

Bay Area Air Quality Management District

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**Permit Evaluation
and
Statement of Basis
For
Significant Revision of the
MAJOR FACILITY REVIEW PERMIT
for
Gilroy Energy Center, LLC
Facility #B4511**

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January 2007

Application Engineer: Allan Chiu
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Application: 10471

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Title V Statement of Basis

A. Background

This facility is subject to the Operating Permit requirements of Title V of the federal Clean Air Act, Part 70 of Volume 40 of the Code of Federal Regulations (CFR), and BAAQMD Regulation 2, Rule 6, Major Facility Review because it is a Phase II Acid Rain facility as defined by BAAQMD Regulation 2-6-217. It is an Acid Rain facility because it burns fossil fuel, serves a generator that is over 25 MW that is used to generate electricity for sale, and was built after November 15, 1990. It is not a “major facility” as defined by BAAQMD Regulation 2-6-212 because it does not have the “potential to emit,” as defined by BAAQMD Regulation 2-6-218, of more than 100 tons per year of a regulated air pollutant.

Major Facility Operating permits (Title V permits) must meet specifications contained in 40 CFR Part 70 as contained in BAAQMD Regulation 2, Rule 6. The permits must contain all applicable requirements (as defined in BAAQMD Regulation 2-6-202), monitoring requirements, recordkeeping requirements, and reporting requirements. The permit holders must submit reports of all monitoring at least every six months and compliance certifications at least every year.

In the Bay Area, state and District requirements are also applicable requirements and are included in the permit. These requirements can be federally enforceable or non-federally enforceable. All applicable requirements are contained in Sections I through VI of the permit.

Each facility in the Bay Area is assigned a facility identifier that consists of a letter and a 4-digit number. This identifier is also considered to be the identifier for the permit. The identifier for this facility is B4511.

Current Permit Action

The purpose of this significant permit revision is to change permit conditions that have been revised under NSR application 10472 that was issued on 1/25/05. The Engineering Evaluation for that application is attached as Appendix B. The changes that were made under application 10472 and are now being proposed for inclusion in the Title V permit are as follows:

1. Clarify the definition of hours to “Clock” hours with any consecutive 60 minute period “beginning on the hour”
2. Condition #19684, part 18.2: Revise the ammonia slip monitoring language to agree with standard language in other Calpine power plant permits. The revised language will allow the use of a District-approved calculation method to monitor ammonia slip. This is not a relaxation of monitoring, but replaces the original calculation method that was inaccurate. In addition, the basis of the permit condition will be changed from “BACT” to “TRMP” (Toxic Risk Management Plan), since the ammonia slip limit was based upon the District health risk assessment policies and not the BACT provision of NSR.

3. Condition #19684, part 24. Change the required source test frequency for the gas turbine from annual to every 8000 hours of gas turbine operation or once every 3 years, whichever comes first. This is a relaxation of monitoring and therefore is considered a significant revision pursuant to Regulation 2-6-226.3.
4. Condition #19684, part 21. Account for increase of emissions from 4 hours of engine startups by increasing NOx and CO from 109 lb/day and 159 lb/day to 121 lb/day and 163 lb/day, respectively.
5. Condition#19684, part 21. Applicant wants to maintain the flexibility to operate the turbine up to 8,760 hrs/yr while maintaining NOx limit of 14.7 tpy, and increase CO, POC, and PM10 limits to 29.2 tpy, 5.5 tpy, and 13.1 tpy, respectively.
6. Condition#19684, part 22. Amend heat input limit from 3,250,000 MM Btu/yr to 4,380,000 MM Btu/yr to reflect turbine usage hours of 8,760 hrs/yr.

B. Supplemental Information

I. Standard Conditions

This section contains administrative requirements and conditions that apply to all facilities.

Changes in this action

There are no changes proposed for this section.

II. Equipment

This section of the permit lists all permitted or significant sources. Each source is identified with an S and a number (e.g., S1).

Changes in this action

There are no changes proposed for this section.

III. Generally Applicable Requirements

This section of the permit lists requirements that generally apply to all sources at a facility including insignificant sources and portable equipment that may not require a District permit

Changes in this action

This table will be updated to reflect current regulation adoption dates and new regulations that have been adopted since the original Title V permit was issued.

IV. Source-Specific Applicable Requirements

Section IV of the permit contains citations to all of the applicable requirements. The text of the requirements is found in the regulations, which are readily available on the District or EPA websites, or in the permit conditions, which are found in Section VI of the permit.

Complex Applicability Determinations

There are no complex applicability determinations associated with the proposed permit condition changes.

Other changes in this action

No other changes are proposed for this section.

V. Schedule of Compliance

A schedule of compliance is required in all Title V permits pursuant to BAAQMD Regulation 2-6-409.10 which provides that a major facility review permit shall contain the following information and provisions:

“409.10 A schedule of compliance containing the following elements:

- 10.1 A statement that the facility shall continue to comply with all applicable requirements with which it is currently in compliance;
- 10.2 A statement that the facility shall meet all applicable requirements on a timely basis as requirements become effective during the permit term; and
- 10.3 If the facility is out of compliance with an applicable requirement at the time of issuance, revision, or reopening, the schedule of compliance shall contain a plan by which the facility will achieve compliance. The plan shall contain deadlines for each item in the plan. The schedule of compliance shall also contain a requirement for submission of progress reports by the facility at least every six months. The progress reports shall contain the dates by which each item in the plan was achieved and an explanation of why any dates in the schedule of compliance were not or will not be met, and any preventive or corrective measures adopted.”

Since the District has not determined that the facility is out of compliance with an applicable requirement, the schedule of compliance for this permit contains only sections 2-6-409.10.1 and 2-6-409.10.2.

VI. Permit Conditions

The regulatory basis is listed following each condition. The regulatory basis may be a rule or regulation. The District is also using the following terms for regulatory basis:

- **BACT:** This term is used for a condition imposed by the Air Pollution Control Officer (APCO) to ensure compliance with the Best Available Control Technology in Regulation 2-2-301.
- **Cumulative Increase:** This term is used for a condition imposed by the APCO which limits a source’s operation to the operation described in the permit application pursuant to BAAQMD Regulation 2-1-403.
- **Offsets:** This term is used for a condition imposed by the APCO to ensure compliance with the use of offsets for the permitting of a source or with the banking of emissions from a source pursuant to Regulation 2, Rules 2 and 4.
- **PSD:** This term is used for a condition imposed by the APCO to ensure compliance with a Prevention of Significant Deterioration permit issued pursuant to Regulation 2, Rule 2.
- **TRMP:** This term is used for a condition imposed by the APCO to ensure compliance with limits that arise from the District’s Toxic Risk Management Policy.

All changes to existing permit conditions are clearly shown in “strike-out/underline” format in the proposed permit. When the permit is issued, all ‘strike-out’ language will be deleted and all “underline” language will be retained, subject to consideration of comments received.

