DOCKETED	
Docket Number:	93-AFC-03C
Project Title:	Compliance - Application for Certification for SMUD's Campbell Soup Cogeneration Project
TN #:	231116
Document Title:	Sacramento Power Authority's Campbell Cogeneration Project - 2018 Annual Compliance Report
Description:	2018 Annual Compliance Report for the Sacramento Power Authority's Campbell Cogeneration Project.
Filer:	Mary Dyas
Organization:	SPA Cogeneration III/EthosEnergy
Submitter Role:	Applicant
Submission Date:	12/11/2019 7:52:20 AM
Docketed Date:	12/11/2019

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February 7, 2019

Mary Dyas
Compliance Project Manager
California Energy Commission
1516 Ninth Street, MS 2000
Sacramento, CA 98514-5504

Re: Sacramento Power Authority Cogeneration Project – Annual Compliance Report 2018

Dear Ms. Dyas,

Pursuant to California Energy Commission (CEC) Docket Number 93-AFC-3 (Sacramento Power Authority at Campbell Cogeneration Project), Section V – Compliance Plan and Monitoring Program, Element II – Project Owner Responsibilities, Condition G – Annual Compliance Report, the Sacramento Power Authority (SPA) Cogeneration III is submitting the attached Annual Compliance Report for Calendar Year 2018.

If there are any questions, please do not hesitate to call.

Best Regards,

Eddie McCormick
Facility Manager

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Sacramento Power Authority (SPA) Cogeneration III

(Sacramento Power Authority at Campbell Cogeneration Project)

CEC Docket Number: 93-AFC-3

2018 CEC Annual Compliance Report

SPA Cogen III
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1.0 COMPLIANCE MATRIX

See Appendix A for an updated compliance matrix for the Sacramento Power Authority (SPA)

Efficiency

EFF-1 (condition modified on 11/14/2013 when the California Energy Commission approved SPA's petition and changed EFF-1 to read – changes are underlined): For periods when a suitable steam host is accepting steam, the facility shall be operated in accordance with the requirements of Public Resources Code section 25134. For all other periods, Public Resources Code Section 25134 shall not apply to the facility.

[For 2018, Public Resources Code Section 25134 does not apply to the facility.]

a) At least 5% of the cogeneration project's total annual energy output shall be in the form of useful thermal energy.

Useful thermal export ÷ electric output plus thermal export = Not Applicable

b) The useful annual power output plus one-half the useful annual thermal energy output equals not less than 42.5% of natural gas input.

Electric MMBTU plus one-half thermal ÷ gas MMBTU = Not Applicable

2018 Facility Parameters	Value	Unit of Measure
Steam Exported	0	Klbs
Steam Enthalpy	0	BTU/Klbs
Condensate Return	0	Klbs
Useful Thermal Export	0	MMBTU
Electric Production (as megawatts)	779,700.57	MWH
Electric (as heat energy)	2,660,448.78	MMBTU
Natural Gas Usage	6,392,621.4	MMBTU

Hazardous Material Handling

HAZ-1 The project owner shall use only those hazardous materials or their equivalent in reportable quantities listed, unless otherwise approved by the CEC CPM.

The plant only uses CEC approved hazardous materials. You will find attached (see Appendix E) a complete list of hazardous materials as submitted December 19, 2018 to Sacramento County Environmental Management Department. In 2018, tank and daily

volumes for BL1555 and BL1794 were lowered. Also, CT775, CL4132 and CL5428, approved by the CEC in 2017, were delivered, and, CL1432 was removed from inventory. Additionally, HMBP submissions in 2018 included updates to both the site map and to the emergency response plan, and, to correct the ammonia concentration.

Reliability

RELI-1 The project owner shall maintain monthly data sets of power plant reliability and maintenance data.

The project owner shall submit a summary of plant forced outages, including their causes and duration, as well as plant availability factors and forced outage rates for the report period, to the CEC CPM in each annual compliance report following commercial operation of the plant.

2018 Contract Availability	98.53%
2018 Forced Outage Rate	1.47%

Forced Outages	Begin	End	Outage Description
1	8/18/2018 10:34 AM	8/23/2018 16:10 PM	CT/STG - Flashback caused burner damage
2	9/1/2018 15:30 PM	9/1/2018 20:40 PM	CT Surge switches malfunction
3	11/28/2018 13:22 PM	11/28/2018 14:08 PM	STG – IP Drum HI HI level probe wire grounded out due to insulating jacket degradation.

Transmission Line Safety and Nuisance

TLSN-3 All radio and television interference records shall be maintained by the project owner, available for CEC CPM inspection, and summarized in the Annual Compliance Reports.

There were no reports of radio or television interference associated with the Sacramento Power Authority transmission lines during 2018.

TLSN-5 The project owner shall provide a summary of the inspection results and any clean-up and fire prevention activities along the right of way in the Annual Compliance Report.

In the year 2018, there were no trees in the right of way of the Sacramento Power Authority that required trimming or removal.

TLSN-8 The project owner shall maintain a record of activities (grounding, notification and correspondence) related to this condition. A summary of these records shall be included in the Annual Compliance Report.

There were no complaints associated with induced voltages on vehicles, fences, or other metallic objects during 2018.

Waste Management

WASTE-1 In the Annual Compliance Report, the project owner shall summarize actual versus planned waste management activities.

Non-Hazardous Solid Waste - disposal of an 8 cubic yard dumpster serviced every week. Based on a full dumpster each service the estimated solid waste would be 416 cubic yards.

Recycled Solid Material – disposal of a 2 cubic yard dumpster serviced every other week. Based on a full dumpster each service the estimated recycled solid material would be 52 cubic yards.

Non-RCRA Hazardous Waste Liquid – 900 gallons of Oily water was disposed of at Ramos Environmental Services in West Sacramento, CA by Ramos Environmental Services in January.

Universal Waste – three boxes of batteries, was recycled in February.

RCRA Hazardous Waste Solids – 300 pounds of ammonium chloride debris disposed of at Veolia ES Technical Solutions, Azusa, CA by Ramos Environmental Services in February.

Non-RCRA Hazardous Solid Waste – 280 pounds of oily debris was disposed of at Ramos Environmental Services in West Sacramento, CA by Ramos Environmental Services in February.

Non-RCRA Waste/Used Oil - Recycling Activity – 55 gallons of used oil was recycled by Ramos in February.

RCRA Hazardous Waste Solid – 10 pounds of metal shavings with was disposed of at Veolia ES Technical Solutions, Azusa, CA by Ramos Environmental Services and Veolia ES Technical Transporters in March.

Non-RCRA Hazardous Solid Waste – 300 pounds of oily debris was disposed of at Ramos Environmental Services in West Sacramento, CA by Ramos Environmental Services in March.

Non-RCRA Hazardous Waste Solids – 300 pounds of iron oxide with ammonia salts was disposed of at Veolia ES Technical Solutions, Azusa, CA by Ramos Environmental Services in March.

Non-RCRA Hazardous Waste Liquid – 500 gallons of water and iron oxide was disposed of at Veolia ES Technical Solutions, Azusa, CA by Ramos Environmental Services and Veolia ES Technical Transporters in March.

Non-RCRA Waste/Used Oil - Recycling Activity – 150 gallons of used oil was recycled by Ramos in March.

RCRA Hazardous Waste Liquid – 30 gallons of Laboratory waste was disposed of at Veolia ES Technical Solutions, Richmond, CA by Ramos Environmental Services and Veolia ES Technical Transporters in April.

Non-Hazardous Weathered Wood – 40 cubic yards of Cooling Tower Wood waste was disposed of at Forward Landfill in Manteca, CA by Republic Services in April.

Universal Waste – 980 pounds of e-waste was recycled by California Electronic Asset Recovery in May.

Non-RCRA Hazardous Waste Liquid – 15 gallons of Oily water was disposed of at Ramos Environmental Services in West Sacramento, CA by Ramos Environmental Services in June.

Non-RCRA Hazardous Solid Waste – 200 pounds of oily debris was disposed of at Ramos Environmental Services in West Sacramento, CA by Ramos Environmental Services in June.

Universal Waste – 30 gallons of empty aerosol cans was recycled by Veola (transported by Ramos) in June.

RCRA Hazardous Waste Liquid – 30 gallons of Laboratory waste was disposed of at Veolia ES Technical Solutions, Richmond, CA by Ramos Environmental Services and Veolia ES Technical Transporters in August.

Non-RCRA Waste/Used Oil - Recycling Activity – 55 gallons of used oil was recycled by Ramos in August.

Non-RCRA Hazardous Solid Waste – 150 pounds of oily debris was disposed of at Ramos Environmental Services in West Sacramento, CA by Ramos Environmental Services in September.

RCRA Hazardous Waste Liquid – 30 gallons of Laboratory waste was disposed of at Veolia ES Technical Solutions, Richmond, CA by Ramos Environmental Services and Veolia ES Technical Transporters in October.

Non-Hazardous Weathered Wood – 20 cubic yards of Cooling Tower Wood waste was disposed of at Forward Landfill in Manteca, CA by Republic Services in October.

Non-RCRA Hazardous Solid Waste – 140 pounds of oily debris was disposed of at Ramos Environmental Services in West Sacramento, CA by Ramos Environmental Services in November.

Universal Waste – 1,320 pounds of e-waste was recycled by California Electronic Asset Recovery in November.

Non-RCRA Hazardous Waste Solids – 2,100 pounds of iron oxide with ammonia salts was disposed of at Veolia ES Technical Solutions, Azusa, CA by Ramos Environmental Services in November.

RCRA Hazardous Waste Solids – 4,320 pounds of cooling tower silt contaminated with chromium was disposed of at Clean Harbors in Buttonwillow, CA by Clean Harbors, in December.

Wastewater Disposal

WATER-2 The project owner shall submit to the CEC CPM a copy of the annual monitoring report submitted to the Regional Water Quality Control Board.

Attached is a copy of the annual report submitted to the State and Regional Water Quality Boards in Appendix B.

Visual Resources

VIS-1 In the Annual Compliance Report during operation, the project owner shall provide to the CEC CPM for review and approval a status report regarding painting maintenance.

In 2018 the following painting maintenance was completed:

1. HRSG exhaust doors

2. Aux Cooling Pumps and Piping
3. Closed Cooling Water Piping
4. Fuel Gas Header Piping
5. Circ Pump A, B, and C discharge lines
6. Circ Water Return Piping Risers
7. Vertical Fire Pump, and piping
8. Fire Hydrants and Post Indicated Valves
9. Yellow border -trip hazards

2.0 SUMMARY OF CURRENT PROJECT OPERATING STATUS AND SIGNIFICANT CHANGES TO FACILITY OPERATIONS

The SPA project is operational.

During 2018 the facility completed:

1. The installation of cooling tower louvers.
2. T3K upgraded.
3. IGV actuator upgrade.
4. Installed new fire system control panel.

In 2018 SPA's Capacity Factor was 53.01%.

3.0 DOCUMENTS AND SUBMITTALS FOR VERIFICATION OF CONDITIONS

Enclosed are the following documents and submittals for verification of the conditions.

1. The Annual Report submitted to the State Water Quality Control Board for the 2017-2018 reporting period (see Appendix B),
2. 2018 SMAQMD Breakdown Reports (see Appendix C), and
3. 2018 RATA/Source Test Report (see Appendix D).
4. 2018 Hazardous Materials List (see Appendix E).

4.0 LISTING OF CHANGES TO THE FACILITY AS A RESULT OF COMMISSIONS POST-CERTIFICATION CHANGE/AMENDMENT PROCESS

- SPA's submission to the CEC of a Petition to Amend 93-AFC-03C to install a Siemens wet compression system upgrade, to replace two existing burners with upgraded Siemens HR3 burners and to increase the start-up CO emissions in October, 2018. The CEC approved the Petition to Amend on 1/9/19. (The 2019 report will incorporate the new and updated conditions.)
- The following from last year's Compliance Report applies again this year (due to the postponement of the delivery of recycled water):
    - Commission Order 16-0713-5 (replacing the use of potable water with recycled water in the cooling tower) was adopted at a meeting of the California Energy Commission on July 13, 2016. Since recycled water use will not occur until after report submission (TBD), only some of the post-certification 2017 commissioning activities associated with the Order are updated (see the compliance matrix in Appendix A). The CEC was notified about project commencement on 11/19/18 and subsequently notified of the project's postponement on 11/21/18.

5.0 EXPLANATION OF ANY SUBMITTAL DEADLINES THAT WERE MISSED

There were no submittal deadlines missed in 2018.

6.0 PERMITS ISSUED IN 2018

In 2018 the following permit(s) were issued for SPA:

- SMAQMD's extension (through July 22, 2020) of ATC 24808 (Modification of the Cooling Tower Supply Water, to a Recycled Water Source - SMAQMD Permit # 13316) in June of 2018.

7.0 PROJECTION OF COMPLIANCE ACTIVITIES SCHEDULED DURING 2018

In 2018 the following activates are scheduled to maintain compliance for SPA.

- 1st Quarter – CEMS Linearity and CGA & Storm Water monitoring
- 2nd Quarter – CEMS Linearity and CGA & Storm Water monitoring;
- 3rd Quarter - CEMS Linearity and CGA & Storm Water monitoring; and,
- 4th Quarter – Annual Emissions Source Testing, CEMS RATA, Linearity & Storm Water Monitoring

8.0 LIST OF YEAR'S ADDITIONS TO SITE COMPLIANCE FILE

- SMAQMD approved SPA's Petition #2017-009 for a Regular Variance for the periods of January 16, 2018 through December 18, 2018, and for a variance extension from December 19, 2018 through March 19, 2019.
- SPA's submission of a Source Test Plan testing for VOC and Hexavalent Chrome, required per the Recycled Water Project (ATC 24808) and of an advance notice of the receipt (i.e., delivery from SRCSD) of recycled water. October 2018. (Both the testing and delivery of recycled water did not occur. The project has been postponed.)

APPENDIX A

2018 Compliance Matrix.

SPA COGEN III - 2017 COMPLIANCE MATRIX (CEC Docket #: 93-AFC-03C)									
CEC Condition No.	**Description of Condition**	**O / C / R / R2**	**RESP**	**Verification Requirements**	**Agency / Due Dates**	**Submittal Date / No.**	**Approval Date**	**Status**	**Comments / Action Required**
AIR QUALITY									
AQ-1	The equipment shall be properly maintained and operated in accordance with the information submitted with the application manufactures reccomdations at all times.	O	SPA	None (Ref. AQ-2, AQ-8 AQ-20)	None	N/A	N/A	TBD	The project owner has made the site available for inspection by representatives of the District, ARB, and the Commission upon request. AQ-20 requires the facilty to assert compliance or non-compliance
AQ-2	The SMAQMD APCO and/or authorized representatives, upon presentation of credentials shall be permitted: a. to enter upon the premises where the source is located or in which any records are required to be kept under the terms and conditions of this ATC; b. at reasonable times to have access to and copy any records required to kept under the terms of this ATC; c. to inspect any equipment, operation, or method required in this ATC, and; d. to sample emissions from the source or require samples to be taken	O	SPA	None (Ref. AQ-1, AQ-8)	None	N/A	N/A	N/A	The project owner shall advise appropriate site personnel of this Condition, and provide the Commission CPM with a notification letter that site personnel have been informed regarding this rights of entry described above
AQ-3a	The ATC does not authorize the emission of air contaminants in excess of those allowed by Division 26, Part 4, Chapter 3, of the California H & S Code or the Rules and Regulations of the SMAQMD	O	SPA	SMAQMD/CEC Upon Occurance	None	N/A	N/A	N/A	N/A
AQ-3b	The facility shall not discharge air contaimnets that cause injury, detriment, nuiscance or annoyance to the public.	C O	SPA	Quarterly Reports	Quaterly	Quaterly	N/A	TBD	As part of the Quartley emssions required by AQ-20
AQ-4	A legible copy of this ATC shall be maintained on the premises with the equipment	O	SPA	None	None	N/A	N/A	N/A	The project owner shall make the site available for inspection by representatives of the District, ARB, and the Commission upon request
AQ-5	Except as specified in Condition AQ-CM9, concentrations of NO_x emission from the gas turbine and duct burner shall not exceed the following limit: 3 ppmv @15% O_2 averaged over any 3-hour period, excluding start-ups, shutdowns, and short term excursions as defined in AQ-13, AQ-14, and AQ-15.	O	SPA	SMAQMD/CEC Upon Occurance (Ref. AQ-CM9, AQ-19 and AQ-20)	None	N/A	N/A	N/A	The project owner shall maintain appropriate emission data records as required by Conditions AQ-19 and AQ-20 and submit source test reports required under Condition AQ-25. A summary of significant operation and maintenance events and monitoring records shall be included in the quarterly operation report (AQ-20)
AQ-6	Except as specified in Condition AQ-CM10, hourly mass emissions from the gas turbine and duct burner shall not exceed the following limits for ROC, NOx, SOx, PM-10, and CO **excluding** start-ups, shutdowns, and short term excursions as defined in AQ-13, AQ-14, and AQ-15.	O	SPA	SMAQMD/CEC Upon Occurance (Ref. AQ-CM10, AQ-19 and AQ-20)	None	N/A	N/A	N/A	The project owner shall maintain appropriate emission data records as required by Conditions AQ-19 and AQ-20 and submit source test reports required under Condition AQ-25. A summary of significant operation and maintenance events and monitoring records shall be included in the quarterly operation report (AQ-20)
AQ-7	Except as specified in Condition No. CM11, daily mass emissions from the following equipment at the facility shall not exceed the following limits for ROC, NOx, SOx, PM-10, and CO **including** start-ups, shutdowns, and short term excursions as defined in AQ-13, AQ-14, and AQ-15.	O	SPA	SMAQMD/CEC Upon Occurance (Ref. AQ-CM11, AQ-19 and AQ-20) SMAQMD Variance Petition 2017-008 & 20017-009 (Valid through 2018)	None	N/A	N/A	N/A	The project owner shall maintain appropriate emission data records as required by Conditions AQ-19 and AQ-20. A summary of significant operation and maintenance events and monitoring records shall be included in the quarterly operation report (AQ-20). **Emissions Table now includes VOC PM2.5 Emmisions Limit fo rthe cooling tower.**
AQ-8	Combined (quarterly) mass emissions from the following equipment at the facility shall not exceed the following limits for ROC, NOx, SOx, PM-10, and CO **including** start-ups, shutdowns, and short term excursions as defined in AQ-13, AQ-14, and AQ-15. This includes GT, DB, and Cooling Tower	O	SPA	SMAQMD/CEC Upon Occurance (Ref. AQ-19 and AQ-20)	None	N/A	N/A	N/A	The project owner shall maintain appropriate emission data records as required by Conditions AQ-19 and AQ-20. A summary of significant operation and maintenance events and monitoring records shall be included in the quarterly operation report (AQ-20). **Updated VOC Limit**
AQ-9	Concentrations of ammonia (NH3) emissions from the gas turbine and duct burner shall not exceed the following limit: 10 ppmv @15% O2 averaged over any 3-hour period, excluding start-ups, shutdowns, and short term excursions as defined in AQ-13, AQ-14, and AQ-15.	O	SPA	SMAQMD/CEC Upon Occurance (Ref. AQ-19 and AQ-20)	None	N/A	N/A	N/A	The project owner shall maintain appropriate emission data records as required by Conditions AQ-19 and AQ-20. A summary of significant operation and maintenance events and monitoring records shall be included in the quarterly operation report (AQ-20)

