ-18.

For particulate matter (PM10), sulfur compounds (SO2 and SO4) and non-methane hydrocarbons, SCC shall determine through the initial source test, the fuel-based emission factors (lbs/mmBtu) for each pollutant. Using these factors, SCC shall determine the maximum allowable fuel input rate (mmBtu/hr) that would comply with the above stated emission limits (lbs/hr) (i.e., emission limit / emission factor = fuel input rate). SCC shall then compare these fuel input rates (as determined above) with the actual daily maximum fuel input rate (mmBtu/hr) for each day of operation, except during times of startup or shutdown, as defined in Condition AQ-18.

SCC shall submit all excess emission reports and break down reports to demonstrate compliance with all concentration limits.

A transitional period is defined as a primary re-ignition period which must meet the following three conditions:

- shall not exceed one hour,
- NOx emissions shall not exceed 15 ppmvd @ 15% O2 during that hour and
- CO emissions shall not exceed 25 ppmvd @ 15% O2.

Verification: SCC shall submit quarterly emission reports with all the information identified in the above protocol to the CEC compliance project manager.

REFERENCES

Sycamore2011. Sycamore Cogeneration Project (84-AFC-6C), Petition to Amend to Include an Extended Startup Mode, July 11, 2011.

SJVAPCD2011. San Joaquin Valley Air Pollution Control District, Authorities to Construct for Sycamore Cogeneration Project, August 30, 2011.