

CALIFORNIA ENERGY COMMISSION

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DATE: February 25, 2011
TO: Interested Parties
FROM: Christina Snow, Compliance Unit

**SUBJECT: Calpine Gilroy Cogen Power Project (84-AFC-4C)
Staff Analysis of Installation of Dry Low NOx (DLN+) Combusters**

On September 13, 2010, Calpine Gilroy Cogen, L.P. filed a petition with the California Energy Commission (Energy Commission) requesting to modify the Gilroy Cogen Power Project. The modifications proposed in the petition would decrease nitrogen oxide (NOx) emissions by installing a Dry Low Nitrogen Oxide (DLN) combustor unit on the Project's S-100 General Electric Frame 7 Gas Turbine Generator (S-100 gas turbine). These changes will update the Conditions of Certification in the 1995 California Energy Commission (Energy Commission) Decision to comply with recent changes in the Bay Area Air Quality Management District (BAAQMD) Regulation 9, Rule 9 requirements.

The 115 megawatt project was certified by the Energy Commission on November 13, 1985, and began commercial operation in May, 1988. The facility is located in the City of Gilroy in Santa Clara County.

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

Staff has analyzed this proposed change and a copy is enclosed for your information and review. The amendment petition and staff's analysis have 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 to extend the commencement of construction at the April 6, 2011 Business Meeting of the Energy Commission.

If you have comments on this proposed modification, please submit written comments by 9 A.M. on April 6, 2011.

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Comments and questions may be submitted by fax to (916) 654-3882, or by e-mail to csnow@energy.state.ca.us.

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: Staff Analysis

CALPINE GILROY COGEN (84-AFC-4C)

Petition installation of a Dry Low NOx Combustors

Air Quality Staff Analysis

Prepared by: Jacquelyn Leyva

February 25, 2011

INTRODUCTION

The Calpine Gilroy Cogen, LP (CGC, LP) submitted a petition to amend various Conditions of Certification for the Gilroy Cogeneration Project (GCP) on September 13, 2010. The California Energy Commission (Commission) has received the request to amend and update the Conditions of Certification to the 1985 Commission Decision and allow the installation of a Dry Low Nitrogen Oxide (DLN) combustor unit to the project's stationary source General Electric Frame 7 gas turbine generator (S-100 gas turbine). This modification to the current stationary source would allow GCP to comply with the Bay Area Air Management District's (BAAQMD) Regulation 9, Rule 9, as currently written.

BACKGROUND

The Gilroy Cogeneration facility is a 115 MW cogeneration facility in Santa Clara County, approximately 30 miles south of San Jose. It was able to meet vintage 1980s emission limits for NOx without SCR, using only steam injection and used an oxidation catalyst to meet carbon monoxide emission limits. The project began operation in May, 1988. The cogeneration facility provides steam to the Gilroy foods plant for food processing and dehydration and generates electricity for sale to PG&E.

The power plant is located immediately east of an existing Gilroy Foods warehouse. The Gilroy Foods plant is located along the Pacheco Pass Highway (Hwy. 152) southeast of the business district of the City of Gilroy. The triangularly shaped project site covers approximately three acres. The site is bounded on the east by the existing Gilroy Food Processing Plant. Along the northeast, the site is bordered by the Santa Clara Valley Water District Right-of-Way. North of this Right-of-Way is the Santa Clara Valley Water District's flood control canal. Agricultural land borders the south end of the project site.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS

The BAAQMD has completed the permit evaluation and Statement of Basis for the Minor Revision to the Major Facility review permit for Calpine Gilroy Cogen. The CEC has received the "*Authority for Modification Permit*" on December 22, 2010 with the new amended conditions to make the Energy Commissions Conditions of Certification consistent with BAAQMD permit conditions. The Calpine Gilroy Cogen will receive their Permit to Operate after completing the Start-up Notification to the BAAQMD, at least seven days prior to operating the new installed Dry Low NOx equipment.

The conditions include emissions limitations, operating limitations, and testing, monitoring, record keeping and reporting requirements that ensure compliance with air quality laws, ordinances, regulations and standards (LORS). **Air Quality Table 1** summarizes the currently applicable LORS for the facility minor modification to S-100.