SPA COGEN III - 2017 COMPLIANCE MATRIX (CEC Docket #: 93-AFC-03C)									
CEC Condition No.	**Description of Condition**	**O / C / R / R2**	**RESP**	**Verification Requirements**	**Agency / Due Dates**	**Submittal Date / No.**	**Approval Date**	**Status**	**Comments / Action Required**
AQ-10	HAP mass emissions from the facility shall not exceed the following limits: Single HAP 9.4 tons/year and Combination of HAPs 24.4 tons/year	O	SPA	SMAQMD/CEC Upon Occurance (Ref. AQ-19 and AQ-20)	None	N/A	N/A	N/A	The project owner shall maintain appropriate emission data records as required by Conditions AQ-19 and AQ-20. A summary of significant operation and maintenance events and monitoring records shall be included in the quarterly operation report (AQ-20)
AQ-11	The duct burner shall not be operated unless the gas turbine is operating.	O	SPA	SMAQMD/CEC Upon Request (Ref. AQ-19 and AQ-20)	None	N/A	N/A	N/A	The project owner shall maintain appropriate emission data records as required by Conditions AQ-19 and AQ-20.
AQ-12	Except as specified in Condition AQ-CM3 for the SCR, the turbine and/or the duct burner shall not be operated without fully functioning selective catalytic reduction and oxidizing catalyst air pollution control systems, excluding periods of start-ups and shutdowns.	O	SPA	SMAQMD/CEC Upon Request (Ref. AQ-19 and AQ-20)	None	N/A	N/A	N/A	The project owner shall maintain appropriate emission data records as required by Conditions AQ-19 and AQ-20. A summary of significant operation and maintenance events and monitoring records shall be included in the quarterly operation report (AQ-20)
AQ-13	The duration of the gas turbine's start-up period shall not exceed 60 minutes. A. Gas turbine start-ups are defined as the time periods commencing with the introduction of fuel to the gas turbine and ending at the time that 15-minute average NOx concentrations do not exceed 3 ppmv at 15% O2, but in no case exceeding 60 consecutive minutes.	O	SPA	SMAQMD/CEC Upon Request (Ref. AQ-19 and AQ-20)	None	N/A	N/A	N/A	The project owner shall maintain appropriate emission data records as required by Conditions AQ-19 and AQ-20. A summary of significant operation and maintenance events and monitoring records shall be included in the quarterly operation report (AQ-20)
AQ-14	Gas turbine shutdowns are defined as the 30-minute time period immediately preceding the termination of fuel to the gas turbine.	O	SPA	SMAQMD/CEC Upon Request (Ref. AQ-19 and AQ-20)	None	N/A	N/A	N/A	The project owner shall maintain appropriate emission data records as required by Conditions AQ-19 and AQ-20. A summary of significant operation and maintenance events and monitoring records shall be included in the quarterly operation report (AQ-20)
AQ-15	Gas turbine short-term excursions are defined as 15-minute periods designated by the applicant that are a direct result of a diffusion mode switchover, not to exceed four consecutive 15-minute periods, when the 15-minute average NOx concentration exceeds 3 ppmv at 15% O2. **A. Maximum 3-hour average NOx concentration for periods that include short-term excursions shall not exceed 30 ppmv at 15% O2.** B. Short-term excursion periods that total in excess of 10 hours per rolling 12-month period shall not be excluded from evaluations for compliance with emission limits in Condition Nos. B.1 and B.2.	O	SPA	SMAQMD/CEC Upon Request (Ref. AQ-19 and AQ-20)	None	N/A	N/A	N/A	The project owner shall maintain appropriate emission data records as required by Conditions AQ-19 and AQ-20. A summary of significant operation and maintenance events and monitoring records shall be included in the quarterly operation report (AQ-20)
AQ-16	The gas turbine and duct burner shall only combust natural gas fuel	O	SPA	None	None	N/A	N/A	N/A	The project owner shall make the site available for inspection by representatives of the District, ARB, and the Commission upon request
AQ-17	The permittee shall operate a continuous emission monitoring system that has been approved by the SMAQMD Air Pollution Control Officer for the gas turbine and duct burner.	O	SPA	CEMS Records	None	N/A	N/A	N/A	The project owner shall provide CEMS protocol for approval by the APCO and CPM. The project owner shall make the site available for inspection by representatives of the District, ARB, and the Commission upon request. A summary of significant operation and maintenance events and monitoring records shall be included in the quarterly operation report (AQ-20)
AQ-18	The permittee shall operate a continuous parameter monitoring system that has been approved by the SMAQMD Air Pollution Control Officer that either measures or calculates and records the following: fuel consumption of GT and DB, and exhaust stack gas flow	O	SPA	CEMS Records	None	N/A	N/A	N/A	The project owner shall make the site available for inspection by representatives of the District, ARB, and the Commission upon request

SPA COGEN III - 2017 COMPLIANCE MATRIX (CEC Docket #: 93-AFC-03C)									
CEC Condition No.	**Description of Condition**	**O / C / R / R2**	**RESP**	**Verification Requirements**	**Agency / Due Dates**	**Submittal Date / No.**	**Approval Date**	**Status**	**Comments / Action Required**
AQ-19	The permittee shall be continuously maintained on site for the most recent five-year period and shall be made available to the SMAQMD Air Pollution Control Officer upon request. Quarterly records as specified in the table below shall be made available for inspection within 30 days of the end of the quarter.	O	SPA	SMAQMD/CEC Upon Request (Ref. AQ-20) & CEMS Records	None	Q1 - 4/12/18 Q2 - 7/6/18 Q3 - 10/8/18 Q4 - 1/8/18	N/A	N/A	The project owner shall submit appropriate records as required by Condition AQ-20. The project owner shall make the site available for inspection by representatives of the District, ARB, and the Commission upon request
AQ-20	Submit to the SMAQMD Air Pollution Control Officer a written report which contains the following information: (EER/NSPS Report)	O	SPA	SMAQMD/CEC Upon Request	None	Q1 - 4/12/18 Q2 - 7/6/18 Q3 - 10/8/18 Q4 - 1/8/18	N/A	N/A	The project owner shall submit quarterly operation reports to the CPM and APCO no later than 30 days following the end of each calendar quarter. This information shall be maintained on site for a minimum of five years and shall be provided to the CPM and District personnel upon request. The project owner shall make the site available for inspection by representatives of the District, ARB, and the Commission upon request
AQ-21	The permittee shall surrender (and has surrendered - See Condition AQ-22, AQ-23, and AQ-24) ERCs to the SMAQMD Air Pollution Control Officer to offset the following amount of emissions: (see table)	O	SPA	None	None	N/A	N/A	N/A	N/A
AQ-22	The following ERCs have been surrendered to the SMAQMD Air Pollution Control Officer to comply with the ROC emission offset requirements as stated in Condition AQ-21: (see table)	O	SPA	None	None	N/A	N/A	N/A	N/A
AQ-23	The following ERCs have been surrendered to the SMAQMD Air Pollution Control Officer to comply with the NOx emission offset requirements as stated in Condition No. 21: (see table)	O	SPA	None	None	N/A	N/A	N/A	N/A
AQ-24	The following ERCs have been surrendered to the SMAQMD Air Pollution Control Officer to comply with the PM10 emission offset requirements as stated in Condition No. 21: (see table)	O	SPA	None	None	N/A	N/A	N/A	N/A
AQ-25	The permittee shall perform an ROC, NOx, PM10 and CO source test and CEM accuracy (RATA) test of the gas turbine and duct burner once each calendar year. A. Submit a source test plan to the SMAQMD Air Pollution Control Officer for approval at least 30 days before the source test is to be performed. The source test plan shall indicate that U.S. EPA approved test methods are used for NOx and CO. B. Notify the SMAQMD Air Pollution Control Officer at least 7 days prior to the source testing date. C. During the source test the gas turbine and duct burner shall be operated at the maximum firing capacity, defined as □ 90% of the heat input capacity that is achievable based on ambient conditions at the time of the source test. D. Submit the source test results to the SMAQMD Air Pollution Control Officer within 60 days after the completion of the source test(s). E. The SMAQMD Air Pollution Control Officer may waive the ROC and PM10 annual source test requirement every other year if the prior annual source test result indicates that the respective hourly emissions are less than or equal to 75% of the respective hourly emission limit.	O	SPA	None	None	Test Completed - 11/6/2018 30-Day Notification on 9/17/2018 7-Day Notification on 10/24/2018 Test Completed - 11/6/2018 Test Submitted - 12/20/2018	N/A	Complete	The project owner shall submit a test plan to the APCO for approval at least 30 days before the source tests are to be performed. The source test results shall be submitted to the APCO and the Commission CPM within 60 days from the completion of the source test

SPA COGEN III - 2017 COMPLIANCE MATRIX (CEC Docket #: 93-AFC-03C)									
CEC Condition No.	**Description of Condition**	**O / C / R / R2**	**RESP**	**Verification Requirements**	**Agency / Due Dates**	**Submittal Date / No.**	**Approval Date**	**Status**	**Comments / Action Required**
AQ-34a	Prior to operation under the terms of this Authority to Construct, SPA must surrender the following amounts of ROC and PM10 emission reduction credits. The proposed ROC and PM10 ERC's and their amounts are presented below.	R2	SPA	SMAQMD/CEC Notification	N/A - Submitted as part of previous turbine modifications prior to 2017	N/A	N/A	N/A	The project owner shall provide the District APCO the banking certificates that show the ROC and PM10 reductions of at least the amounts described in this condition. The project owner shall provide the Commission CPM with the copies of the certificates 30 days after approval of this condition.
AQ-S1	The project owner shall notify the CPM and the SMAQMD, in writing, of the date the recommissioning period will begin	R R2	SPA	None	None	Recommissioning Completed in 2009; 1/17/2017	N/A	N/A	The project owner shall provide notification of the start of recommissioning to the CPM and SMAQMD at least 30 days before starting the recommissioning activity
AQ-S2	After completing the equipment installation contact AQMD to arrange a start-up inspection.	C R2	SPA	SMAQMD/CEC Notification	within 30 days prior to the start-up inspection	11/19/2018	N/A	TBD	Notifiy CEC CPM with a notification lettter regarding aranged startup inspection with SMAQMD. The startup was postponed. The CEC was notified of the postponement on 11/21/18.
AQ-S3	The Authority to Construct may serve as a temporary Permit to Operate	C	SPA	ATC Issued 7/22/2016	None	None	N/A	N/A	ATC 24808's expiration date was extended by 2 years.
AQ-S4	The ATC has been to reviewed through and enhance New Source Review process by SMAQMD	C	SPA	ATC Issued 7/22/2016	None	None	N/A	N/A	ATC 24808's expiration date was extended by 2 years.
AQ-S4	The ATC has been reviewed through an Enhanced New Source Review process in accordance with the procedural requirements of Section 401 through 408 of Rule 207 Title V – Federal Operating Permit Program.	R2	SPA	ATC Issued 7/22/2016	None	11/24/2015	7/13/2016	Complete	No verification necessary. ATC condition S.3. Issued 7/22/2016. ATC 24808's expiration date was extended by 2 years, through July 22, 2020.
AQ-S5	SPA shall submit to SMAQMD an application Title V permit	C	SPA	Submit Notification to CPM	Within fifteen (15) working days before the execution of the condition, the facility owner shall notify the SMAQMD APCO and the CPM.	N/A - No Startup for Recycled Water - Partial Startup for CO Limits to be submitted in February 2019	TBD	TBD	Submit prior to commencing operation
AQ-CM1	The recommissioning period is defined as follows: The recommissioning period shall commence when all mechanical, electrical and control systems associated with the Siemens T-3000 control system are installed and the gas turbine is first fired. The recommissioning period shall terminate 30 operating days after commencement, or when the SPA facility has successfully completed performance testing, tuning and shakedown operations and compliance is demonstrated by continuous emissions monitoring equipment, whichever occurs first. For purposes of this condition, operating day" is defined as any calendar day during which fuel is combusted in the turbine or duct burner."	R	SPA	None	None	Recommissioning Completed in 2009	N/A	N/A	N/A
AQ-CM2	The facility shall record the date that the recommissioning period terminates and submit written notification of this date to the SMAQMD Air Pollution Control Officer within 3 weekdays (Monday through Friday) of such termination.	R	SPA	None	None	Recommissioning Completed in 2009	N/A	Complete	The project owner shall provide notification of the end of recommissioning to the CPM and SMAQMD within 3 weekdays after completing the recommissioining activity.
AQ-CM3	During the recommissioning period at the earliest feasible opportunity, in accordance with recommendations of the equipment manufacturers and the construction contractor, the gas turbine combustors shall be tuned to minimize emissions of CO and NOx.	R	SPA	Operator Logs & CEMS Records	None	Recommissioning Completed in 2009	N/A	Complete	A summary of significant operation and maintenance events shall be included in a report of re-commissioning activities provided to the CPM and SMAQMD within 30 days after completing the re-commissioning activity.

SPA COGEN III - 2017 COMPLIANCE MATRIX (CEC Docket #: 93-AFC-03C)									
CEC Condition No.	**Description of Condition**	**O / C / R / R2**	**RESP**	**Verification Requirements**	**Agency / Due Dates**	**Submittal Date / No.**	**Approval Date**	**Status**	**Comments / Action Required**
AQ-CM4	During the recommissioning period, at the earliest feasible opportunity, in accordance with recommendations of the equipment manufacturers and the construction contractor, the gas turbine and duct burner shall operate with the Selective Catalytic Reduction (SCR) system. The SCR system shall be adjusted and operated to minimize emissions of NOx.	R	SPA	Operator Logs	None	Recommissioning Completed in 2009	N/A	Complete	A summary of significant operation and maintenance events shall be included in a report of re-commissioning activities provided to the CPM and SMAQMD within 30 days after completing the re-commissioning activity.
AQ-CM5	During the recommissioning period, compliance with NOx and CO emission limits for the gas turbine and duct burner shall be demonstrated through the use of properly operated and maintained continuous emission monitoring systems and continuous parameter monitoring systems for the following: See list	R	SPA	CEMS Records	None	Recommissioning Completed in 2009	N/A	Complete	A summary of monitoring records shall be included in a report of re-commissioning activities provide to the CPM and SMAQMD within 30 days after completing re-commissioning activity.
AQ-CM6	During the recommissioning period the monitored parameters shall be recorded at least once every 15 minutes (excluding normal calibration periods or when the monitored source is not in operation) for the gas turbine and duct burner. Previously approved methods shall be used to calculate heat input rates, NOx and CO mass emission rates, and NOx and CO emission concentrations, summarized for each clock hour and each calendar day. All records shall be retained on site for at least 5 years from the date of entry and made available to SMAQMD personnel upon request.	R	SPA	CEMS Records	None	Recommissioning Completed in 2009	N/A	Complete	A summary of monitoring records shall be included in a report of re-commissioning activities provide to the CPM and SMAQMD within 30 days after completing re-commissioning activity.
AQ-CM7	During the recommissioning period the continuous emission and parameter monitors shall be installed, calibrated and operational prior to firing of the gas turbine and duct burner with the new master control system. After initial firing of the gas turbine and duct burner, the detection range of these continuous emission monitors shall be adjusted as necessary to accurately measure the resulting range of NOx and CO emission concentrations.	R	SPA	CEMS Records	None	Recommissioning Completed in 2009	N/A	Complete	A summary of monitoring records shall be included in a report of re-commissioning activities provide to the CPM and SMAQMD within 30 days after completing re-commissioning activity.
AQ-CM8	During the recommissioning period the total number of firing hours of the gas turbine and duct burner without control of NOx emissions by the SCR system shall not exceed 100 hours. Such operation of the gas turbine and duct burner shall be limited to discrete recommissioning activities that can only be properly executed without the SCR system fully operational. **A. The number of firing hours of the gas turbine and duct burner without control of NOx emissions by the SCR system shall be recorded on an hourly basis during the recommissioning period.**	R	SPA	CEMS Records	None	Recommissioning Completed in 2009	N/A	Complete	A summary of monitoring records shall be included in a report of re-commissioning activities provide to the CPM and SMAQMD within 30 days after completing re-commissioning activity.
AQ-CM9	During the recommissioning period the total mass emissions of ROC, NOx, SOx, PMI0 and CO that are emitted by the gas turbine and duct burner shall accrue towards the quarterly mass emission limits in Condition AQ-8.	R	SPA	CEMS Records	None	Recommissioning Completed in 2009	N/A	Complete	A summary of monitoring records shall be included in a report of re-commissioning activities provide to the CPM and SMAQMD within 30 days after completing re-commissioning activity.
AQ-CM10	During the recommissioning period the NOx concentration from the gas turbine and duct burner shall not exceed the following limit: No NO_x ppm limit	R	SPA	CEMS Records	None	Recommissioning Completed in 2009	N/A	Complete	A summary of significant operation and maintenance events shall be included in a report of re-commissioning activities provided to the CPM and SMAQMD within 30 days after completing the re-commissioning activity.

SPA COGEN III - 2017 COMPLIANCE MATRIX (CEC Docket #: 93-AFC-03C)									
CEC Condition No.	Description of Condition	O / C / R / R2	RESP	Verification Requirements	Agency / Due Dates	Submittal Date / No.	Approval Date	Status	Comments / Action Required
AQ-CM11	During the recommissioning period hourly mass emissions from the gas turbine and duct burner shall not exceed the following limits: See table	R	SPA	CEMS Records	None	Recommissioning Completed in 2009	N/A	Complete	A summary of significant operation and maintenance events shall be included in a report of re-commissioning activities provided to the CPM and SMAQMD within 30 days after completing the re-commissioning activity.
AQ-CM12	During the recommissioning period daily mass emissions from the gas turbine and duct burner shall not exceed the following limits: See table	R	SPA	CEMS Records	None	Recommissioning Completed in 2009	N/A	Complete	A summary of significant operation and maintenance events shall be included in a report of re-commissioning activities provided to the CPM and SMAQMD within 30 days after completing the re-commissioning activity.
AQ-SC1	The cooling tower shall not use any chromium containing water treatment chemicals and must keep the hexavalent chromium in the cooling tower circulating water less than 0.15 miligrams hexavalent chromium per liter.	O	SPA	SMAQMD/CEC Upon Request (Ref. AQ-19 and AQ-20)	None	N/A	N/A	TBD	The project owner shall maintain appropriate emission data records as required by Conditions AQ-19 and AQ-20. Water not received compliance determined once in operation
AQ-SC2	The total dissolved solids content of the circulating cooling water shall not exceed 3000 ppmw, averaged over any consecutive three hour period on a clock hour bases	O	SPA	SMAQMD/CEC Upon Request (Ref. AQ-19 and AQ-20)	None	N/A	N/A	Complete	The project owner shall maintain appropriate emission data records as required by Conditions AQ-19 and AQ-20
AQ-SC3	The cooling towers drift rate shall not exceed 0.0006%. The project owner shall provide a written vendor statement, prior to installation, declaring the that cooling towers mist eliminators used meet the drift criteria state above.	O	SPA	None	None	N/A	N/A	N/A	At least 30 days prior to the installation of drift eliminators on the cooling towers, the project owner shall submit to the SMAQMD a written vendor statement declaring that the mist eliminators to be installed meet the drift rate stated above.
AQ-SC4	The following test, reports, and conditions shall be met: a. Within 60 days of terminating the recommissioning period but no later than 180 days after commencing the recommissioning period the owner or operator will conduct performance test(s) as per Condition AQ-SC5 and furnish the APCO a written report of the results of such performance test(s) b. The owner or operator shall provide the APCO 30 days notice of performance test	R	SPA	None	See AQ-SC4	Recommissioning Completed in 2009	N/A	Complete	The project owner shall notify the District and perform the source tests described above and submit to the District and the Commission CPM the results of the source tests witint 60 dyas form the completion of the tests, per the requirements of Condition AQ-SC5.
AQ-SC5	The project owner shall perform a Nox, ROC, CO, PM10, and NH3 source test and CEM accuracy (RATA) test of the combined cycle combustion turine with duct fired HRSG during the time frame pursuant ot the Condition AQ-SC4	O	SPA	None	See AQ-SC4	Test Completed - 11/6/2018	N/A	Complete	The poject owner shall submit a test plan to the APCO for approval at least 30 days before the source tests are to be performed. The source test results shall be submitted to the APCO and the Commission CPM with 60 days from the completion of the source tests.
AQ-SC6	AQ-SC6 As part of the grading and erosion control plans to be submitted to the CPM under the requirement of Condition SOILS-1, the project owner shall include, but not be limited to the following fugitive dust mitigation measures as part of the grading and erosion control plans:	C R2	SPA	Submit to CPM for approval	60 days prior to construction	5/9/2017	N/A	N/A	No control plans required under SOILS-1, therefore no fugitive dust migation was required
AQ-CT1	Equipment must not discharge into the atmosphere any visilble air contamintent other than combined water vapor for a period or periods aggreating more than three minutes in any one hour that is darker than ringlmann No,1 (20% Opacity)	R2	SPA	As part of the Quarterly Air Quality Report (as required by AQ-20), the facility owner shall submit to the Energy Commission CPM a copy of a statement of compliance with the above provisions and regulations.	Quarterly	TBD	TBD	TBD	Submit certication as part of AQ-20 reportng

SPA COGEN III - 2017 COMPLIANCE MATRIX (CEC Docket #: 93-AFC-03C)									
CEC Condition No.	**Description of Condition**	**O / C / R / R2**	**RESP**	**Verification Requirements**	**Agency / Due Dates**	**Submittal Date / No.**	**Approval Date**	**Status**	**Comments / Action Required**
AQ-CT2	Mass Emissions from the cooling tower must not exceed listed hourly, daily, and Quarterly mass emissions limits for VOC, PM10 and PM 2.5	R2	SPA	The project owner shall maintain appropriate emission data records as required by Conditions AQ-19 and AQ-20. A summary of significant operation and maintenance events and monitoring records shall be included in the quarterly operation report (AQ-20).	Quarterly	TBD	TBD	TBD	Submit certication as part of AQ-20 reportng
AQ-CT3	The Sacramento Power Authority shall operate a continuous monitoring system that has been approved by the Air Pollution Control Officer that either measures or calculates and records the following - TDS.	R2	SPA	The facility owner shall make the site available for inspection by representatives of the SMAQMD, the ARB, and the CPM to verify the continuous monitoring and recordkeeping system is properly installed and operational.	Continuously	NA	NA	NA	The facility owner shall make the site available for inspection by representatives of the SMAQMD, the ARB, and the CPM to verify the continuous monitoring and recordkeeping system is properly installed and operational.
AQ-CT4	Testing for VOC/ROC and Hexavalent Chrome (measured as compounds of chrome) of the reclaimed/recycled water inlet to the cooling tower must be performed within 60 days of startup (or if revising the VOC emission limits testing must occur before startup with reclaimed/recycled water) and once every second calendar year thereafter to verify compliance with Condition AQ-CT2 and AQ-SC1.	R2	SPA	At least thirty (30) days before conducting a source test, the facility owner shall submit to the SMAQMD and the CPM for their review and approval, a source test plan. The facility owner shall notify the SMAQMD and the CPM within seven (7) working days before the project begins initial operation and/or plans to conduct a source test. All source test results shall be submitted to the CPM and the SMAQMD within sixty (60) days of the date of the tests.	SMAQMD/CEC	TBD	TBD	TBD	At least thirty (30) days before conducting a source test, the facility owner shall submit to the SMAQMD and the CPM for their review and approval, a source test plan. The facility owner shall notify the SMAQMD and the CPM within seven (7) working days before the project begins initial operation and/or plans to conduct a source test. All source test results shall be submitted to the CPM and the SMAQMD within sixty (60) days of the date of the tests. The CEC was notified of the postponement of recycled water delivery on 11/21/18.
AQ-CT5	The following records must be continuously maintained onsite for the most recent five year period and must be made available to the Air Pollution Control Officer upon request. Monthly, quarterly, and annual records must be made available within 30 days of the end of the reporting period.	O	SPA	The facility owner shall make the site available for inspection by representatives of the SMAQMD, the ARB, and the CPM to verify the continuous monitoring and recordkeeping system is properly installed and operational.	None	TBD	NA	NA	The facility owner shall make the site available for inspection by representatives of the SMAQMD, the ARB, and the CPM to verify the continuous monitoring and recordkeeping system is properly installed and operational.
AQ-CT6	The project owner shall, upon determination of applicability and written notification by the SMAQMD, comply with all applicable requirements of the Air Toxics "Hot Spots" Information and Assessment Act (California Health and Safety Code Section 44300 et seq.)	O	SPA	The facility owner shall notify the SMAQMD and the CPM within fifteen (15) working days before the execution of this condition.	None	TBD	NA	NA	The facility owner shall notify the SMAQMD and the CPM within fifteen (15) working days before the execution of this condition.