Changes in this action

The following permit condition changes are proposed:

1. Clarify the definition of hours to “Clock” hours with any consecutive 60 minute period “beginning on the hour”
2. Condition #19684, part 18.2: Revise the ammonia slip monitoring language to agree with standard language in other Calpine power plant permits. The revised language will allow the use of a District-approved calculation method to monitor ammonia slip. This is not a relaxation of monitoring, but replaces the original calculation method that was inaccurate. In addition, the basis of the permit condition will be changed from “BACT” to “TRMP” (Toxic Risk Management Plan), since the ammonia slip limit was based upon the District health risk assessment policies and not the BACT provision of NSR.
3. Condition #19684, part 24. Change the required source test frequency for the gas turbine from annual to every 8000 hours of gas turbine operation or once every 3 years, whichever comes first. This is a relaxation of monitoring and therefore is considered a significant revision pursuant to Regulation 2-6-226.3.
4. Condition #19684, part 21. Account for increase of emissions from 4 hours of engine startups by increasing NOx and CO from 109 lb/day and 159 lb/day to 121 lb/day and 163 lb/day, respectively.
5. Condition#19684, part 21. Applicant wants to maintain the flexibility to operate the turbine up to 8,760 hrs/yr while maintaining NOx limit of 14.7 tpy, and increase CO, POC, and PM10 limits to 29.2 tpy, 5.5 tpy, and 13.1 tpy, respectively.
6. Condition#19684, part 22. Amend heat input limit from 3,250,000 MM Btu/~~hr~~-yr to 4,380,000 MM Btu/yr to reflect turbine usage hours of 8,760 hrs/yr.

VII. Applicable Limits and Compliance Monitoring Requirements

This section of the permit is a summary of numerical limits and related monitoring requirements for each source. The summary includes a citation for each monitoring requirement, frequency of monitoring, and type of monitoring. The applicable requirements for monitoring are completely contained in Sections IV, Source-Specific Applicable Requirements, and VI, Permit Conditions, of the permit.

The District has reviewed all monitoring and has determined that the existing monitoring is adequate.

Changes in this action

The source test frequency for the gas turbine will be changed from annual to once every 8000 firing hours or once every 3 years, whichever comes first. This reduction in monitoring frequency will not increase the potential for the gas turbine emissions to exceed any applicable mass emission limits or emission concentration limits.

The gas turbine is tested for NO_x, CO, POC, PM₁₀, SO₂, and ammonia emissions. The turbine is not required to test for those pollutants during gas turbine start-up or shutdown.

The potential negative impact of reduced source test frequency is the potential increase in emissions resulting from the degradation of the oxidation catalyst and SCR catalyst. The gas turbine NO_x and CO emissions are monitored by CEMs during all gas turbine operation. In effect, the NO_x and CO emissions are an indicator of the catalyst performance. The NO_x and CO CEMs therefore provide real time monitoring of the oxidation and SCR catalysts performance.

The POC, PM₁₀, SO₂, and ammonia emissions are monitored only by annual source testing. The POC, PM₁₀, and SO₂ emissions are not affected by catalyst degradation. The annual POC emission calculations for the turbine did not assume any emission reduction from the use of the oxidation catalyst. The PM₁₀ and SO₂ emissions are primarily a function of the natural gas fuel characteristics and are not affected by the performance of the oxidation catalyst or SCR system. Therefore, the potential violation of the POC, PM₁₀, or SO₂ emission limits is not considerably greater over a three year period than a one year period.

Furthermore, this reduction in source test frequency will not become a precedent for other baseload combined-cycle power plants since this is a peaking facility that employs a simple-cycle gas turbine.

The proposed change in source testing frequency will not conflict with any provisions of 40 CFR 60, Subpart A, NSPS General Provisions or Subpart GG, Standards of Performance for Stationary Gas Turbines, since these regulations do not specify any frequency for performance testing. In addition, District Regulation 9, Rule 9 only requires an initial source test and does not require periodic source testing. Therefore, the proposed change in source testing frequency does not conflict with Regulation 9, Rule 9.

VIII. Test Methods

This section of the permit lists test methods that are associated with standards in District or other rules. It is included only for reference. In most cases, the test methods in the rules are source test methods that can be used to determine compliance but are not required on an ongoing basis. They are not applicable requirements.

If a rule or permit condition requires on going testing, the requirement will also appear in Section IV of the permit.

Changes in this action

There are no changes proposed for this section.

IX. Permit Shield:

The District rules allow two types of permit shields. The permit shield types are defined as follows: (1) A provision in a major facility review permit explaining that specific federally

enforceable regulations and standards do not apply to a source or group of sources, or (2) A provision in a major facility review permit explaining that specific federally enforceable applicable requirements for monitoring, recordkeeping and/or reporting are subsumed because other applicable requirements for monitoring, recordkeeping, and reporting in the permit will assure compliance with all emission limits.

The second type of permit shield is allowed by EPA's White Paper 2 for Improved Implementation of the Part 70 Operating Permits Program. The District uses the second type of permit shield for all streamlining of monitoring, recordkeeping, and reporting requirements in Title V permits. The District's program does not allow other types of streamlining in Title V permits.

This facility has the first and second types of permit shield.

Changes in this action

There are no changes proposed for this section.

X. Revision History

This section contains the details of issuance and revisions for each permit.

The initial Title V permit for this facility was issued on July 18, 2003.

NSR Application 10472 on January 25, 2005

Significant revision on December 5, 2006

XI. Glossary

This section contains terms that may be unfamiliar to the general public or EPA.

Changes in this action

There are no changes proposed for this section.

C. Alternate Operating Scenarios:

No alternate operating scenarios have been requested for this facility.

D. Differences between the Application and the Proposed Permit:

There are no differences between the application and the proposed permit.

APPENDIX A

GLOSSARY

ACT

Federal Clean Air Act

APCO

Air Pollution Control Officer

ARB

Air Resources Board

BAAQMD

Bay Area Air Quality Management District

BACT

Best Available Control Technology

Basis

The underlying authority which allows the District to impose requirements.

CAA

The federal Clean Air Act

CAAQS

California Ambient Air Quality Standards

CAPCOA

California Air Pollution Control Officers Association

CEM

Continuous Emission Monitor

CEQA

California Environmental Quality Act

CFR

The Code of Federal Regulations. 40 CFR contains the implementing regulations for federal environmental statutes such as the Clean Air Act. Parts 50-99 of 40 CFR contain the requirements for air pollution programs.

CO

Carbon Monoxide

Cumulative Increase

The sum of permitted emissions from each new or modified source since a specified date pursuant to BAAQMD Rule 2-1-403, Permit Conditions (as amended by the District Board on 7/17/91) and SIP Rule 2-1-403, Permit Conditions (as approved by EPA on 6/23/95). Cumulative increase is used to determine whether threshold-based requirements are triggered.

District

The Bay Area Air Quality Management District

dscf

Dry Standard Cubic Feet

EPA

The federal Environmental Protection Agency.

Excluded

Not subject to any District regulations.

FDOC

Final Determination of Compliance (FDOC), prepared pursuant to District Regulation 2, Rule 3, Power Plants.

Federally Enforceable, FE

All limitations and conditions which are enforceable by the Administrator of the EPA including those requirements developed pursuant to 40 CFR Part 51, subpart I (NSR), Part 52.21 (PSD), Part 60 (NSPS), Part 61 (NESHAPs), Part 63 (MACT), and Part 72 (Permits Regulation, Acid Rain), including limitations and conditions contained in operating permits issued under an EPA-approved program that has been incorporated into the SIP.

FP

Filterable Particulate as measured by BAAQMD Method ST-15, Particulate.