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

Applicable Law	Description
Local	Bay Area Air Quality Management District (BAAQMD)
BAAQMD Regulation 9, Rule 9	Stationary Gas Turbines greater than 500 MMBTU/hr – Specifies emission limits of 5 ppmvd NOx or 0.15 pounds NOx per megawatt-hour (lb/MWh), applicable to combustion turbines.

ANALYSIS

In November of 1985, the Energy Commission granted CGC a license to operate a 115 MW cogeneration project in Santa Clara County in the City of Gilroy, California.

Calpine Gilroy Cogen is petitioning the Energy Commission to allow the installation of dry low NOx (DLN1+) combustors in permitted Stationary Source S-100, a General Electric (GE) Frame 7 industrial combined cycle turbine rated at 87 MW, 1,085 MM BTU/hr max¹. Calpine is currently controlling the NOx emissions from the turbine with steam injection (no more than 25 ppm @ 15%O₂). After the Dry Low NOx Combustors are installed, the steam injection equipment will no longer be used. These new combustors are guaranteed to control the NOx emissions from GE Frame 7 turbines to no more than 5 ppm @ 15% O₂. No other modifications to emission limits or equipment are requested by the owner.

The proposed changes to the Air Quality Conditions of Certification are based upon new requirements triggered by a rule modification made by the district. Regulation 9, Rule 9, (Nitrogen Oxides from Stationary Gas Turbines), was amended on December 6, 2006 and now requires S-100 to meet a lower NOx emission rate than the limit that was formerly applicable. In accordance with Regulation 9 Rule 9, section 301.2, S-100 will now be required to meet a NOx emission limit of 5 ppmvd@15% O₂ or 0.15 lb/MW-hr². NOx emissions from S-100 are currently abated solely by steam injection. In order to meet the new Rule 9 requirements, the facility plans to install Dry Low NOx combustors. New Source Review is not required since the facility is required by the BAAQMD to meet this new rule. Thus, a Best Available Control Technology evaluation, which would have required an emissions limit of 2 ppm NOx, is not required. The facility wishes to install Dry Low NOx combustors on S-100 in April, 2011, but this must first be approved

¹ CGC 2010

² BAAQMD 2011

by the Energy Commission. The conditions of certification that will be amended are due to the installation of the Dry Low NOx combustor, and some modifications will remove references to steam injection due to this technology no longer being used.

Currently there is a NOx emission limit on S-100 of 1,876 lb_m/day, including start-up and shut-down, and a maximum emissions limit of 323.7 tons per any consecutive twelve months. Neither of these limits will be affected nor will they be changed due to the Dry Low NOx equipment modification.

CONCLUSIONS AND RECOMMENDATIONS

Staff has analyzed the proposed changes and concludes that there are no new or additional significant adverse impacts associated with an approval of the petition. Staff concludes that the proposed changes are based on information that was not available during the original licensing process. Staff concludes that the proposed language retains the intent of the original Commission Decision and Conditions of Certification. Staff recommends the following modifications to Conditions of Certification 1-1, 1-2, 1-5, 1-7, 1-8, 1-9(a), 1-9(b), and 1-16. There are no emissions increases associated with the project change. There are no toxic emissions increase associated with this project change. No additional offsets are required for the project change. The proposed project change will result in a decrease of the NOx emissions and is required by BAAQMD Regulation 9, Rule 9³.

AMENDED AND PROPOSED CONDITIONS OF CERTIFICATION

Below is a list of the Air Quality Conditions of Certification that need to be revised, which were originally contained in the Decision for Calpine Gilroy Cogen, and a brief discussion of the proposed changes. The BAAQMD issued a Permit Evaluation and Statement of Basis for Minor Revision to the Facility Permit conditions and these are included below as Air Quality Conditions of Certification.

Conditions of Certification that will be amended by this amendment request:

- Insertion of NOx limit of 5 ppmvd at 15% oxygen and 0.15 lb/MW-hr, and installation language of the Dry Low NOx combustors to S-100 stationary source in Condition of Certification **1-1**.
- Deletion of Condition of Certification **1-2**. This condition was only applicable until the Title V application was submitted and is no longer necessary to be in the Conditions of Certification. The Condition of Certification 1-2 required SCR to be installed if 25 ppm was not achieved with steam injection. The 25 ppm limit was reached with steam injection alone and SCR was never installed and is currently not required by BAAQMD.