SPA COGEN III - 2017 COMPLIANCE MATRIX (CEC Docket #: 93-AFC-03C)									
CEC Condition No.	**Description of Condition**	**O / C / R / R2**	**RESP**	**Verification Requirements**	**Agency / Due Dates**	**Submittal Date / No.**	**Approval Date**	**Status**	**Comments / Action Required**
AQ-CT7	Prior to commencing operation, the permittee must surrender sufficient ERCs to the SMAQMD Air Pollution Control Officer to offset the following amount of emissions: The applicant has identified three possible credits that individually are sufficient to offset the project VOC emissions. One of the credit certificates originated from the reduction in rice straw burning from the Feather River Air Quality Management District (FRAQMD). The locations of the reduction in rice straw burning are located greater than 15 miles from SCA but less than 50 miles. Two other credits that could potentially be submitted were generated from a shutdown of the compound application process at Campbell Soup Company which is located adjacent to the SPA facility. Therefore, the table below depicts the total quantity of offsets that would be needed to be surrendered for the project.	R2	SPA	At least thirty (30) days prior to the start of construction, the facility owner must provide to the CPM a copy of one of the three certificates listed as follows: SMAQMD #04-00916, or SMAQMD #04-00920 or the signed recertification from Feather River Air Quality Management District and Sacramento Metropolitan Air Quality Management District demonstration the banking certificate (Certificate FRAQMD #99001-T2) which must have been validated.	4/6/2017	04/30/2017 - VOC ERC only for Recycled water. Certificate from Campbell Soup in SMAQMD.	4/17/2017	Approved by SMAQMD for use for A/C 24808	At least thirty (30) days prior to the start of construction, the facility owner must provide to the CPM a copy of one of the three certificates listed as follows: SMAQMD #04-00916, or SMAQMD #04-00920 or the signed recertification from Feather River Air Quality Management District and Sacramento Metropolitan Air Quality Management District demonstration the banking certificate (Certificate FRAQMD #99001-T2) which must have been validated.
AQ-CT8	The applicant must provide the District, prior to commencing operation under this permit, emission reduction credit certificates in sufficient quantity to offset the emissions increase specified in Condition AQ-CT7. If further source testing of the cooling tower reclaimed/recycled water shows a lower VOC concentration in the reclaimed/recycled water, then the amount of VOC credits submitted may be adjusted downward provided the VOC emission limitations in Conditions AQ-CT2, AQ-7, and AQ-8 are correspondingly adjusted to reflect the revised lower reclaimed/recycled water VOC concentration. Any adjustment of the VOC emission limits and corresponding reduction of VOC credits must occur prior to startup of the cooling tower with reclaimed/recycled water. Source testing must include sampling of the reclaimed/recycled water prior to entering the cooling tower basin.	R2	SPA	Prior to commencing operating of the above activities, the facility owner must provide written notice to the District and the CPM. Any adjustment of the VOC emission limits and corresponding reduction of VOC credits, shall also be in a written notification to the CPM regarding any changes to ERCs.	N/A - No adjustment taken. ERCs surrendered in full (see above).	N/A	N/A	N/A	Prior to commencing operating of the above activities, the facility owner must provide written notice to the District and the CPM. Any adjustment of the VOC emission limits and corresponding reduction of VOC credits, shall also be in a written notification to the CPM regarding any changes to ERCs. The CEC was notified about project commencement on 11/19/18 and subsequently notified of the project's postponement on 11/21/18.
BIOLOGICAL RESOURCES									
CULTURAL RESOURCES									
EFFICIENCY CONFORMANCE									
EFF-1	Operation Standard and Efficinecy Standard - records and calculations	O	SPA	Monthly Records	CEC Annual Rpt or Upon Request	N/A	N/A	Ongoing	Required in Annual Compliance Report.
FACILITY DESIGN									
GEOLOGY									
GEO-3	A Soils Engineering Report as required by Section 1803 of the California Building Code (CBC 2013), or its successor in effect at the time construction of the project were to commence, shall specifically include laboratory test data, associated geotechnical engineering analyses, and a thorough discussion of seismicity; liquefaction; dynamic compaction; compressible soils; corrosive soils; and tsunami. In accordance with CBC, the report must also include recommendations for ground improvement and/or foundation systems necessary to mitigate these potential geologic hazards, if present.	C	SPA	Submit Geotechnical Report	17-Jan-17	17-Jan-17	19-Jan-17	Complete	The project owner shall include in the application for a grading permit a copy of the Soils Engineering Report which addresses the potential for strong seismic shaking; liquefaction; dynamic compaction; settlement due to compressible soils; and corrosive soils; and a summary of how the results of the analyses were incorporated into the project foundation and grading plan design for review and comment by the delegate chief building official (CBO). A copy of the Soils Engineering Report, application for grading permit and any comments by the CBO are to be provided to the Compliance Project Manager (CPM) at least 30 days prior to grading for review and approval.

SPA COGEN III - 2017 COMPLIANCE MATRIX (CEC Docket #: 93-AFC-03C)									
CEC Condition No.	**Description of Condition**	**O / C / R / R2**	**RESP**	**Verification Requirements**	**Agency / Due Dates**	**Submittal Date / No.**	**Approval Date**	**Status**	**Comments / Action Required**
HAZARDOUS MATERIAL HANDLING									
HAZ-1	List of hazardous materials.	O	SPA	Submit list of hazardous materials used in reportable quantities.	CEC Annual Rpt or Upon Request	N/A	11/12/97	Ongoing	The facility can only use hazardous chemicals/materials listed under HAZ-1, unless otherwise approved by CEC.
HAZ-2	Emergancy Response Plan	O	SPA	Draft ER Plan to CPM; 30 day CEC response	CEC - 75 days prior to ops.	10/23/97 SPA 97-379	12/16/97	Complete	
				Final ER Plan to CPM; 15 day final CEC approval	CEC - 30 days after CEC response to draft			Complete	Plan approved 12/16/97.
HAZ-3	Emergancy Response Plan	O	SPA	Submit plan to County for comments with copy to CEC; submit any revisions to CEC	Sacramento County CEC 60-days prior delivery	See Comments	5/11/98	Complete	RMPP to County 5/29/97 SPA 97-162; Business Plan to County 6/5/97 SPA 97-168; Both to CEC 6/5/97 SPA 97-169; County has granted permission to bring chemicals on site. Business Plan map revised and submitted 7/17/97 SPA 97-300. RMP (which replaces RMPP) submitted 4/2/98 SPA 98-050. Per J. Scott, HAZ-3 closed 5/11/98.
				Submit any Revisions	Sacramento County CEC Upon Occurance	Business Plan 07/23/04 RMP 1/31/05 2/3/06		Complete	
HAZ-4	Ammonia storage containment area	O	SPA	None	None	N/A	N/A	N/A	Ammonia containment in service.
HAZ-5	Temporary HCL Spill Containment	O	SPA	Description and specs to CPM for approval; 30 day CEC response	CEC, 30 days after CEC comments	N/A	N/A	N/A	Ammonia containment in service.
				Final description and specs to CPM; 15 day CEC approval response	CEC, 75 days prior delivery	3/5/97 SPA 97-124	N/A	Complete	
HAZ-6	Safety Management Plan	O	SPA	Draft SM plan to CPM for approval; 30 day CEC response	CEC 75 days prior delivery	3/5/97 SPA 97-124	N/A	Complete	
				Final SM plan; 15 day CEC approval response	CEC 30 days after CEC comments	6/5/97 SPA 97-169 8/4/97 SPA 97-313	10/9/1997	Complete	
HAZ-7	Ammonia Concentration shall not exceed 30% and tank shall be constructed per ASME	O	SPA	Maintain purchase order records for at least 1 year	CEC Upon Request	N/A	N/A	Ongoing	Concentration limited to 30%. Normal concentration is 24.5%

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LAND USE									
NOISE									
NOISE-2	Resolution of Noise Complaints	C & O	SPA	Submit copy of Noise Complaint Resolution Form documenting resolution	SCDEM & CEC 30 days after receipt of complaint	N/A	N/A	Ongoing if Occurs	
				If complaint is not resolved by 30 days, submit updated Resolution Form when mitigation is implemented	SCDEM & CEC as needed	N/A	N/A	Will Start if Occurs	
NOISE-5	Steamblow	C & O	SPA	Submit steamblow schedule to CPM	CEC 10 days prior first steam blow	8/12/97 SPA 97-317 10/14/97 SPA 97-374	N/A	Complete	Commission approved the QuietBlow Steam Blow Amendment submitted 6/27/97 (SPA 97-185).
NOISE-6	Public Notification Program	C & O	SPA	Notify residents within 1 mile	Residents prior start of steam blows	8/12/97 SPA 97-310 8/15/97 SacBee ad	N/A	Complete	Letter sent to residents within 1/2 mile. Also, Sacramento Bee ad placed.
PLANT RELIABILITY									
RELI-1	Plant Reliability Records	O	SPA	Maintain monthly records--available for audit by CEC	N/A	N/A	N/A	On going	
				Summary of forced outages, plant availability factors and forced outage rates	CEC Annual Comp. Rpts	See Annual Report	N/A	On going	Summary required in Annual Compliance Report.

SPA COGEN III - 2017 COMPLIANCE MATRIX (CEC Docket #: 93-AFC-03C)									
CEC Condition No.	**Description of Condition**	**O / C / R / R2**	**RESP**	**Verification Requirements**	**Agency / Due Dates**	**Submittal Date / No.**	**Approval Date**	**Status**	**Comments / Action Required**
PUBLIC HEALTH									
Public Health-1	The project owner shall develop and implement a Biocide Use and Monitoring program to ensure that the potential for bacterial growth in cooling water is kept to a minimum. The Biocide Use and Monitoring program shall incorporate, as applicable, the Best Practices and Recommendations for Minimization of Risks Associated with Legionella as outlined in the Cooling Tower Technology Institute July 2008 publication titled "Legionellosis, Guideline: Best Practices for Control of Legionella." The Biocide Use and Monitoring Program shall specifically address full- and part-load plant operation, and short- and long-term shutdowns.	C R2	SPA	Submit Biocide Use and Monitoring Plan	CEC, 60 days prior to commencement of modified cooling tower operations.	10/26/2017	12/13/2017	Complete	At least 60 days prior to the commencement of modified cooling tower operations, the Biocide Use and Monitoring program shall be provided to the CPM for review and approval.

SPA COGEN III - 2017 COMPLIANCE MATRIX (CEC Docket #: 93-AFC-03C)									
CEC Condition No.	**Description of Condition**	**O / C / R / R2**	**RESP**	**Verification Requirements**	**Agency / Due Dates**	**Submittal Date / No.**	**Approval Date**	**Status**	**Comments / Action Required**
SAFETY AND FIRE PROTECTION									
SAF-1	Operations Safety and Health Program	O	SPA	Submit final version, w/ OSHA comments, to CPM and notify CEC all plans and records are present on-site	OSHA	10/28/97 SPA 97-382	5/11/1998	Complete	
					CEC	10/28/97 SPA 97-383			
					30 days prior ops.	4/14/98 SPA 98-053			
SAF-2	Operation FPPP	O	SPA	Submit approved plan and letter from Fire Dept. to CPM	City Fire Dept.	10/23/97 SPA 97-379		Complete	Plan submitted to the Sacramento City Fire Dept.
					CEC	11/12/97 SPA 97-390			
					30 days prior ops.	N/A			
SAF-3	Operation EAP	O	SPA	Submit approved plan and letter from Fire Dept. to CPM	City Fire Dept.	10/23/97 SPA 97-379		Complete	Plan submitted to the Sacramento City Fire Dept.
					CEC	11/12/97 SPA 97-390			
					30 days prior ops.	N/A			
SOCIOECONOMICS									
SOIL RESOURCES									
SOILS-1	Erosion & Sediment Control Plan--including temporary and permanent erosion control measures	C & O	SPA	Plan and drawings approved by Sac County to CPM	Sac County	4/11/96 CNF	5/30/96 Cnty appvl	Complete	
					CEC	5/31/96 SPA 96-375	6/12/96 (verbal)		
					30 days prior rough grading	7/10/97 SPA 97-194			
TRANSMISSION LINE SAFETY AND NUISANCE									
TLSN-3	Radio & TV Interference Records	O	SPA	Interference records maintained, available for CEC inspection, and summarized	CEC Annual Compl Rpt	N/A	N/A	Will Start if Occurs	Maintain written records of all complaints for 5 years. There have been no complaints to date.
TLSN-4	Radio Frequency Noise Measurements	O	SPA	Copy of measurements, conclusions and agreements reached	CEC Upon completion of measurements	N/A	N/A	Will Start if Occurs	Measurements to be taken if any complaints of noise or interference on RR signal circuits. There have been no complaints to date.
				If mitigation necessary, send proof to CEC that mitigation has been implemented	CEC If Needed in Annual Compl Rpt	See Annual Report	N/A	Will Start if Occurs	Information required in Annual Compliance Report if interference occurs.

SPA COGEN III - 2017 COMPLIANCE MATRIX (CEC Docket #: 93-AFC-03C)									
CEC Condition No.	**Description of Condition**	**O / C / R / R2**	**RESP**	**Verification Requirements**	**Agency / Due Dates**	**Submittal Date / No.**	**Approval Date**	**Status**	**Comments / Action Required**
TLSN-5	Transmission Line Right of way free of flammable mtls.	O	SPA	Project owner shall provide a summary of the inspection results and any cleanup and fire prevention activities along the right of way	CEC Annual Compl Rpt	See Annual Report	N/A	On Going	Summary required in Annual Compliance Report.
TLSN-8	Radio Complaints Due to Induced Voltage	O	SPA	Summary of activities (grounding, notification and correspondence)	CEC Annual Compl Rpt	See Annual Report	N/A	Will Start if Occurs	Summary required in Annual Compliance Report.
TRAFFIC & TRANSPORTATION									
TRANS-4	Transportation Management Plan (TMP)	O	SPA	Submit TMP to CPM for approval	CEC 60 days prior ops.	10/14/97 SPA 97-370 11/24/97 SPA 97-403	12/8/97 (verbal)	Complete On Going	
TRANS-6	Hazardous Materials Compliance	C & O	SPA	Maintain copies of shipping manifests on site	Upon request	N/A	N/A	On Going	
TRANSMISSION SYSTEM ENGINEERING									
TRAFFIC & TRANSPORTATION									
VIS-1	Painting Maintenance	O	SPA	Status report on painting maintenance to CEC for review and approval	CEC Annual Compl Rpt	See Annual Report	N/A	On going	Summary required in Annual Compliance Report.
VIS-2	Lighting Complaint Resolution	C & O	SPA	Keep records on-site	Upon request		N/A	N/A	

SPA COGEN III - 2017 COMPLIANCE MATRIX (CEC Docket #: 93-AFC-03C)									
CEC Condition No.	**Description of Condition**	**O / C / R / R2**	**RESP**	**Verification Requirements**	**Agency / Due Dates**	**Submittal Date / No.**	**Approval Date**	**Status**	**Comments / Action Required**
TRAFFIC & TRANSPORTATION									
WASTE-1	Submit a Waste Management Plan	O	SPA	Submit operation waste mgmt plan for approval	CEC 60 days prior ops.	11/20/97 SPA 97-376 11/24/97 SPA 97-402	12/4/97 (verbal)	Complete	
				Submit summary of planned versus actual waste management activities	CEC Annual Compl Rpt	See Annual Report	N/A		Summary required in Annual Compliance Report.
WASTE-3	Waste Enforcement Action	O	SPA	Written notification of enforcement action taken or proposed against any waste contractor, if necessary	CEC 10 working days after becoming aware of action	None	N/A	N/A	
WATER RESOURCES									
WATER-2	Obtain an NPDES for the facility	O	SPA	Annual Monitoring Report; submit in Annual Compliance Report	SRWQCB CEC Following start of Ops.	See Annual Report	N/A	On Going	
				Notify CEC of any changes or renewal of the permit	CEC If necessary	N/A	N/A	Will start if Occurs	
WATER -5	Prior to site discharge of generated industrial wastewater to the sanitary sewer for ultimate disposal to the Regional San's Sacramento Regional Wastewater Treatment Plant (SRWTP), the project owner shall obtain a Permit for Industrial Wastewater Discharge and comply with the wastewater discharge limitations, pretreatment requirements, peak flow restrictions, payment of fees, and monitoring and reporting requirements of SRWTP as applicable for construction.	R2	SPA	SRCSD Permit Submitted	CEC	2/1/2018	11/14/2017	Complete	At least 30 days prior to SPAC's discharge of industrial wastewater generated using recycled water for project operation, the project owner shall provide the CPM with a copy of its Permit for Industrial Wastewater Discharge from Regional San as applicable for construction. The CPM shall be notified in writing within 10 days of any reported non-compliance with Regional San's SRWTP discharge requirements, including corrective measures for non-compliance and the results of implementing those measures.