HAP

Hazardous Air Pollutant. Any pollutant listed pursuant to Section 112(b) of the Act. Also refers to the program mandated by Title I, Section 112, of the Act and implemented by 40 CFR Part 63.

HRSG

Heat Recovery Steam Generator

Major Facility

A facility with potential emissions of: (1) at least 100 tons per year of regulated air pollutants, (2) at least 10 tons per year of any single hazardous air pollutant, and/or (3) at least 25 tons per year of any combination of hazardous air pollutants, or such lesser quantity of hazardous air pollutants as determined by the EPA administrator.

MFR

Major Facility Review. The District's term for the federal operating permit program mandated by Title V of the Federal Clean Air Act and implemented by District Regulation 2, Rule 6.

MOP

The District's Manual of Procedures.

NAAQS

National Ambient Air Quality Standards

NESHAPS

National Emission Standards for Hazardous Air Pollutants. See in 40 CFR Parts 61 and 63.

NMHC

Non-methane Hydrocarbons (Same as NMOC)

NMOC

Non-methane Organic Compounds (Same as NMHC)

NO_x

Oxides of nitrogen.

NSPS

Standards of Performance for New Stationary Sources. Federal standards for emissions from new stationary sources. Mandated by Title I, Section 111 of the Federal Clean Air Act, and implemented by 40 CFR Part 60 and District Regulation 10.

NSR

New Source Review. A federal program for pre-construction review and permitting of new and modified sources of pollutants for which criteria have been established in accordance with Section 108 of the Federal Clean Air Act. Mandated by Title I of the Federal Clean Air Act and implemented by 40 CFR Parts 51 and 52 and District Regulation 2, Rule 2. (Note: There are additional NSR requirements mandated by the California Clean Air Act.)

Offset Requirement

A New Source Review requirement to provide federally enforceable emission offsets for the emissions from a new or modified source. Applies to emissions of POC, NO_x, PM₁₀, and SO₂.

Phase II Acid Rain Facility

A facility that generates electricity for sale through fossil-fuel combustion and is not exempted by 40 CFR 72 from Titles IV and V of the Clean Air Act.

POC

Precursor Organic Compounds

PM

Particulate Matter

PM₁₀

Particulate matter with aerodynamic equivalent diameter of less than or equal to 10 microns

PSD

Prevention of Significant Deterioration. A federal program for permitting new and modified sources of those air pollutants for which the District is classified "attainment" of the National Air Ambient Quality Standards. Mandated by Title I of the Act and implemented by both 40 CFR Part 52 and District Regulation 2, Rule 2.

PUC

Public Utilities Commission (California)

SIP

State Implementation Plan. State and District programs and regulations approved by EPA and developed in order to attain the National Air Ambient Quality Standards. Mandated by Title I of the Act.

SO₂

Sulfur dioxide

THC

Total Hydrocarbons (NMHC + Methane)

Title V

Title V of the federal Clean Air Act. Requires a federally enforceable operating permit program for major and certain other facilities.

TOC

Total Organic Compounds (NMOC + Methane, Same as THC)

TPH

Total Petroleum Hydrocarbons

TRMP

Toxic Risk Management Plan

TSP

Total Suspended Particulate

VOC

Volatile Organic Compounds

Units of Measure:

bhp	=	brake-horsepower
btu	=	British Thermal Unit
cfm	=	cubic feet per minute
g	=	grams
gal	=	gallon
gpm	=	gallons per minute
hp	=	horsepower
hr	=	hour
lb	=	pound
in	=	inches
max	=	maximum
m ²	=	square meter
min	=	minute
mm	=	million
MMbtu	=	million btu
MMcf	=	million cubic feet
ppmv	=	parts per million, by volume
ppmw	=	parts per million, by weight
psia	=	pounds per square inch, absolute
psig	=	pounds per square inch, gauge
scfm	=	standard cubic feet per minute
yr	=	year

Permit Evaluation and Statement of Basis: Site #B4511, Gilroy Energy Center, LLC, 2425 Cordelia Road,
Fairfield, CA 94533

APPENDIX B

Engineering Evaluation for NSR Application 10472

ENGINEERING EVALUATION
Application no. 10472
Gilroy Energy Center, LLC
PLANT #14511

Background

Gilroy Energy Center LLC (Wolfskill Energy Center), an affiliate of Calpine, is requesting for changes of permit conditions for their 49.6 megawatt “peaking” power plant to provide power and transmission and distribution support to the electric grid during periods of high electricity demand. The facility will consist of one simple-cycle, gas-fired combustion turbine and will be located at 2425 Cordelia Road, Fairfield, California. day

The Gilroy Energy Center LLC (Wolfskill Energy Center) Facility consists of the following equipment proposed for installation/operation:

S-1 Combustion Gas Turbine with Water Injection, General Electric LM6000 PC Sprint, natural gas fired, 49.6 MW net simple-cycle, 500 MMBtu/hr maximum heat input rating; abated by A-1 Oxidation Catalyst, and A-2 Selective Catalytic Reduction System.

Requested corrections are as follows:

1. Mass emission limit did not include emissions resulting from 4 hours of engine startups. Requested to increase daily limit for NO_x and CO from 109 lb/day and 159 lb/day to 121 lb/day and 163 lb/day, respectively
2. Current permit mass limit was based on the proposed limit on annual NO_x emissions of 14.7 tpy at 6500 hrs/yr. Applicant wants to maintain the flexibility to operate the turbine up to 8,760 hrs/yr while maintaining NO_x limit of 14.7 tpy. Applicant requested an increase of CO, POC, and PM₁₀ from 21.5 tpy, 4.1 tpy, and 9.8 tpy to 29.2 tpy, 5.5 tpy, and 13.1 tpy, respectively.
3. Amend heat input limit in Condition 22 from 3,250,000 MM Btu/hr to 4,380,000 MM Btu/hr to reflect the turbine usage hours of 8,760 hrs/yr.
4. Amend Condition 18.2 as follows: Ammonia emissions from S-1 Gas Turbine into the atmosphere shall not exceed 10.0 ppmvd @ 15% O₂ (1-hour rolling average), except during periods of startup and shutdown as defined in this permit. The owner/operator shall verify the ammonia concentration by District approved correct ammonia slip calculation. ~~the continuous recording of the ratio of the ammonia injection rate to the NO_x inlet rate to the SCR control system (molar ratio).~~ The owner/operator shall establish the correction factor maximum allowable NH₃/NO_x molar ratio during a District approved source test. ~~and shall not exceed the established limits unless a new ratio has been established during another District approved source~~

5. Amend Definitions as follows: Clock Hour: Any consecutive 60-minute period beginning on the hour

6. Amend Condition 24 to reflect the infrequent operation of the peak Gas Turbine as follows: Source Testing/RATA: Within sixty days after first fire of the gas turbines, and at a minimum on an annual basis thereafter, a relative accuracy test audit (RATA) shall be conducted on the CEMS in accordance with 40 CFR Part 60 Appendix B Performance Specifications. A source test shall be conducted at least every 8,000 hours of turbine operation or once every three years, whichever comes first.. The owner/operator shall provide written test results of the source tests to the District within 60 days after testing. The owner/operator shall submit a complete test protocol to the District no later than 30 days prior to testing, and notification to the District at least ten days prior to the actual date of testing.