³ CGC 2010

- Deletion of Condition of Certification **1-5**. Deleted under BAAQMD Application #13479 (2006); related to commissioning and no longer needed⁴.
- Deletion of Condition of Certification **1-7**. Deleted under BAAQMD Application #13479 (2006); related to commissioning and no longer needed⁵.
- Insertion of language to the Condition of Certification **1-8, 1-9(a) and 1-9(b)** specifying the condition will no longer apply after the Dry Low NOx combustor is installed and operational. Any language with regards to steam injection should also be removed where necessary.
- Deletion of Condition of Certification **1-16**. This condition was only applicable until the Title V application was submitted and is no longer necessary to be in the conditions of Certification.

Conditions of Certification: ~~Strikeout~~ is used to indicate deleted language and **underline and bold** is used for new language.

1-1 ~~Except as provided in Condition 7, (a) The oxides of nitrogen (NOx) concentrations in the gas turbine exhaust shall not exceed 25 ppmdv at 15 percent oxygen averaged over any 3-hour period whether firing natural gas or fuel oil. (b) This limit shall not apply during a cold start-up, which is not to exceed four hours, or shut-down procedure, which is not to exceed two hours. However, for daily start-ups after a shut-down of twelve (12) hours or less, the start-up period shall be limited to one (1) hour. (c) During any mode of operation, GEC shall inject steam for NOx control when steam of specified pressure and temperature is available. Part (c) will no longer apply after the Dry Low NOx combustor is installed and operational. If within six months of initial start up of the subject facility the Applicant is unable to achieve the concentration limitation of 25 ppm, the Applicant shall take action to achieve the 25 ppm limit by retrofitting the heat recovery boiler with an APCO approved control device pursuant to a schedule approved by the District Hearing Board in an action for variance relief. Effective after the new Dry Low NOx combustor becomes operational, the oxides of nitrogen (NOx) concentration in the gas turbine exhaust shall not exceed 5 ppmvd at 15% oxygen or 0.15 lb/MW-hr averaged over any three-hour period excluding startup and shutdown periods. The Dry Low NOx combustor shall be installed at the next scheduled major maintenance or no later than January 1, 2012. (Basis: 9-9-301.2)~~

Verification: GEC shall monitor compliance with the NOx emission limitation with the continuous in-stack emission monitors described in Condition 1-12. ~~In the event that the NOx emissions limitations is not achieved within six months of initial start up of the facility, Gilroy Energy Company shall apply to the BAAQMD for a variance for the purpose of retrofitting the facility with Selective Catalytic Reduction (SCR) or other APCO~~

⁴ BAAQMD 2010

⁵ BAAQMD 2010

approved control device. GEC shall forward to the CEC copies of all submittals made to and received from the BAAQMD.

- ~~1-2 The heat recovery boiler shall be designed to accommodate a Selective Catalytic Reduction (SCR) system, capable of achieving 25 ppm_{dv} NO_x as an alternative to NO_x control by increased steam injection. The APCO may require installation of a SCR system if applicant fails to meet the NO_x emission limitation of DOC Condition No. 1.~~

~~**Verification:** GEC shall provide the BAAQMD drawings acceptable to the BAAQMD, for the heat recovery boiler 45 days prior to the date of their release for fabrication. GEC shall notify the CEC of the availability of drawings when they are provided to the BAAQMD.~~

- ~~1-5 Any fuel oil fired (except as provided in Condition 7) shall not exceed maximum sulfur content of 0.12 percent (by weight). GEC shall maintain records on the duration of fuel oil firing, the sulfur content, and in which operating sources fuel oil firing took place. All fuel receipts must be certified to 0.12 percent weighs sulfur or less.~~

~~**Verification:** GEC shall issue quarterly reports to the BAAQMD and CEC and forward a copy to the ARB upon their request, detailing the contents of the fuel oil firing plant logs. During site inspections, GEC shall make the logs available to the BAAQMD, ARB, and CEC staffs. GEC shall provide the BAAQMD and CEC with copies of the fuel oil firing records upon request.~~