SPA COGEN III - 2017 COMPLIANCE MATRIX (CEC Docket #: 93-AFC-03C)									
CEC Condition No.	**Description of Condition**	**O / C / R / R2**	**RESP**	**Verification Requirements**	**Agency / Due Dates**	**Submittal Date / No.**	**Approval Date**	**Status**	**Comments / Action Required**
WATER-6	Prior to use of recycled water for wet cooling operations, the project owner shall provide the CPM a copy of the executed Recycled Water Purchase Agreement (agreement) with the recycled water producer, Regional San, for the supply and delivery of tertiary treated recycled water to SPAC. SPAC shall not connect to the Regional San's recycled water pipeline without the final agreement in place. The project owner shall comply with the requirements of Title 22 and Title 17 of the California Code of Regulations and section 13523 of the California Water Code.	R2	SPA	Recycled Water Purchase Agreement Between SPA and SRCSD	CEC	2/1/2018	8/22/2017	TBD	No later than 30 days prior to the connection to the Regional San's recycled water pipeline, the project owner shall submit a copy of the executed agreement for the long-term supply and delivery of tertiary treated recycled water to SPAC. The agreement shall specify a maximum delivery rate of 1 MGD and total maximum use of 1,120 AFY and shall specify all terms and costs for the delivery and use of recycled water by SPAC. No later than 30 days prior to connection to the Regional San's recycled water main, the project owner shall submit to the CPM a copy of the Engineering Report and Cross Connection inspection and approval report from the California Department of Public Health and all water reuse requirements issued by the CVRWQCB. The CEC was notified about project commencement on 11/19/18 and subsequently notified of the project's postponement on 11/21/18.
WATER-7	The project owner shall use tertiary treated recycled water supplied from the Regional San's Water Reclamation Facility (WRF) as its primary source for evaporative cooling of the steam cycle in the cooling towers and landscape irrigation. Annual usage (excluding fire suppression) shall not exceed 1,120 acre-feet per year (AFY). Prior to the use of recycled water for commercial operation, the project owner shall install and maintain metering devices as part of the water supply and distribution system or verify that the recycled water supplier will provide adequate metering or billing to the project owner to document project water use as required to monitor and record in gallons per day the total volume(s) of water supplied to the SPAC from this water source. The metering devices shall be operational for the life of the project. The project may use potable water for backup and blending purposes in cases of interruptions in delivery of the recycled water, and when recycled water quantities or water quality are not sufficient for project use. Potable water shall not be used exclusively for evaporative cooling unless the source of recycled water is unavailable in the event of an emergency. For purposes of this condition, the term emergency shall mean the inability for SPAC to take or for Regional San to deliver recycled water to the SPAC in a quantity and quality sufficient to meet SPAC's water constituent criteria limits for plant performance due to other circumstances beyond the control of the project owner	R2	SPA	The project owner shall prepare an annual summary, which will include the monthly range and monthly average of daily water usage in gallons per day, and total water used on a monthly and annual basis in acre-feet. For years subsequent to the initial year of operation, the annual summary will also include the yearly range and yearly average water use by source. For calculating the total water use, the term "year" will correspond to the date established for the annual compliance report submittal. The project owner shall report to the CPM any upsets in the delivery of the recycled water, deliveries of insufficient quantities, and water quality for use by SPAC.	TBD	TBD	TBD	TBD	The project owner shall prepare an annual summary, which will include the monthly range and monthly average of daily water usage in gallons per day, and total water used on a monthly and annual basis in acre-feet. For years subsequent to the initial year of operation, the annual summary will also include the yearly range and yearly average water use by source. For calculating the total water use, the term "year" will correspond to the date established for the annual compliance report submittal. The project owner shall report to the CPM any upsets in the delivery of the recycled water, deliveries of insufficient quantities, and water quality for use by SPAC. The recycled project was postponed on 11/21/18 (prior to it's commencement).

O/C Column:
C = During Construction
O = Operations related (however, may occur during construction)
R = Recommissioning phase in 2009
R2 = Recommissioning for Recycled Water Project

APPENDIX B

Annual report submitted to the State Water Quality Control Board for 2017-2018.

2017-2018

ANNUAL REPORT

FOR STORM WATER DISCHARGES
ASSOCIATED WITH INDUSTRIAL ACTIVITIES

Reporting Period July 1, 2017 through June 30, 2018

Retain a copy of the completed Annual Report for your records.

Please remember that a Notice of Termination and new Notice of Intent are required whenever a facility operation is relocated or changes ownership.

If you have any questions, please contact your Regional Board Industrial Storm Water Permit Contact. The names, telephone numbers, and e-mail addresses of the Regional Board contacts, as well was the Regional Board office addresses, can be found at:
http://www.waterboards.ca.gov/water_issues/programs/stormwater/contact.shtml

General Information

A. Facility Information

WDID: 5S34I019346

Business Name: Sacramento Power Authority

Physical Address: 3215 47th Ave

City: Sacramento

State: CA

Zip: 95824

Contact Person: Eddie McCormick

Phone: 916-391-2993

Email: eddie.mccormick@smud.org

Standard Industrial Classification (SIC) Codes: 4911-Electric Services

B. Facility Owner Information

Business Name: Sacramento Power Authority

Mailing Address: 3215 47th Avenue

City: Sacramento

State: CA

Zip: 95824

Contact Person: Erik Poff

Phone: 916-732-6227

Email: Eric.Poff@SMUD.org

C. Facility Billing Information

Business Name: Ethos Energy Power Plant Services

Mailing Address: 3215 47th Ave

City: Sacramento

State: CA

Zip: 95824

Contact Person: Eddie McCormick

Phone: 916-391-2993 Ext: 4

Email: eddie.mccormick@smud.org

Question Information

1. Has the Discharger conducted monthly visual observations (including authorized and unauthorized Non-Storm Water Discharges and Best Management Practices) in accordance with Section XI.A.1?

☒ Yes ☐ No

If No, see Attachment 1, Summary of Explanation.

2. Has the Discharger conducted sampling event visual observations at each discharge location where a sample was obtained in accordance with Section XI.A.2?

☒ Yes ☐ No

If No, see Attachment 1, Summary of Explanation.

3. Did you sample the required number of Qualifying Storm Events during the reporting year for all discharge locations, in accordance with Section XI.B?

☐ Yes ☒ No

If No, see Attachment 1, Summary of Explanation.

4. How many storm water discharge locations are at your facility?

2

5. Has the Discharger chosen to select Alternative Discharge Locations in accordance with Section XI.C.3?

☐ Yes ☒ No

6. Has the Discharger reduced the number of sampling locations within a drainage area in accordance with the Representative Sampling Reduction in Section XI.C.4?

☐ Yes ☒ No

7. Permitted facilities located within an impaired watershed must assess for potential pollutants that may be present in the facility's industrial storm water discharge. Using the table below, populated based on the facility's location, indicate the presence of the potential pollutant at the facility.
See Attachment 2 for the List of Identified Pollutants within the Impaired Watershed.

8. Has the Discharger included the above pollutants in the SWPPP pollutant source assessment and assessed the need for analytical monitoring for the pollutants?

☒ Yes ☐ No

If No, what date will the parameter(s) will be added to the SWPPP and Monitoring Implementation Plan?

9. Were all samples collected in accordance with Section XI.B.5?

☒ Yes ☐ No

If No, see Attachment 1, Summary of Explanation.

10. Has any contained storm water been discharged from the facility this reporting year?

☐ Yes ☒ No

If Yes, see Attachment 1, Summary of Explanation.

11. Has the Discharger conducted one (1) annual evaluation during the reporting year as required in Section XV?

☒ Yes ☐ No

If Yes, what date was the annual evaluation conducted? 05/23/2018

If No, see Attachment 1, Summary of Explanation.

12. Has the Discharger maintained records on-site for the reporting year in accordance with XXI.J.3?

☒ Yes ☐ No

If No, see Attachment 1, Summary of Explanation.

If your facility is subject to Effluent Limitation Guidelines in Attachment F of the Industrial General Permit, include your specific requirements as an attachment to the Annual Report (attach as file type: Supporting Documentation).

ANNUAL REPORT CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under the direction or supervision in accordance with a system designed to assure that qualified personnel propoerly gether and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Printed Name: Eddie McCormick

Title: Facility Manager Date: 06/29/2018

2017-2018

Annual Report for WDID 5S34I019346

Summary of Explanations

Explanation Question	Explanation Text
Question 3	Our facility takes advantage of Sampling Frequency Reduction (SFR) and is only required to sample twice during the reporting year, once in the first half and once in the second. Our facility was able to collect the required number of samples with one in each half of the reporting year due to SFR. There are two discharge points at the facility and all locations were sampled. In accordance with the IGP Qualified Combined Samples, the samples from each discharge point were composited at the laboratory to test for TSS, O&G, and Fe.

Summary of Attachments

Attachment Type	Attachment Title	Description	Date Uploaded	Part Number	Attachment Hash

2017-2018

Annual Report for WDID 5S34I019346

List of Identified Pollutants within the Impaired Watershed

Parameter	Pollutant	Present at Facility?
Carcinogenic Pesticide Screen	Group A Pesticides	No
Chlorpyrifos	Chlorpyrifos	No
Diazinon	Diazinon	No
Dieldrin	Dieldrin	No
Dioxin compounds (including 2,3,7,8-TCDD)	Dioxin compounds (including 2,3,7,8-TCDD)	No
Furan Compounds	Furan Compounds	No
Metals Screen	Mercury	No
Metals Screen	Selenium	No
PCBs (Polychlorinated biphenyls)	PCBs (Polychlorinated biphenyls) (dioxin-like)	No
PCBs (Polychlorinated biphenyls)	PCBs (Polychlorinated biphenyls)	No
Specific Conductivity	Electrical Conductivity	No
Total DDT (including DDD, DDE and DDT)	DDT (Dichlorodiphenyltrichloroethane)	No
Total chlordane (sum of isomers: cis- and trans-nonachlor, oxychlordane, alpha- and gamma-chlordane)	Chlordane	No

APPENDIX C

There were no breakdowns and therefore there were no SMAQMD breakdown reports submitted for 2018.

APPENDIX D

2018 Source/RATA Test Report.

SOURCE TEST REPORT
2018 EMISSION COMPLIANCE TESTS & RATA
ETHOSENERGY GROUP
SPA COGENERATION III
SIEMENS COMBINED-CYCLE TURBINE
SACRAMENTO, CALIFORNIA

Prepared For:

EthosEnergy Group
3215 47th Avenue
Sacramento, California 95824

Sacramento Power Authority
Sacramento, California 95824

For Submittal To:

Sacramento Metropolitan Air Quality Management District
777 12th Street
Sacramento, California 95814

U.S. EPA Region 9
75 Hawthorne Street
San Francisco, California 94105

Prepared By:

Montrose Air Quality Services, LLC
2825 Verne Roberts Circle
Antioch, California 94509

Document Number:	**005AS-218872-RT-301**
Test Date:	**November 6, 2018**
Date of Issue:	**December 19, 2018**

REVIEW AND CERTIFICATION

All work, calculations, and other activities and tasks performed and presented in this document were carried out by me or under my direction and supervision. I hereby certify that, to the best of my knowledge, Montrose operated in conformance with the requirements of the Montrose Quality Management System and ASTM D7036-04 during this test project.

Signature: Neal Ohlendorf Date: 12/19/2018

Name: Neal Ohlendorf Title: Project Manager

I have reviewed, technically and editorially, details calculations, results, conclusions, and other appropriate written materials contained herein. I hereby certify that, to the best of my knowledge, the presented material is authentic, accurate, and conforms to the requirements of the Montrose Quality Management System and ASTM D7036-04.

Signature: Dan Duncan Date: 12/19/2018

Name: Dan Duncan Title: QA/QC Manager

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LIST OF TABLES

1.0 SUMMARY OF TEST PROGRAM AND RESULTS

1.1 PROGRAM OBJECTIVES

Montrose Air Quality Services, LLC (Montrose) was contracted by EthosEnergy Group (EthosEnergy) to perform a series of air emission tests at the Sacramento Power Authority (SPA) facility located in Sacramento, California. The tests were conducted to determine compliance with the source testing limitations of the Sacramento Metropolitan Air Quality Management District (SMAQMD) Title V Operating Permit No. TV2007-14-02B and Permits to Operate 21738, 14071, 11458, and 11459. Additionally, tests were performed to meet the requirements of Title 40, Parts 60 and 75 of the Code of Federal Regulations (40 CFR 60 & 40 CFR 75).

The testing was conducted by Neal Ohlendorf, Madison Koch, and Konstantin Serin of Montrose on November 6, 2018. Randall Blank of EthosEnergy coordinated the testing program. The tests were conducted according to a test plan dated September 13, 2018 that was submitted to the SMAQMD. Montrose performed the tests to measure the following emission parameters:

- Emission Compliance:
  - CO (ppm volume dry, ppmvd @ 15% O_2, lb/hr)
  - NO_x (ppm volume dry, ppmvd @ 15% O_2, lb/hr, lb/MMBtu)
  - NH_3 (ppm volume dry, ppmvd @ 15% O_2, lb/hr)
- O_2 and CO_2 (% volume dry) – for molecular weight & dilution calculations
- Fuel analysis (composition, HHV, F_d factor)
- Stack volumetric flow rate (dscfm) and moisture content (% by volume)
- Part 60 and Part 75 Relative Accuracy Test Audit (O_2, CO, and NO_x)

The source testing requirements for particulate matter (PM) and reactive organic compounds (ROC) were waived per the SMAQMD. This waiver is included in Appendix F.1.

This report presents the test results and supporting data, descriptions of the testing procedures, descriptions of the facility and sampling locations, and a summary of the quality assurance procedures used by Montrose. The average emission test results are summarized and compared to their respective permit limits and performance specifications in Tables 1-1 and 1-2. Detailed results for individual test runs can be found in Section 4.0. All supporting data can be found in the appendices.

TABLE 1-1
SUMMARY OF AVERAGE COMPLIANCE RESULTS
GAS TURBINE AT FULL LOAD[1]
ETHOSENERGY – SPA COGENERATION III
NOVEMBER 6, 2018

Parameter	Average	Permit Limit
Unit Data:		
Load, megawatts[3]	176.2	--
Fuel flow rate, scfh	1,213,867	--
Stack Gas Data:		
O_2, % volume dry	14.8	--
CO_2, % volume dry	3.5	--
Stack gas flow rate, dscfm[2]	616,698	--
CO Emissions:		
ppm volume dry	0.39	--
ppm @ 15% O_2	0.38	--
lb/hr	1.06	10.81
NO_X Emissions:		
ppm volume dry	2.26	--
ppm @ 15% O_2	2.19	3
lb/hr as NO_2	9.98	17.76
lb/MMBtu as NO_2	0.0080	--
		--
Ammonia Slip:		
ppm volume dry	0.26	--
ppm @ 15% O_2	0.26	10
Fuel Sulfur:		
grains/100scf	0.1434	--

Note: 1 The facility operated the combustion turbine and duct burners at 100% capacity based on ambient conditions.
2 Flow rates have been calculated stoichiometrically using the procedures in EPA Method 19.
3 Unit load MW, is determined by adding the combustion turbine MW output and the calculated HRSG MW output (as determined by the 40 CFR Part 75 Policy Manual, Section 17).
Results in italics contain at least one fraction that has been report at the method detection limit.

TABLE 1-2
SUMMARY OF AVERAGE RATA RESULTS
ETHOSENERGY – SPA COGENERATION III
GAS TURBINE AT FULL LOAD[1]
NOVEMBER 6, 2018

CEMS Parameter	Turbine Results	Performance Specification Part 60	Performance Specification Part 75	Performance Specification Incentive Program
Outlet O_2 Analyzer:				
% volume dry	1.5% RM	--	10.0[f]	7.5[f]
% volume dry	0.2% O_2	1.0[a]	1.0[e]	0.7[e]
NO_X Analyzer:				
ppm @ 15% O_2	10.5% RM	20[b]	N/A	--
lb/hr as NO_2	12.2% RM	20[b]	N/A	--
lb/MMBtu as NO_2	12.5% RM	20[b]	10[f]	7.5[f]
lb/MMBtu as NO_2	0.001 lb/MMBtu	--	0.020[g]	0.015[g]
Bias Adjustment Factor	1.000	--	--	--
Unit Load, MW[2]	175.8 MW	--	--	--
CO Analyzer:				
ppm @ 15% O_2	0.2	5[e]		
lb/hr	0.5 lb/hr	13.4[e]	--	--

Notes: 1 The facility operated the combustion turbine and duct burners at 100% capacity based on ambient conditions.

2 Unit Load MW, is determined by adding the combustion turbine MW output and the calculated HRSG MW output (as determined by the 40 CFR Part 75 Policy Manual, Section 17).

40 CFR, Part 60
[a] No greater than 1% O_2 (based on actual analyzer readings).
[b] No greater than 20% of the RM value (if average emissions are above 50% of the emission standard).
[c] No greater than 10% of the AS (if average emissions are <50% of the emission standard).
[d] No greater than 5% of the AS (if average emissions are <50% of the emission standard).
[e] Based on difference, 5 ppm or lb/hr equivalent (13.40 lb/hr)

40 CFR, Part 75
[e] No greater than 1% O_2 (or 0.7% O_2 for annual RATA incentive).
[f] No greater than 10% of the RM (or 7.5% for annual RATA incentive).
[g] No greater than 0.020 lb/MMBtu (or 0.015 lb/MMBtu for annual RATA incentive) of the RM mean value if the 10% of RM criteria is not met (for use when analyzer emission rate is no greater than 0.200 lb/MMBtu).

1.2 PROJECT CONTACTS

A list of project participants is included below:

Facility Information

Source Location:	EthosEnergy Group Sacramento Power Authority (SPA), Cogeneration III Gas Turbine Facility 3215 47th Avenue Sacramento, California 95824
Project Contact:	Mr. Randall Blank
Role:	Health, Safety, and Environmental Manager
Company:	EthosEnergy Group
Telephone:	+1 916 391 2993 x2 (direct SPA)
Email:	Randall.Blank@ethosenergygroup.com

Agency Information

Regulatory Agency:	Sacramento Metropolitan Air Quality Management District
Agency Contact:	Don Dumaine
Telephone:	916-874-2693
Email:	ddumaine@airquality.org

Testing Company Information

Testing Firm:	Montrose Air Quality Services, LLC (Montrose)	
Contact:	Neal Ohlendorf, QSTI	Neal Ohlendorf, QSTI
Title:	Project Manager	Project Manager
Telephone:	530.771.7428	530.771.7428
Email:	nohlendorf@montrose-env.com	nohlendorf@montrose-env.com

Laboratory Information

Laboratory:	Montrose	AAC
City, State:	Antioch, CA	Ventura, CA

Montrose is qualified to conduct this test program and has established a quality management system that led to accreditation with ASTM Standard D-7036 (Standard Practice for Competence of Air Emission Testing Bodies). Montrose completed multiple functional assessments for ASTM D7036-04 which were conducted by the American Association for Laboratory Accreditation (A2LA). All testing is overseen and supervised on site by at least one Qualified Individual (QI), as defined in 40 CFR 72.2.

2.0 SOURCE DESCRIPTION

2.1 FACILITY AND SOURCE DESCRIPTION

Sacramento Power Authority generates electricity for the Sacramento Municipal Utility District (SMUD). The facility is located on a 5.8-acre site, adjacent to the former Campbell Soup plant at 3215 47th Avenue in Sacramento, California.

The cogeneration plant utilizes the following equipment:

- Siemens V84.2 natural gas-fired combustion turbine generator (CTG) with a nominal capacity of 103 MW;
- Heat recovery generator (HRSG) and with a 200 MMBtu/hr natural gas-fired duct burner;
- 55.9 MW nominal capacity steam turbine generator;
- Selective catalytic reduction (SCR); and
- Oxidation catalyst.

Dry low-NO_X combustors in the CTG together with the SCR are designed for NO_X control. Low-NO_X burners in the HRSG also contribute to the abatement of NO_X. The oxidation catalyst, located upstream of the SCR, operates to reduce ROC and CO emissions. A dry extractive continuous emissions monitoring system (CEMS) measures O_2, CO and NO_X.

2.1.1 CEMS System Description

All flue gas pollutant and diluent measurements are made on a dry basis. Effluent gas from the sampling location is filtered and transported through a heated sample line to the sample conditioning system in the main analyzer cabinet. The sample conditioning system again filters the effluent gas and a chilled condenser removes the moisture. The dry, particulate-free effluent gas is then routed to the analyzers. Table 2-1 outlines the make, model, and serial numbers of the individual analyzers.

TABLE 2-1
CEMS INFORMATION

Analyzer	Make	Model	Serial Number
Oxygen / Oxides of Nitrogen	Thermo Scientific	42i-LS	1162880011
Carbon Monoxide	Thermo Scientific	48i	1162880012

2.1.2 Data Acquisition System and Controller

The analog outputs of the analyzers and certain plant inputs are transmitted to a system controller. The system controls the CEMS and provides timing and control of the sampling system, receives analog inputs from the analyzers, and provides corrected and calculated analog outputs. The controller continuously communicates to the data acquisition and handling

system (DAHS) polling computer located in the control room. Automatic zero and span calibrations are performed on the CEMS monitors every twenty-four hours. Certified calibration gases are injected at a valve box in back of the probe.

The DAHS is a PC-based, multi-user, multi-tasking system that provides automated data monitoring and management capabilities to the CEMS. The DAHS is utilized for operator interface, data storage, report generation, and data display. The DAHS will indicate any occurrence of specification limit exceedances or CEM operational problems and will generate reports in the required format for submittal to the applicable regulatory agencies.

The system generates one-minute averages, from which 1-hour values are then calculated to comply with 40 CFR, Part 75.10 (d)(1). In addition, the DAHS is configured to generate local and federal reports based on applicable permit requirements. These reports may be produced in either hard copy or electronic format and can be made available for telemetry transmission.