Emissions Control Strategy:

The original application showed the facility triggered the Best Available Control Technology (BACT) requirement of New Source Review (District Regulation 2, Rule 2, NSR) for emissions of nitrogen oxides (NO_x), carbon monoxide (CO), precursor organic compounds (POCs), sulfur dioxide (SO₂), and particulate matter of less than 10 microns in diameter (PM₁₀). The applicant is complying with the BACT requirements.

Selective Catalytic Reduction with Ammonia Injection for the Control of NO_x

The S-1 gas turbine is equipped with water injection to minimize NO_x emissions which will be further reduced through the use of a selective catalytic reduction (SCR) system with ammonia injection. The gas turbine is achieve a BACT-level NO_x emission limit of 2.5 ppmvd @ 15 % O₂ (three hour average).

Oxidation Catalyst to Minimize CO and POC Emissions

The S-1 gas turbine is complying with the BACT for CO and POC emissions. A CO catalyst designed to catalytically oxidize the CO and POC will be used to achieve a BACT-level CO emission limit of 6.0 ppmvd @ 15 % O₂ and a POC level of 2.0 ppmvd @ 15 % O₂.

Exclusive Use of Clean-burning Natural gas to Minimize SO₂ and PM₁₀ Emissions

The S-1 gas turbine is utilizing exclusively natural gas as a fuel to minimize SO₂ and PM₁₀ emissions. Because the emission rate of SO₂ depends on the sulfur content of the fuel burned and is not dependent upon the burner type or other combustion characteristics; the use of natural gas will result in the lowest possible emission of SO₂. PM₁₀ emissions are minimized through the use of best combustion practices and "clean burning" natural gas.

Emissions Calculations

Maximum Hourly Emission Estimates:

NOx emissions. The applicant has proposed a NOx emission limit of 2.5 ppmv, dry @ 15% O₂ averaged over three hours. This complies with the BACT requirements for this gas turbine. . This concentration is converted to a mass emission factor as follows:

Adjustment from NOx at 15% O₂ to NOx at 0% O₂

$$(2.5 \text{ ppmvd})(20.95-0)/(20.95 - 15) = 8.8 \text{ ppmv NOx, dry @ 0\% O}_2$$

Conversion from NOx concentration to NOx emission factor

$$(8.8/1,000,000)(1 \text{ lbmol}/385.3 \text{ dscf})(46.01 \text{ lb NOx (as NO}_2\text{)}/\text{lbmol})(8600 \text{ dscf/MMBtu}) \\ = 0.00904 \text{ lb NO}_2\text{/MMBtu}$$

The NOx (as NO₂) mass emission rate based on the maximum firing rate of the turbine is calculated as follows:

$$(0.00904 \text{ lb NOx (as NO}_2\text{)}/\text{MMBtu})(500 \text{ MMBtu/hr}) = \mathbf{4.52 \text{ lb NOx (as NO}_2\text{)}/hr}$$

CO emissions. The CO emissions from the turbine will be limited by permit condition to 6.0 ppmv, dry @ 15% O₂. The CO mass emission rate based on the maximum firing rate of the turbine is calculated as follows based on 6.0 ppmvd @ 15% O₂:

$$(6.0 \text{ ppmvd}) (20.95-0)/(20.95-15) = 21.13 \text{ ppmv CO, dry @ 0\% O}_2$$

$$(21.13/1,000,000)(1/385.3 \text{ dscf}) (28\text{lb CO}/\text{lbmol})(8600 \text{ dscf/MMBtu}) = \\ 0.0132 \text{ lb CO/MMBtu}$$

$$(0.0132 \text{ lb CO/MMBtu})(500 \text{ MMBtu/hr}) = \mathbf{6.60 \text{ lb CO/hr}}$$

POC emissions. The POC emission from the turbine will be limited by permit condition to 2.0 ppmv, dry @ 15% O₂. The POC mass emission rate based on the maximum firing rate of the turbine is calculated as follows based on 2.0 ppmvd @ 15% O₂:

$$(2.0 \text{ ppmvd}) (20.95-0)/(20.95-15) = 7.04 \text{ ppmv CH}_4, \text{ dry @0\%}$$

$$(7.04/1,000,000)(1/385.3 \text{ dscf}) (16\text{lb CO}/\text{lbmol})(8600 \text{ dscf/MMBtu}) = \\ 0.0025 \text{ lb as CH}_4\text{/MMBtu}$$

$$(0.0025 \text{ lb POC/MMBtu})(500 \text{ MMBtu/hr}) = \mathbf{1.26 \text{ lb POC/hr}}$$

PM₁₀ emissions. The PM₁₀ emission factor is based upon the General Electric vendor guarantee of 3.0 lb/hr. This is consistent with use of natural gas as a fuel, which is BACT for a simple cycle gas turbine.

SO₂ emissions. The SO₂ emission factor is based upon an expected average natural gas sulfur content that will not exceed 1.0 grains per 100 scf and a higher heating value of 1030 Btu/scf.

The sulfur content is the maximum amount of sulfur in commercial grade natural gas allowed by the PUC. The sulfur content of gas supplied by the utility is typically much lower.

The sulfur emission factor is calculated as follows:

$$(1.0 \text{ gr}/100\text{scf})(10^6 \text{ Btu}/\text{MM Btu})(2 \text{ lb SO}_2/\text{lb S})/[(7000 \text{ gr}/\text{lb})(1030 \text{ Btu}/\text{scf})] \\ = 0.00277 \text{ lb SO}_2 / \text{MM Btu}$$

The corresponding mass SO₂ emission rate is:

$$(0.00277 \text{ lb SO}_2/\text{MM Btu})(500 \text{ MM Btu}/\text{hr}) = \mathbf{1.38 \text{ lb/hr}}$$

Ammonia emissions. The ammonia (NH₃) mass emission rate from the turbine will be limited by permit condition to 10.0 ppmv, dry @ 15% O₂. The NH₃ mass emission rate based on the maximum firing rate of the turbine is calculated as follows based on 10.0 ppmv @ 15% O₂:

$$(10 \text{ ppmvd})(20.95/20.95-15) = 35.2 \text{ ppmv NH}_3, \text{ dry @ 0\% O}_2$$

$$(35.21/1,000,000)(1/385.3 \text{ dscf}) (17\text{lb NH}_3/\text{lbmol})(8600 \text{ dscf}/\text{MMBtu}) = \\ 0.0134 \text{ lb as NCH}_3/\text{MMBtu}$$

$$(0.0133 \text{ lb NH}_3/\text{MMBtu})(500 \text{ MMBtu}/\text{hr}) = \mathbf{6.68 \text{ lb NH}_3/\text{hr}}$$

Baseload Hourly Emissions Estimates, lb/hour-turbine

NO_x (NO₂)	CO	POC	PM₁₀	SO₂
4.52	6.60	1.26	3.0	1.38

The start-up/shutdown (non-baseload) emissions data were provided by the turbine manufacturer, General Electric, for the Gilroy Energy Center Projects. A start-up is anticipated to take an average of ten minutes for a simple cycle turbine whereas shutdowns are practically instantaneous. The SCR catalyst will require approximately 30 minutes to reach optimal operating temperature and the oxidation catalyst, about 10 minutes. Hence, hourly emissions during a start-up cycle are higher than normal baseload operation.