- ~~1-7 During periods of PGandE curtailment of natural gas, the maximum sulfur content of the fuel oil burned shall not exceed 0.25 percent (by weight), provided that the gas turbine was being fired on natural gas prior to the curtailment. During such periods, the NO_x emissions limit in Condition 1 shall not apply; NO_x will be controlled via steam injection at no less than the rate determined by the manufacturers recommended maximum steam/fuel ratio or 83,000 lb/hr (at 59°F).~~

~~**Verification:** GEC shall provide the BAAQMD and CEC upon request, with copies of the fuel oil firing records required by Condition 5 and steam injection records required by Condition 9.~~

- 1-8 The steam injection to control NO_x emissions shall be operated during all periods when injection steam is available at the specified pressure and temperature. GEC shall, during the start-up period, perform tests to determine the steam injection rate necessary to assure compliance with Condition 1-1. The steam injection rate will be controlled by the gas turbine control system at all times during the operation of the gas turbine. **This part will no longer apply after the Dry Low NO_x combustor is installed and operational. (BACT)**

Verification: **Until such time that the Dry Low NOx combustor is installed and operational,** GEC shall provide the BAAQMD and CEC, upon request, steam injection records required by Condition 1-9. **This condition will no longer apply after the Dry Low NOx combustor is installed and operational.**

1-9a Pursuant to **the PSD permit** ~~Regulation 10, Rule 26, Section 504,~~ GEC shall install and operate a continuous monitoring system to monitor and record the fuel consumption and the ratio of steam injection to fuel fired in the turbine. **This part shall apply until installation of the Dry Low NOx combustor. (PSD, 2-1-403)**

Verification: GEC shall issue quarterly reports to the BAAQMD and CEC and forward a copy to the ARB upon their request, ~~detailing the contents of the steam injection and fuel consumption logs.~~ During site inspection GEC shall make the logs available to the BAAQMD, ARB, and CEC staffs. GEC shall provide the BAAQMD and CEC with copies of ~~the steam injection and fuel consumption logs~~ upon request.

1-9b Pursuant to **the PSD permit** ~~Regulation 10, Rule 26, Section 504,~~ GEC shall install and operate a continuous monitoring system to monitor and record the fuel consumption and the ratio of steam injection to fuel fired in the turbine. **This part shall apply until installation of the Dry Low NOx combustor. (PSD, 2-1-403)**

Verification: GEC shall issue quarterly reports to the BAAQMD and CEC and forward a copy to the ARB upon their request, ~~detailing the contents of the steam injection and fuel consumption logs.~~ During site inspection GEC shall make the logs available to the BAAQMD, ARB, and CEC staffs. GEC shall provide the BAAQMD and CEC with copies of ~~the steam injection and fuel consumption logs~~ upon request.

1-16 ~~Prior to burning fuel oil as the primary fuel in the gas turbine, GEC shall demonstrate to the satisfaction of the APCO and the CEC, during an approved test period that the "quiet combustor" is capable of meeting the emission requirements of Condition 1. If within six months of initial start up of fuel oil as a discretionary fuel, the application is unable to achieve the concentration limitation of 25 ppm, the applicant shall take action to install a selective catalytic reduction system or another APCO approved equivalent control system capable of satisfying the emission limit in Condition 1.~~

Verification: ~~Action to install a selective catalytic reduction system or another approved equivalent shall include immediate submittal to the BAAQMD and the CEC of the design details of the proposed change and a discussion of the potential change in air emissions from the project. GEC may not implement any major change without prior written approval from the CEC.~~

References

BAAQMD 2010 – Bay Area Air Quality Management District, Authority for Modification Permit Application No. 18434, Plant No. 11180, December 22, 2010.

BAAQMD 2011 – Bay Area Air Quality Management District, Permit Evaluation and Statement of Basis for Minor Revision to the Major Facility Review Permit for Calpine Gilroy Cogen, LP and Gilroy Energy Center, LLC. Facility #B1180, January, 2011.

CGC 2010 – Calpine Gilroy Cogen, L.P., Calpine Gilroy Cogen, LP Amendment AFC 84-AFC-4C. September 13, 2010.