2.2 SAMPLING LOCATIONS AND ACCESS

Information regarding the sampling location is presented below:

Sample location ID:	Unit Exhaust Duct
Configuration:	Vertical, Cylindrical
Dimensions:	204” diameter
Port locations:	102” (0.5 Diameters) upstream from nearest disturbance 408” (2.0 Diameters) downstream from nearest disturbance
Port access:	Stairs then Ladder to a permanent platform.

Traverse point information is presented below:

- Gaseous emission tests - 12 points total, 6 from each of 2 ports located according to EPA Method 7E
- RATA - 3 points total – 16.7, 50.0, and 83.3 percent of internal diameter

See Appendix B.1 for detailed information on sampling location and traverse points.

2.3 OPERATING CONDITIONS AND PROCESS DATA

During the source test, the gas turbine and duct burners were operated at the maximum firing capacity, defined as >= 90% of the heat input capacity that is achievable based on the ambient conditions at the time of the source test (Permit Condition TV2007-14-2B, Condition C.23.C). A minimum of nine RATA test runs were performed. The RATA runs were ~21 minutes in duration. Six test runs were averaged in pairs (to create three 42-minute runs) for determination of compliance with the applicable permitted emission limits.

Plant personnel established the test conditions and collected all applicable unit-operating data. Montrose monitored the collection of process data and provided additional data collection as necessary to document operation. The plant’s unit operating data was used to document process conditions during the test runs. Data presented in this report includes the following:

- Fuel flow rates

- Power Output
- CEMS Data

3.0 TEST METHOD DETAILS

3.1 LIST OF TEST METHODS

The test procedures for this test program are summarized in Table 3-1 below. Additional information regarding specific applications or modifications to standard procedures is presented in the following sub-sections.

TABLE 3-1
TEST PROCEDURES

Parameter	Measurement Principle	Reference Method
O_2	Paramagnetism	EPA 3A / 20
CO_2	Nondispersive infrared	EPA 3A / 20
CO	Gas filter correlation	EPA 10
NO_X	Chemiluminescence	EPA 7E / 20
NH_3	Ion selective electrode	BA ST-1B
Vol. flow rate	Stoichiometric calculation	EPA 19
Moisture content	Impinger weight gain	EPA 4
Fuel Composition	Gas chromatography	ASTM D-1945
Stratification	Part 60 and Part 75 RATA Requirement	EPA 3A, 7E and 10

3.1.1 Volumetric Flow Rate and Moisture Content

Stack gas volumetric flow rates were determined by the procedures outlined in EPA Method 19. Pertinent information regarding the performance of the method is presented below:

- F Factor: Oxygen based F factor, dry basis (F_d)
- F Factor Source: EPA 19
- Heat Input Data: Calculated based on fuel flow rate and higher heating value
- Higher Heating Value Source: Analysis of fuel samples

During the NH_3 emission tests, the moisture content was determined using EPA Method 4 in conjunction with each test.

3.1.2 Gaseous Emissions

Concentrations of the gaseous constituents of stack gas (O_2, CO_2, NO_X & CO) are measured using Montrose's dry extractive reference method (RM) monitor system in accordance with EPA and CARB methods for gaseous species. This system meets the requirements of EPA methods for gaseous species. Pertinent information regarding the performance of the method is presented below:

- Method Deviations: None
- Method Options: N/A
- Detection Limits: 2% of calibration span

Sampling traverse points for gaseous emissions were determined in accordance with EPA Method 7E. As required by 40 CFR Part 60, the stack gas was sampled at three traverse points

on each source. The stack has a diameter greater than 7.8 feet; therefore, probe tips were located at 0.4, 1.2, and 2.0 meters from the stack wall as allowed in Performance Specification 2, Section 8.1.3.2. Source gas was sampled for a period of 21 minutes for each of the 12 audit runs.

3.1.3 Ammonia Slip Emissions

Concentrations of ammonia slip were determined using Bay Area Air Quality Management District (BAAQMD) Method ST-1B. Pertinent information regarding the performance of the methods is presented below:

- Method Deviations: None
- Method Options: None
- Minimum Required Sample Duration: 40 minutes
- Minimum Required Sample Volume: 21 dscf
- Detection Limit: 0.5 ppm
- Analytical Laboratory: Montrose – Antioch, CA

3.1.4 Relative Accuracy Test Audit

The relative accuracy of each CEMS were audited per the procedures of 40 CFR, Part 60, Appendices B and F. Pertinent information regarding the performance of the audit is presented below:

- Traverse Points: Three located along the measurement line
- Relevant Performance Specifications: 40 CFR 60, PS 2, 3 and 4A; 40 CFR 75 Appendix A, Sections 3.3.2 and 3.3.3 and Appendix B, Section 2.3.1.2

Relative accuracy was calculated in the following units:

- O_2 analyzer - % volume dry
- CO analyzer - ppm @ 15% O_2, lb/hr
- NO_X analyzer - ppm @ 15% O_2, lb/hr, lb/MMBtu
- The NO_X RATA run results were also used to calculate a bias adjustment factor (BAF) of 1.000 according to reporting under Part 75. See Table 4-7.

3.1.5 Fuel Sampling and Analysis

Sample gas from the facility's natural gas fuel supply pipeline was collected and submitted for analysis. Pertinent information regarding the fuel analysis is presented below:

- Analytical Method: ASTM D-1945
- Sample Containers: Evacuated Cylinders
- Analytical Laboratory: Atmospheric Analysis and Consulting, Ventura, California

4.0 TEST RESULTS AND OVERVIEW

4.1 DISCUSSION OF RESULTS

The average results are compared to the permit limits and performance specifications in Tables 1-1 and 1-2. The results of individual compliance test runs are presented in Table 4-1. The test results show that all of the emissions were within their respective permit compliance limits. Emissions have been reported in units consistent with those in the permits.

Detailed results from the individual relative accuracy test runs are presented in Tables 4-2 through 4-7. The results were calculated using nine of the available test results for each CEMS component. All of the analyzers performed within their applicable performance specifications.

Additional information is included in the appendices. Appendix A presents the general and specific equations used for the emissions calculations and computer spreadsheets. Raw field data sheets and data acquisition printouts are included in Appendix B. Laboratory reports and chain of custody sheets for the samples are located in Appendix C. CEM and process data provided by the client is located in Appendix D. Appendix E presents the quality assurance information, including instrument calibration data. Additional correspondence and relevant regulatory information are located in Appendix F.

Both qualitative and quantitative factors contribute to field measurement uncertainty and should be taken into consideration when interpreting the results contained within this report. Whenever possible, Montrose Air Quality Services, LLC, (Montrose) personnel reduce the impact of these uncertainty factors using approved and validated test methods. In addition, Montrose personnel perform routine instrument and equipment calibrations and ensure that the calibration standards, instruments, and equipment used during test events meet, at a minimum, test method specifications as well as the specifications of our Quality Manual and ASTM D 7036-04. The limitations of the various methods, instruments, equipment, and materials utilized during this test have been reasonably considered, but the ultimate impact of the cumulative uncertainty of this project is not fully identified within the results of this report.

4.2 DEVIATIONS AND EXCEPTIONS

Runs 1 and 2 were voided due to the duct burner being off, which does meet the operating requirements for this test program. The three ammonia runs were performed during RATA Runs 4-5, 6-7, and 8-9 respectively.

TABLE 4-1
RESULTS SUMMARY GASEOUS EMISSIONS
ETHOSENERGY – SPA COGENERATION III
GAS TURBINE AT FULL LOAD[1]

Run Number:	Runs 4-5	Runs 6-7	Runs 8-9	Average
Date:	11/06/18	11/06/18	11/06/18	--
Time:	1109-1208	1219-1308	1315-1406	--
Process Data:				
Unit Load, MW[3]	177.0	176.0	175.5	176.2
Total Fuel flow rate, scfh	1,219,075	1,212,790	1,209,735	1,213,867
Flue Gas:				
O_2, % volume dry	14.8	14.8	14.8	14.8
Volumetric flow rate, dscfm[2]	619,004	616,825	614,264	616,698
Carbon Monoxide:				
ppm volume dry	0.41	0.38	0.39	0.39
ppm @ 15% O_2	0.40	0.37	0.38	0.38
lb/hr	1.11	1.02	1.04	1.06
Nitrogen Oxides:				
ppm volume dry	2.26	2.24	2.28	2.26
ppm @ 15% O_2	2.19	2.17	2.21	2.19
lb/hr as NO_2	10.03	9.89	10.02	9.98
MMBtu/hr as NO_2	0.0080	0.0079	0.0081	0.0080
Ammonia:				
ppm volume dry	0.29	0.25	0.25	0.26
ppm @ 15% O_2	0.28	0.24	0.24	0.26

Note: 1 The facility operated the combustion turbine and duct burners at 100% capacity based on ambient conditions.
2 Flow rates have been calculated stoichiometrically using the procedures in EPA Method 19.
3 Unit load MW, is determined by adding the combustion turbine MW output and the calculated HRSG MW output (as determined by the 40 CFR Part 75 Policy Manual, Section 17).
Results in italics contain at least one fraction that has been report at the method detection limit.

TABLE 4-2
RELATIVE ACCURACY TEST RESULTS
O_2, % VOLUME DRY
ETHOSENERGY – SPA COGENERATION III

Run Number	Date	Time	Montrose RM	Plant CEMS	Difference
~~Run 1~~	~~11/6/18~~	~~0820-0856~~	~~15.1~~	~~15.1~~	~~0.0~~
~~Run 2~~	~~11/6/18~~	~~0928-0949~~	~~15.1~~	~~15.0~~	~~0.1~~
~~Run 3~~	~~11/6/18~~	~~1025-1059~~	~~14.8~~	~~14.6~~	~~0.2~~
Run 4	11/6/18	1109-1130	14.8	14.6	0.2
Run 5	11/6/18	1147-1208	14.8	14.6	0.2
Run 6	11/6/18	1219-1240	14.8	14.6	0.2
Run 7	11/6/18	1247-1308	14.8	14.6	0.2
Run 8	11/6/18	1315-1336	14.8	14.6	0.2
Run 9	11/6/18	1345-1406	14.8	14.6	0.2
Run 10	11/6/18	1414-1435	14.8	14.6	0.2
Run 11	11/6/18	1442-1503	14.8	14.6	0.2
Run 12	11/6/18	1511-1532	14.8	14.6	0.2
AVERAGES:			14.8	14.6	0.2
STANDARD DEVIATION:					0.020
CONFIDENCE COEFFICIENT:					0.015
RELATIVE ACCURACY[a], %:					**0.2**
RELATIVE ACCURACY[b], %:					**1.5**

Note: Percent relative accuracy using nine of the available test runs.
[a] Based on difference in % O_2
[b] Based on % of the reference method

TABLE 4-3
RELATIVE ACCURACY TEST RESULTS
CO, PPMVD @ 15% O_2
ETHOSENERGY – SPA COGENERATION III

Run Number	Date	Time	Montrose RM	Plant CEMS	Difference
~~Run 1~~	~~11/6/18~~	~~0820-0856~~	~~0.1~~	~~0.0~~	~~0.1~~
~~Run 2~~	~~11/6/18~~	~~0928-0949~~	~~0.1~~	~~0.0~~	~~0.1~~
Run 3	11/6/18	1025-1059	0.4	0.2	0.2
Run 4	11/6/18	1109-1130	0.4	0.2	0.2
~~Run 5~~	~~11/6/18~~	~~1147-1208~~	~~0.4~~	~~0.2~~	~~0.2~~
Run 6	11/6/18	1219-1240	0.4	0.2	0.2
Run 7	11/6/18	1247-1308	0.4	0.2	0.2
Run 8	11/6/18	1315-1336	0.4	0.2	0.2
Run 9	11/6/18	1345-1406	0.4	0.2	0.2
Run 10	11/6/18	1414-1435	0.4	0.2	0.2
Run 11	11/6/18	1442-1503	0.4	0.2	0.2
Run 12	11/6/18	1511-1532	0.3	0.2	0.1
AVERAGES:			0.4	0.2	0.2
STANDARD DEVIATION:					0.015
CONFIDENCE COEFFICIENT:					0.012
RELATIVE ACCURACY, PPM:					**0.2**

Note: Percent relative accuracy is based on the difference in ppm using nine of the available test runs.

TABLE 4-4
RELATIVE ACCURACY TEST RESULTS
CO, LB/HR
ETHOSENERGY – SPA COGENERATION III

Run Number	Date	Time	Montrose RM	Plant CEMS	Difference
~~Run 1~~	~~11/6/18~~	~~0820-0856~~	~~0.33~~	~~0.00~~	~~0.33~~
~~Run 2~~	~~11/6/18~~	~~0928-0949~~	~~0.25~~	~~0.00~~	~~0.25~~
Run 3	11/6/18	1025-1059	1.01	0.64	0.37
Run 4	11/6/18	1109-1130	1.10	0.61	0.49
~~Run 5~~	~~11/6/18~~	~~1147-1208~~	~~1.13~~	~~0.59~~	~~0.54~~
Run 6	11/6/18	1219-1240	1.01	0.58	0.43
Run 7	11/6/18	1247-1308	1.03	0.57	0.46
Run 8	11/6/18	1315-1336	1.01	0.56	0.45
Run 9	11/6/18	1345-1406	1.07	0.55	0.52
Run 10	11/6/18	1414-1435	1.04	0.55	0.49
Run 11	11/6/18	1442-1503	0.97	0.54	0.43
Run 12	11/6/18	1511-1532	0.95	0.54	0.41
AVERAGES:			1.02	0.57	0.45
EMISSION LIMIT:					10.81
STANDARD DEVIATION:					0.045
CONFIDENCE COEFFICIENT:					0.034
RELATIVE ACCURACY, LB/HR:					**0.5**

Note: Percent relative accuracy is based on the difference in lb/hr using nine of the available test runs.

TABLE 4-5
RELATIVE ACCURACY TEST RESULTS
NO_X, PPMVD @ 15% O_2
ETHOSENERGY – SPA COGENERATION III

Run Number	Date	Time	Montrose RM	Plant CEMS	Difference
~~Run 1~~	~~11/6/18~~	~~0820-0856~~	~~2.1~~	~~2.4~~	~~-0.3~~
~~Run 2~~	~~11/6/18~~	~~0928-0949~~	~~2.2~~	~~2.4~~	~~-0.2~~
~~Run 3~~	~~11/6/18~~	~~1025-1059~~	~~2.0~~	~~2.4~~	~~-0.4~~
Run 4	11/6/18	1109-1130	2.2	2.4	-0.2
Run 5	11/6/18	1147-1208	2.1	2.4	-0.3
Run 6	11/6/18	1219-1240	2.1	2.3	-0.2
Run 7	11/6/18	1247-1308	2.2	2.4	-0.2
Run 8	11/6/18	1315-1336	2.1	2.3	-0.2
Run 9	11/6/18	1345-1406	2.3	2.4	-0.1
Run 10	11/6/18	1414-1435	2.2	2.3	-0.1
Run 11	11/6/18	1442-1503	2.1	2.4	-0.3
Run 12	11/6/18	1511-1532	2.3	2.4	-0.1
AVERAGES:			2.2	2.4	-0.2
EMISSION LIMIT:					3.00
STANDARD DEVIATION:					0.062
CONFIDENCE COEFFICIENT:					0.048
RELATIVE ACCURACY, %:					**10.5**

Note: Percent relative accuracy is based on the reference method using nine of the available test runs.

TABLE 4-6
RELATIVE ACCURACY TEST RESULTS
NO_X, LB/HR
ETHOSENERGY – SPA COGENERATION III

Run Number	Date	Time	Montrose RM	Plant CEMS	Difference
~~Run 1~~	~~11/6/18~~	~~0820-0856~~	~~8.94~~	~~10.25~~	~~-1.31~~
~~Run 2~~	~~11/6/18~~	~~0928-0949~~	~~9.49~~	~~10.64~~	~~-1.15~~
~~Run 3~~	~~11/6/18~~	~~1025-1059~~	~~9.37~~	~~11.01~~	~~-1.64~~
Run 4	11/6/18	1109-1130	10.24	11.23	-0.99
Run 5	11/6/18	1147-1208	9.83	11.09	-1.26
Run 6	11/6/18	1219-1240	9.67	10.72	-1.05
Run 7	11/6/18	1247-1308	10.11	11.06	-0.95
Run 8	11/6/18	1315-1336	9.54	10.71	-1.17
Run 9	11/6/18	1345-1406	10.51	10.98	-0.47
Run 10	11/6/18	1414-1435	9.77	10.75	-0.98
Run 11	11/6/18	1442-1503	9.52	10.88	-1.36
Run 12	11/6/18	1511-1532	10.20	11.02	-0.82
AVERAGES:			9.93	10.94	-1.01
EMISSION LIMIT:					17.76
STANDARD DEVIATION:					0.262
CONFIDENCE COEFFICIENT:					0.201
RELATIVE ACCURACY, %:					**12.2**

Note: Percent relative accuracy is based on the reference method using nine of the available test runs.

TABLE 4-7
RELATIVE ACCURACY TEST RESULTS
NO_X, LB/MMBTU – EDR DATA
ETHOSENERGY – SPA COGENERATION III

Run Number	Date	Time	Load, MW	Montrose RM	Plant CEMS	Difference
~~Run 1~~	~~11/6/18~~	~~0820-0856~~	~~99.4~~	~~0.008~~	~~0.009~~	~~-0.001~~
~~Run 2~~	~~11/6/18~~	~~0928-0949~~	~~102~~	~~0.008~~	~~0.009~~	~~-0.001~~
~~Run 3~~	~~11/6/18~~	~~1025-1059~~	~~178~~	~~0.007~~	~~0.009~~	~~-0.002~~
Run 4	11/6/18	1109-1130	177	0.008	0.009	-0.001
Run 5	11/6/18	1147-1208	177	0.008	0.009	-0.001
Run 6	11/6/18	1219-1240	176	0.008	0.009	-0.001
Run 7	11/6/18	1247-1308	176	0.008	0.009	-0.001
Run 8	11/6/18	1315-1336	176	0.008	0.009	-0.001
Run 9	11/6/18	1345-1406	175	0.008	0.009	-0.001
Run 10	11/6/18	1414-1435	175	0.008	0.009	-0.001
Run 11	11/6/18	1442-1503	175	0.008	0.009	-0.001
Run 12	11/6/18	1511-1532	175	0.008	0.009	-0.001
AVERAGES:			175.8	0.008	0.009	-0.001
BIAS ADJUSTMENT FACTOR:						**1.000**
STANDARD DEVIATION:						0.000
CONFIDENCE COEFFICIENT:						0.000
RELATIVE ACCURACY, % RM:						**12.5**
RELATIVE ACCURACY, LB/MMBTU:						**0.001**

Note: Percent relative accuracy is based on the difference in lb/MMBtu using nine of the available test runs.