General Electric Start-up/Stop Emissions, lb-turbine/hour-start/stop

NO_x(NO₂)	CO	POC	PM₁₀	SO₂
7.7	7.7	1.26	3.0	0.33

Maximum Daily Emissions, lb/day:

Maximum daily emissions are estimated based on 24 hours of worst-case emission rates. The worst-case daily emission rate is either: a day, which includes a startup/shutdown, with the balance of the daily operations based on 100% load (33.8° F ambient temperature) or 100% load for 24 hours. The baseload hourly emission estimates are based on allowable BACT

concentration emission limits at 100% load. The start/stop hourly emission estimates are based on the emission estimates provided by the turbine vendor.

$$\text{NO}_2 = (7.7 \text{ lb/hr-start/stop})(4 \text{ starts}) + (4.52 \text{ lb/hr-baseload})(20 \text{ hr}) = 121 \text{ lb/day NO}_2$$

$$\text{CO} = (7.7 \text{ lb/hr-start/stop})(4 \text{ start}) + (6.60 \text{ lb/hr-baseload})(20 \text{ hr}) = 163 \text{ lb/day CO}$$

$$\text{POC} = (1.26 \text{ lb/hr-baseload})(24 \text{ hr}) = 31 \text{ lb/day POC}$$

$$\text{PM}_{10} = (3.0 \text{ lb/hr-start/stop})(4 \text{ start}) + (3.0 \text{ lb/hr-baseload})(20 \text{ hr}) = 72 \text{ lb/day PM}_{10}$$

$$\text{SO}_2 = (1.38 \text{ lb/hr-baseload})(24 \text{ hr}) = 32.1 \text{ lb/day SO}_2$$

Annual Emissions, tons/year:

The applicant is requesting emission limits based on nominal operation limited to 24 hours/day and fuel use equivalent to approximately 8760 hours/year of baseload operation per turbine. The NO_x (as NO₂) emissions have been capped at 15 tons/yr. This may necessitate actual emissions of NO_x being lower than the BACT level of 2.5 ppm or reducing the operating time to less than the proposed 8760 hrs/yr. Nevertheless, the applicant is requesting to operate up to 8760 hours (including startups and shutdowns) with a corresponding increase of CO, POC, and PM₁₀ to be capped at 29.2 tpy, 5.5 tpy, and 13.1 tpy, respectively. The accumulated emission totals will be monitored by the Continuous Emission Monitor (CEM) system.

NO_x (as NO₂) emissions calculation:

$$[(4.52 \text{ lb/hr})(6500 \text{ hours/yr.})](1 \text{ ton}/2000 \text{ lb}) = 14.7 \text{ tons NO}_x \text{ (as NO}_2\text{) /yr.}$$

CO emissions calculation:

$$\begin{aligned} [(6.6 \text{ lb/hr})(6750 \text{ hours/yr.})](1 \text{ ton}/2000 \text{ lb}) &= 22.3 \text{ tons CO /yr. (baseload emissions)} \\ [(7.7 \text{ lb/hr})(2000 \text{ hours/yr})] (1\text{ton}/2000 \text{ lb}) &= 7.7 \text{ tons CO/yr (startups and shutdowns)} \\ \text{total} &= 30 \text{ tons CO/yr} \end{aligned}$$

POC emissions calculation:

$$\begin{aligned} [(1.26 \text{ lb/hr})(6750 \text{ hours/yr.})](1 \text{ ton}/2000 \text{ lb}) &= 4.25 \text{ tons POC /yr. (baseload emissions)} \\ [(1.26 \text{ lb/hr})(2000 \text{ hours/yr.})](1 \text{ ton}/2000 \text{ lb}) &= 1.36 \text{ tons POC /yr. (startups and shutdowns)} \\ \text{total} &= 5.61 \text{ tons POC/yr} \end{aligned}$$

PM₁₀ emissions calculation:

$$\begin{aligned} [(3.0 \text{ lb/hr})(6750 \text{ hours/yr.})](1 \text{ ton}/2000 \text{ lb}) &= 10.1 \text{ tons PM}_{10}\text{/yr. (baseload emissions)} \\ [(3.0 \text{ lb/hr})(2000 \text{ hours/yr.})](1 \text{ ton}/2000 \text{ lb}) &= 3.0 \text{ tons PM}_{10}\text{/yr (startups and shutdowns)} \\ \text{total} &= 13.1 \text{ tons PM}_{10}\text{/yr} \end{aligned}$$

SO₂ emissions calculation:

$$[(1.38 \text{ lb/hr})(6500 \text{ hours/yr.})](1 \text{ ton}/2000 \text{ lb}) = 4.5 \text{ tons/yr. SO}_2$$

Permitted Maximum Annual Emissions, tons/yr

PLANT CUMULATIVE INCREASE

NO _x = 14.7 (old) + (0.0) new =	14.7 TPY
CO = 21.5 TPY (old) + 7.7 TPY (new)=	29.2 TPY
POC=4.1 TPY (old) + 1.36 TPY (new)=	5.5 TPY
PM10=9.8 TPY (old) + 3.0 TPY (new)=	13.1 TPY

Compliance Determination

Best Available Control Technology (BACT) Determinations

The following section includes BACT determinations by pollutant for the permitted sources of the proposed project.

Air Pollution Control Strategies and Equipment

The proposed facility includes sources that trigger the Best Available Control Technology (BACT) requirement of New Source Review (District Regulation 2, Rule 2, NSR) for emissions of nitrogen oxides (NO_x), carbon monoxide (CO), precursor organic compounds (POC), sulfur dioxide (SO₂), and particulate matter of less than 10 microns in diameter (PM₁₀).

Pursuant to Regulation 2-2-206, BACT is defined as the more stringent of:

- (a) "The most effective control device or technique which has been successfully utilized for the type of equipment comprising such a source; or
- (b) The most stringent emission limitation achieved by an emission control device or technique for the type of equipment comprising such a source; or
- (c) Any emission control device or technique determined to be technologically feasible and cost-effective by the APCO; or
- (d) The most effective emission control limitation for the type of equipment comprising such a source which the EPA states, prior to or during the public comment period, is contained in an approved implementation plan of any state, unless the applicant demonstrates to the satisfaction of the APCO that such limitations are not achievable. Under no circumstances shall the emission control required be less stringent than the emission control required by any applicable provision of federal, state or District laws, rules or regulations."

The type of BACT described in definitions (a) and (b) must have been demonstrated in practice and approved by a local Air Pollution Control District, CARB, or the EPA and is referred to as "BACT 2". This type of BACT is termed "achieved in practice". The BACT category described in definition (c) is referred to as "technologically feasible/cost-effective" and must have been demonstrated to be effective and reliable on a full-scale unit and shown to be cost-effective on the basis of dollars per ton of pollutant abated. This is referred to as "BACT 1". BACT specifications (for both the "achieved in practice" and "technologically feasible/cost-effective" categories) for various source categories have been compiled in the BAAQMD BACT Guideline.

The NO_x, CO and oxygen concentrations will be monitored continuously using a continuous emissions monitor (CEM). Therefore, emission concentrations of NO_x and CO will be limited to parts per million (ppm) emissions concentrations in the permit conditions.