APPENDIX A
CALCULATIONS

Appendix A.1
Gaseous Emissions Spreadsheets

GASEOUS EMISSIONS COMPLIANCE
ETHOSENERGY
SPA COGEN III TURBINE

Test No.	Compliance Run 1 Runs 4, 5	Compliance Run 2 Runs 6, 7	Compliance Run 3 Runs 8, 9	Average
Date	11/06/18	11/06/18	11/06/18	--
Start Time	1109-1208	1219-1308	1315-1406	--
Unit load, MW	177.0	176.0	175.5	**176.2**
Unit fuel flow @ 60 °F, scfh	1,219,075	1,212,790	1,209,735	**1,213,867**
O2, % volume dry	14.8	14.8	14.8	**14.8**
CO2, % volume dry	3.5	3.5	3.5	**3.5**
Stack flow rate - based on fuel, dscfm	619,004	616,825	614,264	**616,698**
CO, ppm volume dry	0.41	0.38	0.39	**0.39**
CO, ppm dry @ 15% O2	0.40	0.37	0.38	**0.38**
CO, lb/hr	1.11	1.02	1.04	**1.06**
NOX, ppm volume dry	2.26	2.24	2.28	**2.26**
NOX, ppm dry @ 15% O2	2.19	2.17	2.21	**2.19**
NOX, lb/hr as NO2	10.03	9.89	10.02	**9.98**
NOX, lb/MMBtu as NO2	0.0080	0.0079	0.0081	**0.0080**

Appendix A.2
Ammonia Slip Spreadsheets

SOURCE TEST DATA SUMMARY

	Client				EthosEnergy
	Unit / Location				SPA Cogen III
	A (stack area), ft^2				226.980
	Reference temperature, °F				68
	Test number	1-NH3	2-NH3	3-NH3	Average
	Date	11/6/18	11/6/18	11/6/18	--
	Start / Stop time	1109-1149	1219-1259	1315-1355	--
	FUEL DATA				
	Fuel "F" factor @ 68°F, dscf/MMBtu	8,644	8,644	8,644	8,644
	Fuel "F" factor @ T_{ref}, dscf/MMBtu	8,644	8,644	8,644	8,644
	Fuel higher heating value (HHV), Btu/scf	1,027	1,027	1,027	1,027
	Fuel flow, scfh	1,219,075	1,212,790	1,209,735	1,213,867
	SAMPLE TRAIN DATA				
	Meter box number	CB-03	CB-03	CB-03	--
	C_p (pitot coefficient), dimensionless	0.84	0.84	0.84	0.84
	Y (meter calibration factor), dimensionless	1.025	1.025	1.025	1.025
	P_{bar} (barometric pressure), in Hg	29.94	29.94	29.94	29.94
	V_m (meter box volume), acf	28.923	29.609	30.138	29.557
	V_{lc} (impinger liquid volume), ml	47.4	50.6	51.8	49.9
	T_m (meter temperature), °F	78.0	84.8	88.8	83.8
	ΔH (meter pressure), in. H_2O	1.800	1.800	1.800	1.800
	ANALYZER DATA				
	O_2, % volume dry	14.81	14.82	14.81	14.81
	CO_2, % volume dry	3.53	3.53	3.52	3.53
	VOLUMETRIC FLOW RATE				
1a	V_{mstd}, standard sample volume, dscf	29.243	29.566	29.875	29.561
1b	V_{wcstd}, water vapor volume, scf	2.2349	2.3858	2.4424	2.3544
1c	B_{ws} (moisture fraction), non-dimensional	0.0710	0.0747	0.0756	0.0737
1d	M_d, stack gas dry molecular weight, lb/lb-mole	29.157	29.158	29.156	29.157
1e	M_s, stack gas wet molecular weight, lb/lb-mole	28.365	28.325	28.313	28.334
	Stack flow rate - based on fuel, dscfm	619,004	616,825	614,261	616,697
	NH_3 ION SELECTIVE ELECTRODE				
	Audit sample concentration (measured), ppm	9.94	9.94	9.94	9.94
	Audit sample concentration (actual), ppm	10.00	10.00	10.00	10.00
	Audit sample, % recovery	99.40	99.40	99.40	99.40
	Sample volume - fraction 1 - (total), ml	343.30	290.10	300.60	311.33
	Sample concentration - fraction 1 - (measured), ppm	*0.50*	*0.50*	*0.50*	*0.50*
	EMISSIONS				
	NH_3 concentrations, ppm volume dry	0.29	0.25	0.25	0.26
2b	NH_3 concentrations, ppm @ 15% O_2 dry	0.28	0.24	0.24	0.26

Appendix A.3
Relative Accuracy Spreadsheets

RELATIVE ACCURACY TEST AUDIT DETERMINATION
ETHOSENERGY
SPA COGEN III TURBINE

Test No.	Run 1	Run 2	Run 3	Run 4	Run 5	Run 6	Run 7	Run 8	Run 9	Run 10	Run 11	Run 12	Average
Date	11/6/18	11/6/18	11/6/18	11/6/18	11/6/18	11/6/18	11/6/18	11/6/18	11/6/18	11/6/18	11/6/18	11/6/18	Runs 1-12
Start Time	0820-0856	0928-0949	1025-1059	1109-1130	1147-1208	1219-1240	1247-1308	1315-1336	1345-1406	1414-1435	1442-1503	1511-1532	--
Stack area, ft^2	226.980	226.980	226.980	226.980	226.980	226.980	226.980	226.980	226.980	226.980	226.980	226.980	--
Reference temperature, °F	68	68.00	68.00	68.00	68.00	68.00	68.00	68.00	68.00	68.00	68.00	68.00	**68.00**
Unit load, MW	99	102	178	177	177	176	176	176	175	175	175	175	**163**
Unit fuel flow @ 60 °F, scfh	1,139,640	1,157,630	1,223,090	1,220,450	1,217,700	1,214,180	1,211,400	1,210,480	1,208,990	1,206,060	1,205,230	1,204,070	**1,201,577**
"F_d" factor @ 68 °F, dscf/MMBtu	8644	8,644	8,644	8,644	8,644	8,644	8,644	8,644	8,644	8,644	8,644	8,644	**8,644**
"F_d" factor @ T_{ref} °F, dscf/MMBtu	8,644	8,644	8,644	8,644	8,644	8,644	8,644	8,644	8,644	8,644	8,644	8,644	**8,644**
HHV @ 60 °F, btu/scf	1027	1,027	1,027	1,027	1,027	1,027	1,027	1,027	1,027	1,027	1,027	1,027	**1,027**
Stack flow rate - based on fuel, dscfm	611,822	615,074	620,024	618,686	619,323	617,532	616,118	615,651	612,877	610,391	610,971	606,406	**614,573**
Stack flow rate - based on fuel, dscfm	611,822	615,074	620,024	618,686	619,323	617,532	616,118	615,651	612,877	610,391	610,971	606,406	614,573
O_2, % volume dry	15.14	15.08	14.80	14.80	14.82	14.82	14.82	14.82	14.80	14.79	14.80	14.76	**14.85**
CO_2, % volume dry	3.32	3.36	3.52	3.53	3.53	3.54	3.53	3.51	3.54	3.53	3.52	3.54	**3.50**
CO, ppm volume dry	0.123	0.094	0.374	0.406	0.417	0.376	0.383	0.378	0.401	0.390	0.365	0.361	**0.339**
CO, ppm dry @ 15% O_2	0.126	0.095	0.362	0.393	0.405	0.365	0.372	0.367	0.388	0.377	0.353	0.347	**0.329**
CO, lb/hr	0.328	0.252	1.011	1.096	1.126	1.013	1.029	1.015	1.072	1.038	0.973	0.955	**0.909**
CO, lb/day (24 hours)	7.877	6.052	24.272	26.292	27.033	24.304	24.700	24.359	25.725	24.918	23.342	22.914	**21.816**
CO, lb/MMBtu	0.000	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	**0.001**
NO_X, ppm volume dry	2.040	2.153	2.110	2.310	2.215	2.186	2.291	2.162	2.394	2.234	2.175	2.348	**2.218**
NO_X, ppm dry @ 15% O_2	2.090	2.183	2.041	2.234	2.149	2.121	2.223	2.098	2.316	2.157	2.104	2.256	**2.164**
NO_X, lb/hr as NO_2	8.942	9.487	9.372	10.239	9.828	9.671	10.112	9.536	10.511	9.769	9.520	10.201	**9.766**
NO_X, lb/day (24 hours) as NO_2	214.599	227.690	224.938	245.728	235.865	232.104	242.695	228.856	252.272	234.457	228.482	244.813	**234.375**
NO_X, lb/MMBtu as NO_2	0.008	0.008	0.007	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	**0.008**

RELATIVE ACCURACY TEST AUDIT DETERMINATION
EPA CFR 40, PART 75, APPENDIX A
ETHOSENERGY
SPA COGEN III TURBINE

O_2, % volume dry

Run #	Date	Time	RM	CEMS	Difference	n	$t_{0.975}$
~~Run 1~~	~~11/6/18~~	~~0820-0856~~	~~15.1~~	~~15.1~~	~~0.0~~	1	100.00
~~Run 2~~	~~11/6/18~~	~~0928-0949~~	~~15.1~~	~~15.0~~	~~0.1~~	2	12.706
~~Run 3~~	~~11/6/18~~	~~1025-1059~~	~~14.8~~	~~14.6~~	~~0.2~~	3	4.303
Run 4	11/6/18	1109-1130	14.8	14.6	0.2	4	3.182
Run 5	11/6/18	1147-1208	14.8	14.6	0.2	5	2.776
Run 6	11/6/18	1219-1240	14.8	14.6	0.2	6	2.571
Run 7	11/6/18	1247-1308	14.8	14.6	0.2	7	2.447
Run 8	11/6/18	1315-1336	14.8	14.6	0.2	8	2.365
Run 9	11/6/18	1345-1406	14.8	14.6	0.2	9	2.306
Run 10	11/6/18	1414-1435	14.8	14.6	0.2	10	2.262
Run 11	11/6/18	1442-1503	14.8	14.6	0.2	11	2.228
Run 12	11/6/18	1511-1532	14.8	14.6	0.2	12	2.201
AVERAGES:			14.8	14.6	0.2		

choose only one of the two available criteria

STANDARD DEVIATION:	0.020
CONFIDENCE COEFFICIENT:	0.015
RELATIVE ACCURACY (BASED ON REFERENCE METHOD), %:	
RELATIVE ACCURACY (BASED ON DIFFERENCE), %:	

Criteria	*Result*
≤10	**1.5**
≤1	**0.20**

Note: The relative accuracy (RA) of the CEMS shall not exceed 10.0 percent. The relative accuracy test results are also acceptable if the difference between the mean value of the CEMS O2 monitor measurements and the corresponding reference method (RM) measurement mean value does not exceed 1.0 percent O2.

RELATIVE ACCURACY TEST AUDIT DETERMINATION
EPA CFR 40, PART 60, APPENDIX B, PS 4/4A
ETHOSENERGY
SPA COGEN III TURBINE

CO, ppm @ 15% O_2

Run #	Date	Time	RM	CEMS	Difference	n	$t_{0.975}$
~~Run 1~~	~~11/6/18~~	~~0820-0856~~	~~0.1~~	~~0.0~~	~~0.1~~	1	100.00
~~Run 2~~	~~11/6/18~~	~~0928-0949~~	~~0.1~~	~~0.0~~	~~0.1~~	2	12.706
Run 3	11/6/18	1025-1059	0.4	0.2	0.2	3	4.303
Run 4	11/6/18	1109-1130	0.4	0.2	0.2	4	3.182
~~Run 5~~	~~11/6/18~~	~~1147-1208~~	~~0.4~~	~~0.2~~	~~0.2~~	5	2.776
Run 6	11/6/18	1219-1240	0.4	0.2	0.2	6	2.571
Run 7	11/6/18	1247-1308	0.4	0.2	0.2	7	2.447
Run 8	11/6/18	1315-1336	0.4	0.2	0.2	8	2.365
Run 9	11/6/18	1345-1406	0.4	0.2	0.2	9	2.306
Run 10	11/6/18	1414-1435	0.4	0.2	0.2	10	2.262
Run 11	11/6/18	1442-1503	0.4	0.2	0.2	11	2.228
Run 12	11/6/18	1511-1532	0.3	0.2	0.1	12	2.201
AVERAGES:			0.4	0.2	0.2		
EMISSION LIMIT:					N/A		
STANDARD DEVIATION:					0.015		
CONFIDENCE COEFFICIENT:					0.012		

choose only one of the three available criteria

Criteria	***Result***
RELATIVE ACCURACY (BASED ON REFERENCE METHOD), %:	**≤10**	**48.9**
RELATIVE ACCURACY (BASED ON APPLICABLE STANDARD), %:	**≤5**	**N/A**
RELATIVE ACCURACY (BASED ON DIFFERENCE), PPM: *- 4A only -*	**≤5**	**0.18**

Note: Performance Specification (PS) 4 is to be used on sources operating above 200 ppm analyzer span and PS 4A on sources operating below 200 ppm analyzer span. The relative accuracy (RA) of the CEMS must be no greater than 10 percent when the average reference method (RM) value is used to calculate RA, 5 percent when the applicable standard (AS) is used to calculate RA, or within 5 ppm (to be used with PS 4A only) when the RA is calculated as the absolute average difference between the RM and CEMS plus the 2.5 percent confidence coefficient.

RELATIVE ACCURACY TEST AUDIT DETERMINATION
EPA CFR 40, PART 60, APPENDIX B, PS 4(A)
ETHOSENERGY
SPA COGEN III TURBINE

CO, lb/hr

Run #	Date	Time	RM	CEMS	Difference	n	$t_{0.975}$
~~Run 1~~	~~11/6/18~~	~~0820-0856~~	~~0.33~~	~~0.00~~	~~0.33~~	1	100.00
~~Run 2~~	~~11/6/18~~	~~0928-0949~~	~~0.25~~	~~0.00~~	~~0.25~~	2	12.706
Run 3	11/6/18	1025-1059	1.01	0.64	0.37	3	4.303
Run 4	11/6/18	1109-1130	1.10	0.61	0.49	4	3.182
~~Run 5~~	~~11/6/18~~	~~1147-1208~~	~~1.13~~	~~0.59~~	~~0.54~~	5	2.776
Run 6	11/6/18	1219-1240	1.01	0.58	0.43	6	2.571
Run 7	11/6/18	1247-1308	1.03	0.57	0.46	7	2.447
Run 8	11/6/18	1315-1336	1.01	0.56	0.45	8	2.365
Run 9	11/6/18	1345-1406	1.07	0.55	0.52	9	2.306
Run 10	11/6/18	1414-1435	1.04	0.55	0.49	10	2.262
Run 11	11/6/18	1442-1503	0.97	0.54	0.43	11	2.228
Run 12	11/6/18	1511-1532	0.95	0.54	0.41	12	2.201

AVERAGES:	1.02	0.57	0.45	
EMISSION LIMIT:			10.81	
STANDARD DEVIATION:			0.045	
CONFIDENCE COEFFICIENT:			0.034	

choose only one of the three available criteria

Criteria	***Result***
≤10	**47.5**
≤5	**4.49**
≤13.40	**0.485625**

RELATIVE ACCURACY (BASED ON REFERENCE METHOD), %:

RELATIVE ACCURACY (BASED ON APPLICABLE STANDARD), %:

RELATIVE ACCURACY (BASED ON DIFFERENCE), LB/HR:

Note: Performance Specification (PS) 4 is to be used on sources operating above 200 ppm analyzer span and PS 4A on sources operating below 200 ppm analyzer span. The relative accuracy (RA) of the CEMS must be no greater than 10 percent when the average reference method (RM) value is used to calculate RA, 5 percent when the applicable standard (AS) is used to calculate RA, or within 5 ppm -or lb/hr equivalent - (to be used with PS 4A only) when the RA is calculated as the absolute average difference between the RM and CEMS plus the 2.5 percent confidence coefficient.

RELATIVE ACCURACY TEST AUDIT DETERMINATION
EPA CFR 40, PART 60, APPENDIX B, PS 2
ETHOSENERGY
SPA COGEN III TURBINE

NO_X, ppm @ 15% O_2

Run #	Date	Time	RM	CEMS	Difference	n	$t_{0.975}$
~~Run 1~~	~~11/6/18~~	~~0820-0856~~	~~2.1~~	~~2.4~~	~~-0.3~~	1	100.00
~~Run 2~~	~~11/6/18~~	~~0928-0949~~	~~2.2~~	~~2.4~~	~~-0.2~~	2	12.706
~~Run 3~~	~~11/6/18~~	~~1025-1059~~	~~2.0~~	~~2.4~~	~~-0.4~~	3	4.303
Run 4	11/6/18	1109-1130	2.2	2.4	-0.2	4	3.182
Run 5	11/6/18	1147-1208	2.1	2.4	-0.3	5	2.776
Run 6	11/6/18	1219-1240	2.1	2.3	-0.2	6	2.571
Run 7	11/6/18	1247-1308	2.2	2.4	-0.2	7	2.447
Run 8	11/6/18	1315-1336	2.1	2.3	-0.2	8	2.365
Run 9	11/6/18	1345-1406	2.3	2.4	-0.1	9	2.306
Run 10	11/6/18	1414-1435	2.2	2.3	-0.1	10	2.262
Run 11	11/6/18	1442-1503	2.1	2.4	-0.3	11	2.228
Run 12	11/6/18	1511-1532	2.3	2.4	-0.1	12	2.201

AVERAGES:	2.2	2.4	-0.2	***> 50% of limit,***
EMISSION LIMIT:			3.00	***must use RM criteria***
STANDARD DEVIATION:			0.062	
CONFIDENCE COEFFICIENT:			0.048	

Criteria	***Result***
≤20	**10.5**
≤10	**7.7**

RELATIVE ACCURACY (BASED ON REFERENCE METHOD), %:

RELATIVE ACCURACY (BASED ON APPLICABLE STANDARD), %:

Note: The relative accuracy (RA) of the CEMS must be no greater than 20 percent when the reference method (RM) is used in the denominator of Equation 2–6 (the average emissions during the test are greater than 50 percent of the emission standard) or 10 percent when the applicable standard (AS) is used in the denominator of Equation 2–6 (the average emissions during the test are less than 50 percent of the emission standard).

RELATIVE ACCURACY TEST AUDIT DETERMINATION
EPA CFR 40, PART 60, APPENDIX B, PS 2 / 6
ETHOSENERGY
SPA COGEN III TURBINE

NO_X, lb/hr

Run #	Date	Time	RM	CEMS	Difference	n	$t_{0.975}$
~~Run 1~~	~~11/6/18~~	~~0820-0856~~	~~8.94~~	~~10.25~~	~~-1.31~~	1	100.00
~~Run 2~~	~~11/6/18~~	~~0928-0949~~	~~9.49~~	~~10.64~~	~~-1.15~~	2	12.706
~~Run 3~~	~~11/6/18~~	~~1025-1059~~	~~9.37~~	~~11.01~~	~~-1.64~~	3	4.303
Run 4	11/6/18	1109-1130	10.24	11.23	-0.99	4	3.182
Run 5	11/6/18	1147-1208	9.83	11.09	-1.26	5	2.776
Run 6	11/6/18	1219-1240	9.67	10.72	-1.05	6	2.571
Run 7	11/6/18	1247-1308	10.11	11.06	-0.95	7	2.447
Run 8	11/6/18	1315-1336	9.54	10.71	-1.17	8	2.365
Run 9	11/6/18	1345-1406	10.51	10.98	-0.47	9	2.306
Run 10	11/6/18	1414-1435	9.77	10.75	-0.98	10	2.262
Run 11	11/6/18	1442-1503	9.52	10.88	-1.36	11	2.228
Run 12	11/6/18	1511-1532	10.20	11.02	-0.82	12	2.201
AVERAGES:			9.93	10.94	-1.01		
EMISSION LIMIT:					17.76		
STANDARD DEVIATION:					0.262		
CONFIDENCE COEFFICIENT:					0.201		

> 50% of limit, must use RM criteria

Criteria	***Result***
≤20	**12.2**
≤10	**6.8**

RELATIVE ACCURACY (BASED ON REFERENCE METHOD), %:

RELATIVE ACCURACY (BASED ON APPLICABLE STANDARD), %:

Note: Since this unit incorporates the total equipment required for the determining and recording the pollutant mass emission rate (in terms of mass per unit of time), the unit is technically defined as a continuous emissions rate monitoring system (CERMS) and is subject to Performance Specification (PS) 6. The relative accuracy (RA) of the CERMS shall be no greater than 20 percent of the mean value of the reference method (RM) test data in terms of the units of the emission standard, or 10 percent of the applicable standard (AS), whichever is greater.

RELATIVE ACCURACY TEST AUDIT DETERMINATION
EPA CFR 40, PART 75, APPENDIX A
EDR TABLE
ETHOSENERGY
SPA COGEN III TURBINE

NO_X, lb/MMBtu

Run #	Date	Time	RM	CEMS	Difference	n	$t_{0.975}$	MW
~~Run 1~~	~~11/6/18~~	~~0820-0856~~	~~0.008~~	~~0.009~~	~~-0.001~~	1	100.00	99.4
~~Run 2~~	~~11/6/18~~	~~0928-0949~~	~~0.008~~	~~0.009~~	~~-0.001~~	2	12.706	101.7
~~Run 3~~	~~11/6/18~~	~~1025-1059~~	~~0.007~~	~~0.009~~	~~-0.002~~	3	4.303	178
Run 4	11/6/18	1109-1130	0.008	0.009	-0.001	4	3.182	177
Run 5	11/6/18	1147-1208	0.008	0.009	-0.001	5	2.776	177
Run 6	11/6/18	1219-1240	0.008	0.009	-0.001	6	2.571	176
Run 7	11/6/18	1247-1308	0.008	0.009	-0.001	7	2.447	176
Run 8	11/6/18	1315-1336	0.008	0.009	-0.001	8	2.365	176
Run 9	11/6/18	1345-1406	0.008	0.009	-0.001	9	2.306	175
Run 10	11/6/18	1414-1435	0.008	0.009	-0.001	10	2.262	175
Run 11	11/6/18	1442-1503	0.008	0.009	-0.001	11	2.228	175
Run 12	11/6/18	1511-1532	0.008	0.009	-0.001	12	2.201	175
AVERAGES:			0.008	0.009	-0.001			175.8
EMISSION LIMIT:					N/A			

> 50% of limit, you may choose either the RM or the difference

BIAS ADJUSTMENT FACTOR:	**1.000**
STANDARD DEVIATION:	0.000
CONFIDENCE COEFFICIENT:	0.000
RELATIVE ACCURACY (BASED ON REFERENCE METHOD), %:	
RELATIVE ACCURACY (BASED ON lb/MMBtu DIFFERENCE), %:	
UNIT LOAD, MW:	

Criteria	***Result***
≤10	**12.5**
0.020	**0.001**
N/A	**175.8**

Note: The relative accuracy (RA) of the CEMS must be no greater than 20 percent when the reference method (RM) is used in the denominator of Equation 2–6 (the average emissions during the test are greater than 50 percent of the emission standard) or 10 percent when the applicable standard (AS) is used in the denominator of Equation 2–6 (the average emissions during the test are less than 50 percent of the emission standard).