BACT limits for POC, PM10, and SO₂ are expressed as emission rates in units of pounds per million Btu. Compliance with these limits will be demonstrated by annual source tests.

Nitrogen Oxides (NO_x)

District BACT Guideline 89.1.3, dated 7/18/03, specifies BACT1 (technologically feasible/cost-effective) for NO_x for a simple-cycle gas turbine with a power rating \leq 50 MW as NO_x emissions \leq 2.5 ppmvd @ 15% O₂, achieved through the use of Selective Catalytic Reduction (SCR) with ammonia injection in conjunction with combustion modifications and water injection. BACT 2 (achieved in practice) is \leq 2.5 ppmvd @ 15% O₂.

This project will use SCR for NO_x control. Water will be injected into the turbine combustor to reduce NO_x emissions in the combustor exhaust. Aqueous ammonia is injected into the SCR catalyst to control exiting stack emissions to less than 2.5 ppmvd NO_x @ 15% O₂. The ammonia slip will be limited by permit condition to 10 ppmv. Since SCR, controlling NO_x emissions to 2.5 ppmv corrected to 15% oxygen, represents a control technology that is technologically feasible, cost-effective, and achieved in practice in a wide variety of applications, it represents BACT for the project.

Carbon Monoxide (CO)

District BACT Guideline 89.1.3, dated 7/18/03, specifies BACT (achieved in practice) for CO for a gas turbine with a power rating \leq 50 MW as CO emissions \leq 6.0 ppmvd @ 15% O₂, achieved through the use of Selective Catalytic Reduction (SCR) with ammonia injection in conjunction with combustion modifications.

The CO emissions from the combustion turbine will be reduced through the use of an oxidation catalyst to less than 6.0 ppmvd CO @ 15% O₂. CO emissions are also minimized through the use of best combustion practices and "clean burning" natural gas. This complies with BACT.

Precursor Organic Compounds (POCs)

District BACT Guideline 89.1.3, dated 7/18/03, specifies BACT (achieved in practice) for POC for a gas turbine with a power rating \leq 50 MW as POC emissions \leq 2.0 ppmvd @ 15% O₂, achieved through the use of Selective Catalytic Reduction (SCR) with ammonia injection in conjunction with combustion modifications.

Because CEMs for organic compounds only measure carbon (as C₁), and because methane and ethane are expected to be in the gas turbine exhaust, it is not possible to determine non-methane/ethane hydrocarbon concentrations on a real-time basis. As a result, a continuous emission concentration limitation as BACT for POC is not feasible. Therefore, BACT for POC is deemed to be a mass emission rate limitation to be verified by annual source testing. The POC emissions from the combustion turbine will be reduced to less than 2.0 ppmvd through the use of

an oxidation catalyst. POC emissions are also minimized through the use of best combustion practices and "clean burning" natural gas.

Particulate Matter (PM₁₀)

District BACT Guideline 89.1.3, dated 7/18/03, specifies BACT (achieved in practice) for POC for a gas turbine with a rated heat input ≥ 2.0 MW and < 50 MW as the exclusive use of clean-burning natural gas. The proposed turbines will utilize natural gas exclusively, which will result in minimal nitrate and sulfate particulate formation. The gas turbines will utilize natural gas exclusively to minimize PM₁₀ emissions. PM₁₀ emissions are minimized through the use of best combustion practices and "clean burning" natural gas.

Sulfur Dioxide (SO₂)

District BACT Guideline 89.1.2, dated 8/28/00, specifies BACT (achieved in practice) for POC for a gas turbine with a rated heat input ≥ 2.0 MW and < 50 MW as the exclusive use of clean-burning natural gas. The proposed turbines will utilize natural gas exclusively, which will result in minimal SO₂ emissions. Because the emission rate of SO₂ depends on the quantity and sulfur content of the fuel burned and is not dependent upon the burner type or other combustion characteristics, the use of natural gas will result in the lowest possible emission of SO₂. Sulfur content has been limited to 1 grain/100 scf (condition 23(b)) and will be analyzed quarterly (condition 24(e)).

Emission Offsets

This facility is within 3 miles of the Creed and Goose Haven Energy Center facilities which is owned and operated by Calpine, therefore the Wolfskill facility's PM-10, NO_x and POC emissions must be offset per Regulation 2-2-302 and 303.

The total emissions for each pollutant are listed below.

Pollutant	NO_x (as NO₂)	CO	POC	PM₁₀	SO₂
Wolfskill (tpy)	14.7	29.2	5.5	13.1	4.5
<u>Offset Threshold</u> (tpy)	15	n/a	15	100	100

CEQA Analysis

Per District Regulation 2-1-310, except for permit applications which will be reviewed as ministerial projects under Section 2-1-311 or which are exempt from California Environmental Quality Act (CEQA) review pursuant to Section 2-1-312, all proposed new and modified sources for which an authority to construct must be obtained from the District shall be reviewed in accordance with the requirements of CEQA. For this project, the Lead Agency under CEQA is the County of Solano, California.

An Initial Study of the project was performed by the Lead Agency to assess potential impacts and identify mitigation measures to avoid, reduce, or minimize significant impacts to less than significant levels. Since the Initial Study concludes that all project impacts would be reduced to less than significant with the implementation of mitigation measures, the County of Solano has issued a Negative Declaration for the project (Resolution 2002-?? September, 2002). This project therefore complies with the requirements of Regulation 2-1-426.2.

Regulation 9, Rule 9, Nitrogen Oxides from Stationary Gas Turbines

Because the proposed combustion gas turbine will be limited by permit condition to NO_x emissions of 2.5 ppmvd @ 15% O₂, it is expected to comply with the Regulation 9-9-301.3 NO_x limitation of 9 ppmvd @ 15% O₂.

Regulation 10: New Source Performance Standards (NSPS)

Regulation 10 incorporates the federal NSPS (40 CFR 60) by reference.

Subpart A General Provisions provides the general framework for NSPS. Subpart Db Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units does not apply because this project does not utilize duct burners.

Subpart GG Standards of Performance for Stationary Gas Turbines – contains NO_x and SO_x emission limits, as well as monitoring and testing requirements for combustion turbines. The project emissions will be well below the applicable NO_x and SO₂ emissions limits. The Applicant will comply with emission and fuel monitoring requirements, and monitoring plans will be submitted, as required. The applicable requirements will be incorporated into the Title V permit.

Section 112 of the Clean Air Act, National Emission Standards for Hazardous Air Pollutants (NESHAP)

These standards are contained in 40 CFR Parts 61 and 63 and are not applicable to the proposed project because the HAP emissions are less than 10 tons per year..

Permit Conditions

Definitions:

Hour:	Any continuous 60-minute period <u>beginning on the hour</u> .
Calendar Day	Any continuous 24 hour period beginning at 12:00 AM or 0000 hours
Year:	Any consecutive twelve-month period
Heat Input:	All heat inputs refer to the heat input at the higher heating value (HHV) of the fuel, in Btu/scf.

Firing Hours:	Period of time, during which fuel is flowing to a unit, measured in fifteen-minute increments.
MM Btu:	million British thermal units
Gas Turbine Start-up Mode:	The time beginning with the introduction of continuous fuel flow to the Gas Turbine until the requirements listed in Condition 19 are met, but not to exceed 60 minutes.
Gas Turbine Shutdown Mode:	The time from non-compliance with any requirement listed in Condition 19 until termination of fuel flow to the Gas Turbine, but not to exceed 30 minutes.
Corrected Concentration:	The concentration of any pollutant (generally NO _x , CO or NH ₃) corrected to a standard stack gas oxygen concentration. For an emission point (exhaust of a Gas Turbine) the standard stack gas oxygen concentration is 15% O ₂ by volume on a dry basis
Commissioning Activities:	All testing, adjustment, tuning, and calibration activities recommended by the equipment manufacturers and the construction contractor to insure safe and reliable steady state operation of the gas turbines, heat recovery steam generators, steam turbine, and associated electrical delivery systems.
Commissioning Period:	The Period shall commence when a gas turbine is first fired. The period shall terminate when the plant has completed performance testing, is available for commercial operation, and has initiated sales to the power exchange. The commissioning period shall not exceed 180 days under any circumstances.
Precursor Organic Compounds (POCs):	Any compound of carbon, excluding methane, ethane, carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate

EQUIPMENT DESCRIPTION:

This Authority To Construct is issued and is valid for this equipment only while it is in the configuration set forth in the following description:

Installation of one Simple-Cycle Gas Turbine Generator Consisting Of:

1. Simple Cycle Gas Turbine, General Electric LM6000 PC, Maximum Heat Input 500 MMBtu/hr, Nominal Electrical Output 49.6 MW, Natural Gas-Fired.
2. Selective Catalytic Reduction (SCR) NO_x Control System.
3. Ammonia Injection System.
(including the ammonia storage tank and control system)
4. Oxidation Catalyst (OC) System.

5. Continuous emission monitoring system (CEMS) designed to continuously record the measured gaseous concentrations, and calculate and continuously monitor and record the NOx and CO concentrations in ppmvd corrected to 15% oxygen on a dry basis.

PERMIT CONDITIONS:

Conditions for the Commissioning Period

1. deleted
2. deleted
3. deleted
4. deleted
5. deleted
6. deleted
7. deleted
8. deleted
9. deleted
10. deleted
11. Consistency with Analyses: The owner/operator shall operate all equipment in accordance with all information submitted with the application (and supplements thereof) and the analyses under which this permit is issued unless otherwise noted below.
12. Conflicts Between Conditions: In the event that any condition herein is determined to be in conflict with any other condition contained herein, then, if principles of law do not provide to the contrary, the condition most protective of air quality and public health and safety shall prevail to the extent feasible.
13. Reimbursement of Costs: All reasonable expenses, as set forth in the District's rules or regulations, incurred by the District for all activities that follow the issuance of this permit, including but not limited to permit condition implementation, compliance verification and emergency response, directly and necessarily related to enforcement of the permit shall be reimbursed by the owner/operator as required by the District's rules or regulations.
14. Access to Records and Facilities: As to any condition that requires for its effective enforcement the inspection of records or facilities by representatives of the District, the Air Resources Board (ARB), the U.S. Environmental Protection Agency (U.S. EPA), or the California Energy Commission (CEC), the owner/operator shall make such records available or provide access to such facilities upon notice from representatives of the District, ARB, U.S. EPA, or CEC. Access shall mean access consistent with California Health and Safety Code Section 41510 and Clean Air Act Section 114A.
15. Notification of Commencement of Operation: The owner/operator shall notify the District of the date of anticipated commencement of turbine operation not less than 10 days prior to such date. Temporary operations under this permit is granted consistent with the District's rules and regulations.

16. Operations: The owner/operator shall properly maintain and keep the gas turbine, emission controls, CEMs and associated equipment in good operating condition at all times when the equipment is in operation.
17. Visible Emissions: The owner/operator shall not discharge air contaminant into the atmosphere for a period or periods aggregating more than three minutes in any one hour which is as dark or darker than Ringelmann 1 or equivalent 20% opacity.

18. Emissions Limits:

18.1 The owner/operator of S-1 Gas Turbine shall not emit more than 2.5 ppmvd oxides of nitrogen (NO_x) @ 15% O₂ (3-hour rolling average) into the atmosphere, except during periods of startup and shutdown as defined in this permit. The owner/operator shall verify the NO_x concentrations from the stack of S-1 by a District-approved continuous emission monitoring system (CEMS) and during any required source test. (basis: BACT)

18.2 The owner/operator of S-1 shall not emit more than 10.0 ppmvd ammonia @ 15% O₂ (1-hour average) into the atmosphere, except during periods of startup and shutdown as defined in this permit. The owner/operator shall verify the ammonia concentration by ~~the continuous recording of the ratio of the ammonia injection rate to the NO_x inlet rate to the SCR control system (molar ratio).~~ a District approved corrected ammonia slip calculation. The owner/operator shall establish the correction ammonia slip factor~~factor~~maximum allowable NH₃/NO_x molar ratio during a District approved source test, and shall not exceed the established limits unless a new ratio has been established during another District approved source test. (basis: ~~BACT~~BACTRMP)

18.3 The owner/operator of S-1 shall not emit more than 6.0 ppmvd carbon monoxide (CO) @ 15 % O₂ (3-hour rolling average) into the atmosphere, except during periods of startup and shutdown as defined in this permit. The owner/operator shall verify the CO concentration of S-1 by a District-approved CEMS and during any required source test. (basis: BACT)

18.4 The owner/operator of S-1 shall not emit more than 2.0 ppmvd precursor organic compound (POC) @ 15% O₂ (1-hour average) into the atmosphere, except during periods of startup and shutdown as defined in this permit. The owner/operator shall verify the POC concentration from the stack of S-1 during any required source test. (basis: BACT)

18.5 The owner/operator of S-1 shall not emit more than 3.0 pounds per hour particulate matter emissions of less than ten microns in diameter (PM₁₀) into the atmosphere, except during periods of startup and shutdown as defined in this permit. The owner/operator shall verify PM₁₀ mass emission rate from the stack of S-1 during any required source test. (basis: BACT & cumulative increase)

18.6 The owner/operator of S-1 shall not emit more than 1.38 pounds per hour oxides of sulfur emissions (SO_x) into the atmosphere, except during periods of startup and shutdown as defined in this permit. The owner/operator shall verify the SO_x emission rate during any required source test or natural gas certification. (basis: BACT & cumulative increase)

19. Turbine Startup: The owner/operator of S-1 shall not exceed a time period of 60 minutes per start-up, or another time period based on good engineering practice and approved in advance by the District. The startup clock begins with the turbine’s initial firing and continues until the unit meets the emission concentration limits. (Basis: Cumulative increase)
20. Turbine Shutdown: The owner/operator of S-1 shall not exceed a time period of 30 minutes each per shutdown, or another time period based on good engineering practice and approved in advance by the District. Shutdown begins with initiation of the turbine shutdown sequence and ends with the cessation of turbine firing. (Basis: Cumulative increase)
21. Mass Emission Limits: The owner/operator of S-1 shall not exceed the mass emission limits listed in Table 1 below.