Appendix A.4
Example Calculations

EXAMPLE CALCULATIONS
AMMONIA BY ION SELECTIVE ELECTRODE

Project name: Ethosenergy **Project number:** 218872

Computed by: Katie Resch **Calculation date:** 12/3/18

Run number: 1-NH3 **Gaseous species:** NH3

EMISSIONS DATA

Reference temperature, °R	528	T_{ref} = (°F plus 460)
Sample volume – total, ml	343.3	S_v
Sample concentration – measured, ppm	0.5	C_m
Standard Sample Volume, dscf	29.243	V_{mstd}
Dry stack gas flow rate at standard conditions, dscfm	619.004	Q_{ds}
Stack O_2, % volume dry	14.81	O_2
Molecular weight of gaseous species, lb/lb mole 17.03 for NH_3	17.03	MW_s where,
Specific molar volume of an ideal gas at standard conditions, ft^3/lb mole	385.3	SV where,

SV = 379.5 ft^3/lb mole for T_{ref} at 520 °R (60 °F)

SV = 385.3 ft^3/lb mole for T_{ref} at 528 °R (68 °F)

SV = 386.8 ft^3/lb mole for T_{ref} at 530 °R (70 °F)

$$SV = (379.5)\left[\frac{((T_{ref}\ ^\circ R))}{520}\right]$$ at different reference temperatures

Note: The results calculated in the pages that follow may differ slightly from the results presented in the final report. This difference can be attributed to "significant digit round-off errors" common when comparing computer spreadsheets results with those derived from using a calculator.

1. NH3 ION SELECTIVE ELECTRODE

a. Concentration, ppm

$$C = \frac{(0.049 \times S_v \times C_m)}{V_{mstd} \times \frac{520}{T_{ref}}}$$

$$C = \frac{(0.049 \times 34331 \times 0.5)}{29.243 \times \frac{520}{528}}$$

$C =$ 0.29 ppm

2. GASEOUS EMISSIONS

a. Concentration, ppm @ 15% O_2 dry

$$C_3 = (C)\left[\frac{(20.9 - 15.0)}{(20.9 - \%\ O_2)}\right]$$

$$C_3 = (0.29)\left[\frac{(20.9 - 15.0)}{(20.9 - 14.81)}\right]$$

$C_3 =$ 0.28 ppm @ 15% O_2

EXAMPLE CALCULATIONS
RELATIVE ACCURACY CALCULATIONS

Project name: EthosEnergy **Project number:** 218872

Computed by: Katie Resch **Calculation date:** 12/3/18

Analyzer, Units: CO lb/hr **Equipment Unit:** SPA Cogen III

EMISSIONS DATA

RATA Results

Run #	RM	CEMS	Diff., d
~~Run 1~~	~~0.33~~	~~0.00~~	~~0.33~~
~~Run 2~~	~~0.25~~	~~0.00~~	~~0.25~~
Run 3	1.01	0.64	0.37
Run 4	1.10	0.61	0.49
~~Run 5~~	~~1.13~~	~~0.59~~	~~0.54~~
Run 6	1.01	0.58	0.43
Run 7	1.03	0.57	0.46
Run 8	1.01	0.56	0.45
Run 9	1.07	0.55	0.52
Run 10	1.04	0.55	0.49
Run 11	0.97	0.54	0.43
Run 12	0.95	0.54	0.41

Number of runs, *n* 9 *n*

t-value associated with n, $t_{0.975}$ 2.306 $t_{0.975}$

Adapted from Figure 2-1 of 40 CFR 60 Appendix B, Performance Specification 2:

n	2	3	4	5	6	7	8	9	10	11	12	13
$t_{0.075}$	12.706	4.303	3.182	2.776	2.571	2.447	2.365	2.306	2.262	2.228	2.201	2.179

Note: The results calculated in the pages that follow may differ slightly from the results presented in the final report. This difference can be attributed to "significant digit round-off errors" common when comparing computer spreadsheets results with those derived from using a calculator.

6. RELATIVE ACCURACY TEST AUDIT CALCULATIONS

a. Arithmetic Mean of Differences, $\bar{d}$

$$\bar{d} = \frac{1}{n}\sum_{i-1}^{n} d_i$$

$$\bar{d} = \frac{1}{9} \times (4.05)$$

$$\bar{d} = 0.45$$

b. Standard Deviation, S_d

$$S_d = \left[\frac{\sum_{i-1}^{n} d_i^2 - \left(\frac{\left(\sum_{i-1}^{n} d_i \right)^2}{n} \right)}{n-1} \right]^{1/2}$$

$$S_d = \left[\frac{1.84 - \frac{1}{9}(4.05)^2}{9-1} \right]^{1/2}$$

$$S_d = 0.046$$

c. 2.5 % Error Confidence Coefficient (one-tailed), CC

$$CC = t_{0.975}\left(\frac{S_d}{\sqrt{n}}\right)$$

$$CC = 2.306\left(\frac{0.046}{\sqrt{9}}\right)$$

$$CC = 0.035$$

d. Relative Accuracy (based on applicable standard), RA

$$RA = \frac{\left(|\bar{d}| + |CC|\right)}{AS} \times 100$$

$$RA = \frac{\left(|0.45| + |0.035|\right)}{10.81} \times 100$$

$$RA = 4.49$$

e. Relative Accuracy (based on reference method data), RA

$$RA = \frac{\left(|\bar{d}| + |CC|\right)}{\overline{RM}} \times 100$$

$$RA = \frac{\left(|0.45| + |0.035|\right)}{1.02} \times 100$$

$$RA = 47.5$$

Where,

AS = **Applicable standard**

$\overline{RM}$ = **Arithmetic mean of reference method data**

EXAMPLE CALCULATIONS
GASEOUS EMISSIONS

Project name: Ethos Energy **Project number:** 218872

Computed by: Katie Resch **Calculation date:** 12/3/18

Run number: 2-Comp **Gaseous species:** NOx

EMISSIONS DATA

Reference temperature, °R	528	T_{ref} = (°F plus 460)
Concentration of gaseous species, ppmvd	2.24	C
Dry stack gas flow rate at standard conditions, dscfm	616825	Q_{ds}
Stack O_2, % volume dry	14.8	O_2
"F" factor of fuel based on O_2, dscf/MMBtu @ 0% O_2	8644	F_d
Molecular weight of gaseous species, lb/lb mole	46.01	MW_s where,

MW_s = 28.01 for CO 46.01 for NO_X as NO_2 64.06 for SO_X as SO_2

Specific molar volume of an ideal gas at standard conditions, ft^3/lb mole: 385.3 *SV* where,

SV = 379.5 ft^3/*lb mole for* T_{ref} at 520 °*R* (60 °F)

SV = 385.3 ft^3/*lb mole for* T_{ref} at 528 °*R* (68 °F)

SV = 386.8 ft^3/*lb mole for* T_{ref} at530 °*R* (70 °F)

$$SV = (379.5)\left[\frac{((T_{ref}\ ^\circ R))}{520}\right]$$ at different reference temperatures

Note: The results calculated in the pages that follow may differ slightly from the results presented in the final report. This difference can be attributed to "significant digit round-off errors" common when comparing computer spreadsheets results with those derived from using a calculator.

1. GASEOUS EMISSIONS

a. Concentration, ppm @ 15% O_2 dry

$$C_3 = (C)\left[\frac{(20.9 - 15.0)}{(20.9 - \%\ O_2)}\right]$$

$$C_3 = (2.24)\left[\frac{(20.9 - 15.0)}{(20.9 - 14.8)}\right]$$

$C_3 =$ 2.17 ppm @ 15% O_2

b. Mass emissions, lb/hr

$$M = (C)\,(10^{-6})\left(\frac{MW_s}{SV}\right)(Q_{ds})(60\ min/hr)$$

$$M = (2.24)\,(10^{-6})\left(\frac{46.01}{385.3}\right)(616825)(60)$$

$M =$ 9.9 lb/hr

c. Emission rate, lb/MMBtu

$$E = (C)\,(10^{-6})\left(\frac{MW_s}{SV}\right)(F_d)\left(\frac{20.9}{20.9 - \%\ O_2}\right)$$

$$E = (2.24)\,(10^{-6})\left(\frac{46.01}{385.3}\right)(8644)\left(\frac{20.9}{20.9 - 14.8}\right)$$

$E =$ 0.0079 lb/MMBtu

Appendix A.5
General Emissions Calculations

EMISSION CALCULATIONS

1. Volumetric Flow and Isokinetics

   a. Standard sample gas volume, dscf

   $$V_{m\,std} = (V_m)(Y)\frac{(T_{std} + 460)\left(P_{bar} + \frac{\Delta H}{13.6}\right)}{(T_m + 460)(P_{std})}$$

   b. Water vapor volume, scf

   $$V_{w\,std} = (0.04715)(V_{lc})\left(\frac{T_{std} + 460}{528}\right)$$

   c. Moisture content, non-dimensional

   $$B_{ws} = \frac{V_{w\,std}}{(V_{m\,std} + V_{w\,std})}$$

   d. Stack gas molecular weight, lb/lb mole (dry)

   $$MW_{dry} = [0.44(\%CO_2)] + [0.32(\%O_2)] + [0.28(\%N_2)]$$

   e. Stack gas molecular weight, lb/lb mole (wet)

   $$MW_{wet} = \left[MW_{dry}(1 - B_{ws})\right] + [18(B_{ws})]$$

   f. Absolute stack pressure, in Hg

   $$P_s = P_{bar} + \left(\frac{P_{sg}}{13.6}\right)$$

   g. Stack velocity, ft/sec

   $$v_s = (85.49)\left(C_p\right)\left(\sqrt{\Delta P}\right)\sqrt{\frac{T_s}{(P_s)(MW_{wet})}}$$

   h. Actual stack flow rate, acfm

   $$Q = (v_s)(A_s)(60\ min/hr)$$

   i. Standard stack gas flow rate, wscfm

   $$Q_{ws} = (v_s)(A_s)(60\ min/hr)\left(\frac{T_{std} + 460}{T_s + 460}\right)\left(\frac{P_s}{P_{std}}\right)$$

   j. Standard stack gas flow rate, dscfm

   $$Q_{ds} = (v_s)(A_s)(60\ min/hr)(1 - B_{ws})\left(\frac{T_{std} + 460}{T_s + 460}\right)\left(\frac{P_s}{P_{std}}\right)$$

   k. Percent isokinetic

   $$I = \frac{(T_s)(V_{m\,std})(P_{std})(100)}{(T_{std} + 460)(v_s)(\theta)(A_n)(P_s)(60)(1 - B_{ws})}$$

2. Gaseous Emissions

a. Concentration, ppm volume wet (i.e. to calculate wet ppm from dry ppm)

$$C_w = (C)(1 - B_{ws})$$

b. Concentration, ppm @ 3% O_2 dry

$$C_3 = (C)\left[\frac{(20.9 - 3.0)}{(20.9 - \%\ O_2)}\right]$$

c. Concentration, ppm @ 12% CO_2 dry

$$C_{12} = (C)\left(\frac{12.0}{\%\ CO_2}\right)$$

d. Concentration, ppm volume dry (i.e. to calculate dry ppm from wet ppm)

$$C = \left[\frac{C_w}{(1 - B_{ws})}\right]$$

e. Mass emission rate, lb/hr

$$M = (C)(CF)(Q_{ds})(60\ min/hr)$$

where,

CF = conversion factor from ppm to lb/scf:

$$CF_{NOx} = 1.194 \times 10^{-7}\left(\frac{lb/scf}{ppm}\right)$$

$$CF_{SO2} = 1.660 \times 10^{-7}\left(\frac{lb/scf}{ppm}\right)$$

$CF_X = CF_{NOX}\left(\frac{MW_X}{MW_{NOX}}\right)$ for other compounds (x)

f. Emission rate, lb/MMBtu

$$E = (C)(CF)(F_d)\left(\frac{20.9}{20.9 - \%\ O_2}\right)$$

g. Mass emission rate, grams/bhp-hr

$$M_j = (M)\left(\frac{453.59\ g/lb}{J}\right)$$

3. Particulate Emissions

   a. Grain loading, gr/dscf

   $$G = (0.0154)\left(\frac{G_m}{V_{m\,std}}\right)$$

   b. Grain loading corrected to 12% CO_2, gr/dscf @ 12% CO_2

   $$G_{12} = (G)\left(\frac{12.0}{\%\ CO_2}\right)$$

   c. Mass emission rate, lb/hr

   $$M = (G)(Q_{ds})\left(\frac{60\ min/hr}{7{,}000\ gr/lb}\right)$$

   d. Emission rate, lb/MMBtu

   $$E = (G)\left(\frac{1\ lb}{7{,}000\ gr}\right)(F_d)\left(\frac{20.9}{20.9 - \%\ O_2}\right)$$

4. Fuel Factor "F"

   a. Choice #1 – use the values for F_d provided in Method 19, Table 19-1
   Choice #2 – if you have fuel ultimate and proximate analysis, calculate F_d (need fuel weight %CHONS, HHV)
   Stoichiometric fuel factor at 68 °F, dscf/MMBtu at 0% O_2:

   $$F_d = \frac{(10^6)[3.64(\%\ H) + 1.53(\%\ C) + 0.14(\%\ N) + 0.57(\%\ S) - 0.46(\%\ O)]}{HHV, Btu/lb}$$

   b. Fuel factor at 60 °F (use if all your volumes and flows are at 60 °F)

   $$F_{d\,60} = F_d\left(\frac{520°R}{528°R}\right)$$

5. Miscellaneous Equations

a. Standard stack gas flow rate, calculated from fuel flow and F factor, dscfm

Note: Q_f and HHV need to be in units of either lb/hr and Btu/lb, or scf/hr and Btu/scf. *Do not mix units!*

(calculation based on stack $\%O_2$)

$$Q_{ds} = (Q_f)(HHV)(10^{-6})(F_d)\left(\frac{20.9}{20.9 - \%\ O_2}\right)/(60\ min/hr)$$

or (calculation based on stack $\%CO_2$ – see EPA Method 19 for values of F_c)

$$Q_{ds} = (Q_f)(HHV)(10^{-6})(F_c)\left(\frac{100}{\%\ CO_2}\right)/(60\ min/hr)$$

b. Destruction efficiency of emission control device, %

$EFF = \left(\frac{C_{in} - C_{out}}{C_{in}}\right)(100\%)$ based on concentrations

or

$EFF = \left(\frac{M_{in} - M_{out}}{M_{in}}\right)(100\%)$ based on mass emission rates

c. Cylinder gas audit, % accuracy

$$A_c = \left(\frac{C_m - C_a}{C_a}\right)(100\%)$$

Nomenclature:

A_c	=	accuracy of CEMS during cylinder gas audit (CGA), % difference
A_n	=	nozzle area, in^2 (πr^2), where π = 3.1416 and r = radius (½ diameter) in inches
A_s	=	stack area, ft^2 (πr^2), where π = 3.1416 and r = radius (½ diameter) in feet
B_{ws}	=	flue gas moisture content (multiply by 100 for % by volume)
C	=	concentration of gaseous species, ppm volume dry
C_a	=	concentration of audit gas, ppm (for CGA, equation 5c)
C_m	=	concentration measured by CEMS, ppm (for CGA, equation 5c)
C_p	=	calibration factor for pitot tube, dimensionless
C_w	=	concentration of gaseous species, ppm volume wet
C_3	=	corrected concentration of gaseous species, ppm @ 3% O_2 dry
C_{12}	=	corrected concentration of gaseous species, ppm @ 12% CO_2 dry
E	=	mass emission rate, lb/MMBtu
EFF	=	destruction or removal efficiency of emission control device, % efficiency
F_c	=	stoichiometric “F” factor of fuel based on CO_2, dscf/MMBtu @ 100% CO_2
F_d	=	stoichiometric “F” factor of fuel based on O_2, dscf/MMBtu @ 0% O_2
G	=	particulate matter grain loading, grains/dscf
G_{12}	=	corrected particulate matter grain loading, grains/dscf @ 12% CO_2
G_m	=	mass of collected particulate matter, mg
HHV	=	higher heating value, Btu/cubic foot
I	=	% isokinetic sampling rate, %
J	=	brake horsepower, bhp
M_j	=	mass emission rate of measured species (s), g/hp-hr
M	=	mass emission rate, lb/hr
MW_{dry}	=	molecular weight of stack gas, dry basis
MW_{wet}	=	molecular weight of stack gas, wet basis
MW_s	=	molecular weight of gaseous species (s), lb/lb mole:

CO:	28.01	(can use 28)	NO_x as NO_2:	46.01	(can use 46)
SO_x as SO_2:	64.06	(can use 64)	Hydrocarbons as C:	12.01	(can use 12)
Hydrocarbons as CH_4:	16.04	(can use 16)	Hydrocarbons as C_3H_8:	44.10	(can use 44)
NH_3:	17.03	(can use 17)			

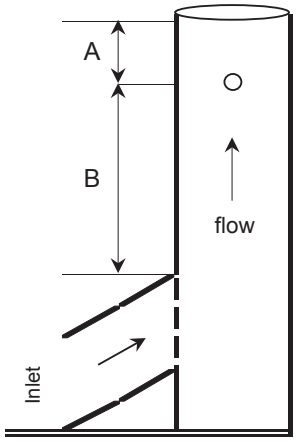
N_2	=	nitrogen content of stack gas, % volume dry
P_{bar}	=	barometric pressure, in. Hg
P_s	=	stack absolute pressure, in. Hg
P_{sg}	=	stack static pressure, inches of water, gauge (iwg)
Q	=	wet stack gas flow rate at actual conditions, acfm
Q_f	=	fuel flow rate, scfh or lb/hr (be careful of units)
Q_{ds}	=	dry stack gas flow rate at standard conditions, dscfm
Q_{ws}	=	wet stack gas flow rate at standard conditions, wscfm
SV	=	specific molar volume of an ideal gas at standard conditions, ft^3/lb mole
T_m	=	meter temperature, °R
T_{std}	=	reference temperature, °R
T_s	=	stack gas temperature, °R
v_s	=	stack gas velocity, ft/sec
V_{lc}	=	volume of liquid collected in impingers, ml
V_m	=	dry meter volume uncorrected, acf
$V_{m\ std}$	=	dry meter volume corrected to standard conditions, dscf
$V_{w\ std}$	=	volume of water vapor at standard conditions, scf
Y	=	meter calibration coefficient, dimensionless
ΔH	=	average pressure differential across meter, inches water
ΔP	=	average velocity head of stack gas, inches water
Θ	=	sampling time, minutes

APPENDIX B
FIELD AND COMPUTER-GENERATED DATA

Appendix B.1
Sampling Locations

SPA Cogeneration III
TRAVERSE POINT LAYOUT (PARTICULATE)
CIRCULAR STACKS OVER 24 INCHES

Stack diameter:	**204.0**	***inches***
Upstream diameter (A):	**102.0**	***inches***
Downstream diameter (B):	**408.0**	***inches***
Port length:	**12.50**	***inches***
Number of ports being used:	**2**	***see note***
Equivalent upstream diameter (A):	**0.500**	***Pass***
Equivalent downstream diameter (B):	**2.000**	***Pass***
All points at least 1.0" from stack wall:	**4.284**	***Pass***
Total points:	**24**	
Points per port:	**12**	