Table 1 – Mass Emission Limits (Including Startups and Shutdowns)

Pollutant	day (lb.)	Yearly (tons)
NOx (as NO ₂)	109 <u>121</u>	14.7
CO	159 <u>163</u>	21.5 <u>29.2</u>
POC	31	4.1 <u>5.5</u>
PM10	72	9.8 <u>13.1</u>
SOx (as SO ₂)	32	4.5

The owner/operator shall demonstrate compliance on one-hour average readings through the use of process monitors (e.g., fuel use meters), CEMS, and source test results; and the monitoring, recordkeeping and reporting conditions of this permit. (Basis: Cumulative increase & record keeping)

22. Operational Limits: In order to assure compliance with the emission limits of this permit, the owner/operator shall comply with the following operational limits:
 - (a) The heat input to the gas turbine not to exceed:
 - Hourly: 500 MMBtu/hr
 - Daily: 12,000 MMBtu/day
 - Annual: ~~3,250,000~~ 4,380,000 MMBtu/year
 - (b) The owner/operator shall use only PUC Quality natural gas to fire the gas turbine (General Order 58-a). The owner/operator shall not use natural gas with sulfur concentrations in excess of 1 gr./100 scf.
23. Monitoring Requirements: The owner/operator shall comply with the following monitoring requirements for the gas turbine:

- (a) install and maintain exhaust stack platform with permanent provisions to allow collection of stack gas samples consistent with EPA test methods.
 - (b) install and maintain an ammonia injection system with an operational ammonia flowmeter and injection pressure indicator accurate to plus or minus five percent at full scale and to be calibrated once every twelve months.
 - (c) install and maintain a continuously recording emissions monitor(s) for NO_x, CO and O₂. Continuous emissions monitors must comply with the requirements of 40 CFR Part 60, Appendix B; Performance Specifications & Appendix F; Quality Assurances procedures and 40 CFR Part 75, Appendix A; Specifications and Test Procedures, & Appendix F; Quality Assurance and Quality Procedures and be capable of monitoring concentrations and mass emissions during normal operating conditions and during startups and shutdowns.
 - (d) continuously record the fuel flow rate using District-approved fuel flow meters along with quarterly fuel compositional analyses for the measuring the fuel's higher heating value (wet basis).
 - (e) analyze the total sulfur content of the fuel gas on a quarterly basis.
(Basis: Monitoring & record keeping)
24. Source Testing/RATA: Within sixty days after startup of the gas turbines, and at a minimum on an annual basis thereafter, a relative accuracy test audit (RATA) shall be conducted on the CEMS in accordance with 40 CFR Part 60 Appendix B Performance Specifications. ~~A and a~~ source test shall be conducted to verify compliance with part 18 at least every 8,000 hours of turbine operation or once every three years, whichever comes first. The owner/operator shall provide written test results of the source tests to the District within sixty days after testing. The owner/operator shall submit a complete test protocol to the District no later than 30 days prior to testing, and notification to the District at least ten days prior to the actual date of testing. The owner/operator shall comply with the source test protocol for the following: measurements of NO_x, CO, POC, and stack gas oxygen content in accordance with ARB Test Method 100; measurements of PM₁₀ in accordance with ARB Test Method 5; and measurements of ammonia in accordance with Bay Area Air Quality Management District test method ST-1B. Alternative test methods, and source testing scope, may also be used to address the source testing requirements of the permit if approved in advance by the District. The owner/operator shall include initial and annual source tests parameters specified in the approved test protocol, and at a minimum include the following:
- a. NO_x (as NO₂) – ppmvd at 15% O₂ and lb/MMBtu;
 - b. Ammonia – ppmvd at 15% O₂ (Exhaust);
 - c. CO – ppmvd at 15% O₂ and lb/MMBtu (Exhaust);
 - d. POC – ppmvd at 15% O₂ and lb/MMBtu (Exhaust);
 - e. PM₁₀ – lb/hr (Exhaust);
 - f. SO_x – lb/hr (Exhaust);
 - g. Natural gas consumption, fuel High Heating Value (HHV), and total fuel sulfur content;
 - h. Turbine load in megawatts;

- i. Stack gas flow rate (SDCFM) calculated according to procedures in U.S. EPA Method 19.
 - j. Exhaust gas temperature (°F)
 - k. Ammonia injection rate (lb/hr or moles/hr)
(Basis: source test requirements & monitoring)
25. The owner/operator shall establish a written quality assurance program in accordance with 40 CFR Part 75, Appendix B and 40 CFR Part 60 Appendix F. (Basis: continuous emission monitoring)
26. The owner/operator shall comply with the applicable requirements of 40 CFR Part 60 Subpart GG. (Basis: NSPS)
27. The owner/operator shall notify the District in writing of any breakdown condition consistent with the District's breakdown regulations. (Basis: Regulation 1-432)
28. The owner/operator shall include a breakdown condition description of the equipment malfunction or failure, the date and cause of the initial failure, the estimate of the emissions excess of those allowed, and the actions taken to restore normal operations. (Basis: Regulation 1-431)
29. Recordkeeping: The owner/operator shall maintain the following records:
 - (a) hourly, daily, quarterly and yearly quantity of fuel used and corresponding heat input rates;
 - (b) the date and time of each occurrence, duration, and type of any startup, shutdown, or malfunction along with the resulting mass emissions during such time period;
 - (c) emission measurements from all source testing, RATAs and fuel analyses;
 - (d) daily, quarterly and yearly hours of operation;
 - (e) hourly records of NO_x and CO, emission concentrations and hourly ammonia injection rates and ammonia/NO_x ratio.
 - (f) for the continuous emissions monitoring system; performance testing, evaluations, calibrations, checks, maintenance, adjustments, and any period of non-operation of any continuous emissions monitor.
(Basis: record keeping)
30. The owner/operator shall maintain all records for at least five years and shall make them available for District inspection upon request. (Basis: record keeping)
31. Reporting: The owner/operator shall submit to the District a written report for each calendar quarter, within 30 days of the end of the quarter. The required written report shall include:
 - (a) Daily and quarterly fuel use and corresponding heat input rates;
 - (b) Daily, monthly, and (for each month) yearly mass emission rates for all criteria pollutants during normal operations and during other periods (startup/shutdown, breakdowns);

- (c) Time intervals, date, and magnitude of excess emissions;
 - (d) Nature and cause of the excess emission, and corrective actions taken;
 - (e) Time and date of each period during which the CEM was inoperative, except for zero and span checks, and the nature of system repairs and adjustments;
 - (f) A declaration stating periods during which no excess emissions occurred;
 - (g) Results of quarterly fuel analyses for HHV and total sulfur content.
- (Basis: record keeping & reporting)

- 32. District Operating Permit: The owner/operator shall apply for and obtain all the necessary permits to operate in accordance with the requirements of the District's rules and regulations. (Basis: Regulations 2-2 & 2-6)
- 33. Title IV and Title V Permits: The acid rain monitors (Title IV) must be certified within 90 days of first-fire. (Basis: Regulation 2-6)

Conclusion

The Wolfskill Energy Center, which is composed of the source listed below, complies with all applicable District rules and regulations. It is therefore recommended that changes of permit conditions be issued for:

S-1 Combustion Gas Turbine with Water Injection, General Electric LM6000 PC Sprint, natural gas fired, 49.6 MW net simple-cycle, 500 MMBtu/hr maximum heat input rating; abated by A-1 Oxidation Catalyst, and A-2 Selective Catalytic Reduction System.

By: _____
Allan Chui, AQ Engineer II

Date _____