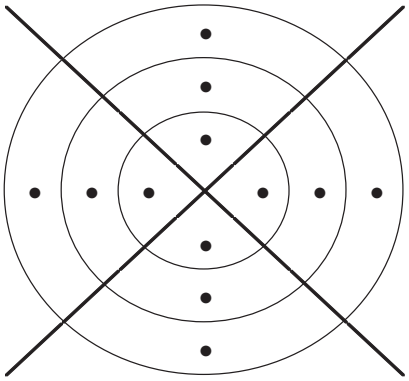


Typical vertical exhaust stack

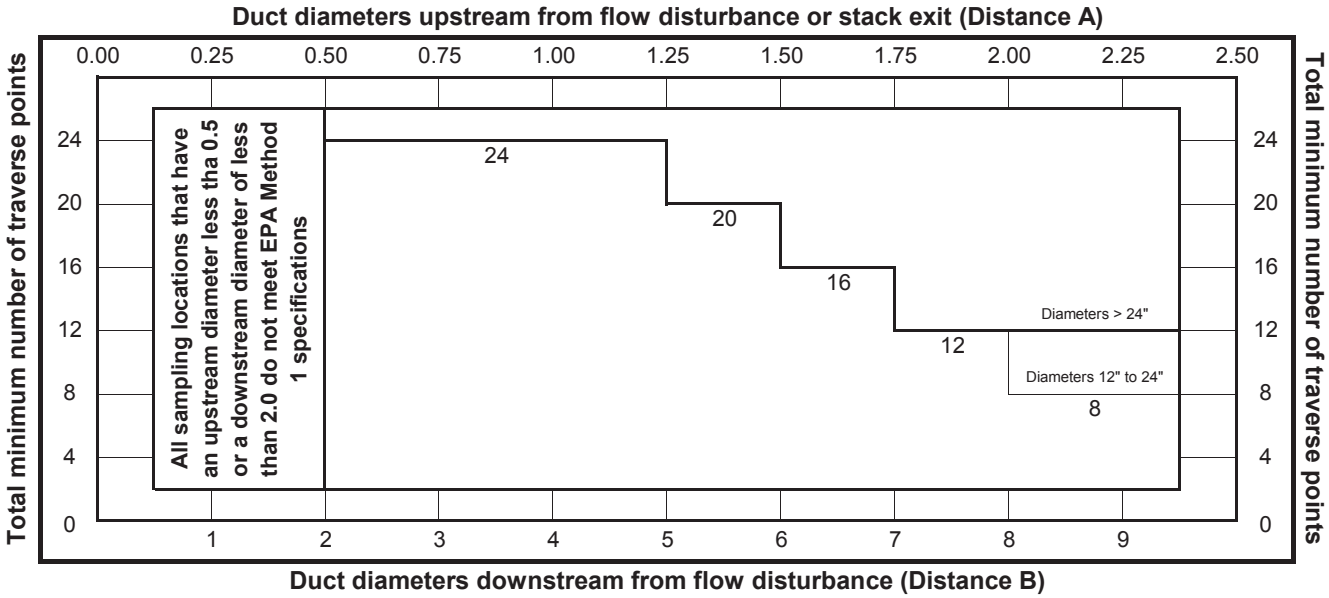
Point	% Diameter	Inside wall Distance (in)	Outside port Distance (in)
1	2.1	4.3	16.8
2	6.7	13.7	26.2
3	11.8	24.1	36.6
4	17.7	36.1	48.6
5	25.0	51.0	63.5
6	35.6	72.6	85.1
7	64.4	131.4	143.9
8	75.0	153.0	165.5
9	82.3	167.9	180.4
10	88.2	179.9	192.4
11	93.3	190.3	202.8
12	97.9	199.7	212.2

Note: No traverse point shall be within 1.0" of the stack walls (see Sections 11.3.1)

DUCT AREA = 226.980 ft^2



Example: Location of 12 points



Appendix B.2
Ammonia Slip Data Sheets

MONTROSE AIR QUALITY SERVICES

SAMPLE TRAIN DATA

Project Information

Client / Facility: Ethos SPA COGEN III — Page 1 of 1

Source / Location: turbine — Method ST-1B

Run no. KS 1 3 - NH3 — Date 11/6/18 — Operator / Assistant KS — Project No. 005AS-218872

Equipment Identification

Meter console ID	CS-03
Stack TC ID	
Probe/pitot ID	
Nozzle ID	
Imp. outlet TC ID	GSW-19
Filter TC ID	
Micromanometer ID	
Sensitivity, in. H_2O	0.01

Calibration

Meter Yd	1.025
Meter ΔH@0.75cfm	1.775
Pitot tube Cp	
Nozzle diameter, in.	

ALT-011 TC Check (see bottom of page)

Std. TC ID	SEE RUN
Std. TC temp., °F	
Continuity Check	☐

Test / Sampling Parameters

Run duration, min.	40
No. of traverse pts.	4
No. of ports	1
Points per port	4
Time per point, min.	10
Probe/filter range, °F	
Imp. outlet max., °F	68
K Factor: ΔH =	1.7 ~~x ΔP or dwell time =~~ x √ΔP

Ambient / Stack Gas Conditions

Baro. press., in. Hg	29.94
Ambient temp., °F	
Static (P_g), in. H_2O	
O_2 conc., % dry vol.	
CO_2 conc., % dry vol.	
Wet bulb temp., °F	

Equipment Checks

	Pre	Post
Meter: cfm @ in. Hg	0.004 @ 14	0.002 @ 6
Pitot (+): in. H_2O @ in. H_2O	@	@
Pitot (-): in. H_2O @ in. H_2O	@	@
Pitot visual:	~~aligned / damaged~~	~~aligned / damaged~~
Nozzle visual:	intact / damaged	intact / damaged
Other:		

Impingers	Initial, g	Final, g	Difference
0.1 N HCl	659.0	695.5	36.5
0.1 N HCl	655.5	657.9	2.4
MT	558.5	560.1	1.6
SG	846.5	853.4	6.9
Tared Line Rinse			
Total impinger weight gain, g			47.4

Filter ID

Traverse pt. number	Sample or dwell time (Δt), min.	Clock time (24 hr)	Meter Reading (Vm), cf	ΔP in. H_2O	ΔH in. H_2O	Stack temp. °F	Probe temp. °F	Filter temp. °F	Imp. outlet °F	Meter temp., °F inlet	Meter temp., °F outlet		Vaccum in. Hg
4	10	1109	754.128		1.6				55		75		5.0
3		1119	761.30		↓				48		80		5.0
2		1129	768.42						54		78		5.0
1		1139	775.64						57		79		5.0
End	↓	1149	783.051										
							Averages		53.5		78		

ALT-011

Comments:

MONTROSE AIR QUALITY SERVICES

SAMPLE TRAIN DATA

Project Information

Client / Facility: Etnas SPA Cogen III — Page: 1 of 1
Source / Location: Turbine — Method: ST-1B
Run no.: 2-NH3 — Date: 11/6/18 — Operator / Assistant: KS — Project No.:

Equipment Identification

Meter console ID: CB-03
Stack TC ID:
Probe/pitot ID:
Nozzle ID:
Imp. outlet TC ID: CSV-19
Filter TC ID:
Micromanometer ID:
Sensitivity, in. H_2O: 0.01

Test / Sampling Parameters

Run duration, min.: 40
No. of traverse pts.: 4
No. of ports: 1
Points per port: 4
Time per point, min.: 10
Probe/filter range, °F: —
Imp. outlet max., °F: 68
K Factor: ΔH = 1.8 ~~x ΔP or dwell time =~~ ~~x √ΔP~~

Calibration

Meter Yd: 1.025
Meter ΔH@0.75cfm: 1.775
Pitot tube Cp:
Nozzle diameter, in.:

ALT-011 TC Check (see bottom of page)

Std. TC ID: SEE PLAN
Std. TC temp., °F:
Continuity Check: ☐

Ambient / Stack Gas Conditions

Baro. press., in. Hg: 29.94
Ambient temp., °F:
Static (P_g), in. H_2O:
O_2 conc., % dry vol.:
CO_2 conc., % dry vol.:
Wet bulb temp., °F:

Equipment Checks

	Pre	Post
Meter: cfm @ in. Hg	0.006 @ 15	0.002 @ 5
Pitot (+): in. H_2O @ in. H_2O	@	@
Pitot (-): in. H_2O @ in. H_2O	@	@
Pitot visual:	aligned / ~~damaged~~	aligned / damaged
Nozzle visual:	intact / ~~damaged~~	intact / damaged
Other:		

Impingers	Initial, g	Final, g	Difference
0.1 N HCl	648.8	689.8	41.0
0.1 N HCl	668.0	670.6	2.6
MT	553.0	553.5	0.5
SG	805.2	811.7	6.5
Tared Line Rinse			
Total impinger weight gain, g			50.6

Filter ID:

Traverse pt. number	Sample or dwell time (Δt), min.	Clock time (24 hr)	Meter Reading (Vm), cf	ΔP in. H_2O	ΔH in. H_2O	Stack temp. °F	Probe temp. °F	Filter temp. °F	Imp. outlet °F	Meter temp., °F inlet	Meter temp., °F outlet		Vaccum in. Hg
4	10	1214	783.250		1.8				54		84		4.5
3	↓	1224	790.60		↓				50		83		4.5
2		1234	797.87						53		85		4.5
1		1244	805.37						55		87		4.5
End	—	1254	812.859										
							Averages		54.25		84.75		

ALT-011

Comments:

MONTROSE AIR QUALITY SERVICES

SAMPLE TRAIN DATA

Project Information

Client / Facility	Ethos SPA COGEN III	Page	1 of 1
Source / Location	Turbine	Method	BAAQMD ST-1B
Run no.	3 -NH3	Date	11/06/18
Operator / Assistant	KS/MK	Project No.	005AS-218872

Equipment Identification

Meter console ID	CB-03
Stack TC ID	X
Probe/pitot ID	X
Nozzle ID	X
Imp. outlet TC ID	GSN-19
Filter TC ID	X
Micromanometer ID	X
Sensitivity, in. H_2O	0.01

Test / Sampling Parameters

Run duration, min.	40
No. of traverse pts.	4
No. of ports	1
Points per port	4
Time per point, min.	10
Probe/filter range, °F	X
Imp. outlet max., °F	68
K Factor: ΔH =	1.8 ~~x ΔP or dwell time =~~ ~~x √ΔP~~

Calibration

Meter Yd	1.025
Meter ΔH@0.75cfm	1.775
Pitot tube Cp	X
Nozzle diameter, in.	X

ALT-011 TC Check (see bottom of page)

Std. TC ID	NBS #5
Std. TC temp., °F	72.0
Continuity Check	(+) or -

Ambient / Stack Gas Conditions

Baro. press., in. Hg	29.94
Ambient temp., °F	-
Static (P_g), in. H_2O	X
O_2 conc., % dry vol.	-
CO_2 conc., % dry vol.	-
Wet bulb temp., °F	X

Equipment Checks

	Pre	Post
Meter: cfm @ in. Hg	0.008 @ 13	0.008 @ 7
Pitot (+): in. H_2O @ in. H_2O	@	@
Pitot (-): in. H_2O @ in. H_2O	@	@
Pitot visual:	~~aligned / damaged~~	~~aligned / damaged~~
Nozzle visual:	~~intact / damaged~~	~~intact / damaged~~
Other:		

Impingers	Initial, g	Final, g	Difference
0.1 N HCl	644.1	682.2	38.1
0.1 N HCl	651.6	655.9	4.3
EMPTY	552.2	554.0	1.8
SILICA GEL	820.1	827.7	7.6
Tared Line Rinse			
Total impinger weight gain, g			51.8
Filter ID			

Traverse pt. number	Sample or dwell time (Δt), min.	Clock time (24 hr)	Meter Reading (Vm), cf	ΔP in. H_2O	ΔH in. H_2O	Stack temp. °F	Probe temp. °F	Filter temp. °F	Imp. outlet °F	Meter temp., °F inlet	Meter temp., °F outlet		Vacuum in. Hg
4	10	1315	812.942		1.8				67		88		4.5
3	↓	1325	820.11		↓				58		88		4.5
2		1335	827.46						55		89		4.5
1		1345	834.87						59		90		4.5
End	↓	1355	843.080		↓								
ALT-011				-	-	-			13.5	-	89		
									12.0		87.3		

Comments: Std.

MONTROSE AIR QUALITY SERVICES

SAMPLE TRAIN DATA

Project Information

Client / Facility: Ethos SPA COGEN III — Page: 1 of 1
Source / Location: (NW) turbine — Method: ST-1B
Run no.: 4 for NH3-DB — Date: 11/06/18 — Operator / Assistant: KS — Project No.: 218872

Equipment Identification

Meter console ID	CB-03
Stack TC ID	
Probe/pitot ID	
Nozzle ID	
Imp. outlet TC ID	GSW-10
Filter TC ID	
Micromanometer ID	
Sensitivity, in. H_2O	0.01

Calibration

Meter Yd	1.025
Meter ΔH@0.75cfm	1.775
Pitot tube Cp	
Nozzle diameter, in.	

ALT-011 TC Check (see bottom of page)

Std. TC ID	
Std. TC temp., °F	
Continuity Check	☐

Test / Sampling Parameters

Run duration, min.	40
No. of traverse pts.	4
No. of ports	1
Points per port	4
Time per point, min.	10
Probe/filter range, °F	X
Imp. outlet max., °F	68
K Factor: ΔH =	1.8 x ~~ΔP or dwell time~~ = ~~x √ΔP~~

Ambient / Stack Gas Conditions

Baro. press., in. Hg	29.94
Ambient temp., °F	
Static (P_g), in. H_2O	
O_2 conc., % dry vol.	
CO_2 conc., % dry vol.	
Wet bulb temp., °F	

Equipment Checks

	Pre	Post
Meter: cfm @ in. Hg	0.008 @ 13	@
Pitot (+): in. H_2O @ in. H_2O	@	@
Pitot (-): in. H_2O @ in. H_2O	@	@
Pitot visual:	~~aligned / damaged~~	~~aligned / damaged~~
Nozzle visual:	~~intact / damaged~~	~~intact / damaged~~
Other:		

Impingers	Initial, g	Final, g	Difference
0.1 N HCl	644.1	656.3	
0.1 N HCl	651.3	653.1	
MT	552.0	552.2	
SG	817	820.1	
Tared Line Rinse			
Total impinger weight gain, g			

Filter ID

Traverse pt. number	Sample or dwell time (Δt), min.	Clock time (24 hr)	Meter Reading (Vm), cf	ΔP in. H_2O	ΔH in. H_2O	Stack temp. °F	Probe temp. °F	Filter temp. °F	Imp. outlet °F	Meter temp., °F inlet	Meter temp., °F outlet		Vaccum in. Hg
4	10	0928	742.554		1.8				64		81		4.0
3	↓	0938	744.79		↓				53		80		4.0
2		0948											
1		0958											
End		1008											

ALT-011

Comments: * Pause at 944 754.008 DUCT BURNERS OFF - ABORTED

MONTROSE AIR QUALITY SERVICES

SAMPLE RECOVERY DATA

Project Information

Client / Facility: ETHOS SPA COGEN III — Page: 1 of 1
Source / Location: Turbine — Method: ST 1B
Pollutant(s): NH3 — Date: 11/6/18 — Operator / Assistant: NA, MK, KS — Project No.: 218872

Ambient Conditions (Mobile Lab)

Relative humidity, %:
Temperature, °F:
Mobile lab no.: Tx

Balance Audit

Standard set ID: W-3 — Field balance ID: B-AB-OAK

Standard mass, g	500.0	500.0	500.0
Field balance mass, g	499.9	500.0	500.1

Field balance must be within 0.5g of standard weight mass

Sampling Equipment Materials

Nozzle type	quartz	glass	steel	titanium	inconel
Nozzle 1 diameters	D_1	D_2	D_3		average
Nozzle 2 diameters	D_1	D_2	D_3		average
Nozzle 3 diameters	D_1	D_2	D_3		average
Probe type	heated	non-heated	air-cooled	water-cooled	
Probe liner	quartz	glass	✓ steel	Teflon®	

Front-half filter	yes	✓ no			
Size, mm	47	90	110	125	
Filter media	glass fiber	quartz fiber	Teflon®		
Support	steel	glass frit	Teflon® frit		
Gasket	Viton®	silicone	other		

Back-half filter	yes	✓ no		
Tared	yes	no		
Filter media	quartz fiber	glass fiber	Teflon®	

Recovery Procedure

Purge required: ✓ no ___ yes — gas type: ___ — purge cyl. ID: ___ — flow rate, lpm: ___
Purge start/stop times: Run 1 ___ Run 2 ___ Run 3 ___
202 CPM filter temp., °F: ___
Container levels marked: ✓ yes — Sample labels complete: ✓ yes
Blanks/spikes required: ___ reagent blanks ✓ field blank ___ spike ___ other ___

Sample Observations

	Run 1	Run 2	Run 3	Run ___
Front-half filter appearance	X	X	X	
Condensate appearance	Clear	Clear	Clear	
Back-half filter appearance				
Condensate pH				
Trap appearance				

Reagent Use and Quality

Water	Type I	✓ Type II (DI)	Other	Lot ID	DI 15
Acetone	Grade	Notes		Lot ID	
Hexane	Grade	Notes		Lot ID	
0.1 N HCl	Grade	Notes		Lot ID	DI 15 / R325
	Grade	Notes		Lot ID	
	Grade	Notes		Lot ID	
	Grade	Notes		Lot ID	

Glassware Preparation

Impinger Cleaning Procedure:
✓ Detergent and water ___ Acetone rinse ___ Hexane rinse
___ Acid soak and DI rinse ___ Triple solvent rinses (for PAH, PCDD/DF)
✓ Other 0.1 N HCl Rinse x3

If this information is not accurate for all runs, note all exceptions:

Appendix B.3
Reference Method Data

MAQDAQ 1.0			
Project Name: Ethos SPA COGEN	Project Number: 005AS-218872	CEMS Operator: N. Ohlendorf	Unit/Condition: Turbine
Run Length: 24	Record Interval: 6	Average Interval: 60	Triplicate Sampling: False
Traverse: True	Ports: 4	Points per port: 3	DAQ Device: DT9803(00)

Initial bias

	Name:	O2	CO2	CO	NOx				
	Make/Model:								
	25A or 7E:	7E	7E	7E	7E				

Cylinder Concentrations									
	Zero:	0.000	0.000	0.000	0.000				
	Low:								
	Mid:	11.53	3.991	4.654	2.380				
	High:	20.98	8.323	9.562	4.737				

Calibration Readings									
	Zero reading:	0.057	0.017	0.028	0.002				
	Low reading:	0.000	0.000	0.000	0.000				
	Mid reading:	11.53	4.057	4.771	2.353				
	High reading:	21.04	8.328	9.510	4.756				

EPA Method 7E Error Calculations									
Zero %Err:	**<2.0**	0.272	0.204	0.293	0.042				
Mid %Err:	**<2.0**	0.000	0.793	1.224	-0.570				
High %Err:	**<2.0**	0.286	0.060	-0.544	0.401				

Initial Bias Data									
	Zero reading:	0.018	0.047	0.067	0.002				
	Span reading:	11.45	4.036	4.790	2.329				
Zero % bias:	**<5.0**	-0.186	0.360	0.408	0.000				
Span % bias:	**<5.0**	-0.381	-0.252	0.199	-0.507				

MAQDAQ 1.0			
Project Name: Ethos SPA COGEN	Project Number: 005AS-218872	CEMS Operator: N. Ohlendorf	Unit/Condition: Turbine
Run Length: 24	Record Interval: 6	Average Interval: 60	Triplicate Sampling: False
Traverse: True	Ports: 4	Points per port: 3	DAQ Device: DT9803(00)

Run 1 Average Results

08:20:00 - 08:56:00

	Name:	O2	CO2	CO	NOx				
	Make/Model:								
Nov 6 2018	08:21:00	15.05	3.363	0.173	1.955				
Nov 6 2018	08:22:00	15.10	3.370	0.170	1.954				
End of port 1 point 1									
Nov 6 2018	08:23:00	15.10	3.372	0.170	1.995				
Nov 6 2018	08:24:00	14.92	3.358	0.177	1.999				
End of port 1 point 2									
Nov 6 2018	08:25:00	15.17	3.358	0.163	1.944				
Nov 6 2018	08:26:00	15.03	3.360	0.176	1.964				
End of port 1 point 3									
Nov 6 2018	08:31:00	15.06	3.367	0.172	1.944				
Nov 6 2018	08:32:00	15.12	3.372	0.166	1.986				
End of port 2 point 1									
Nov 6 2018	08:33:00	15.06	3.371	0.176	1.987				
Nov 6 2018	08:34:00	15.03	3.366	0.175	2.072				
End of port 2 point 2									
Nov 6 2018	08:35:00	15.01	3.371	0.161	2.158				
Nov 6 2018	08:36:00	14.95	3.368	0.173	2.153				
End of port 2 point 3									
Nov 6 2018	08:41:00	15.07	3.369	0.171	1.874				
Nov 6 2018	08:42:00	15.05	3.367	0.175	1.803				
End of port 3 point 1									
Nov 6 2018	08:43:00	14.97	3.373	0.165	1.850				
Nov 6 2018	08:44:00	15.01	3.377	0.172	1.903				
End of port 3 point 2									
Nov 6 2018	08:45:00	15.00	3.382	0.162	1.918				
Nov 6 2018	08:46:00	15.02	3.376	0.167	1.891				
End of port 3 point 3									
Nov 6 2018	08:51:00	15.05	3.365	0.165	2.129				
Nov 6 2018	08:52:00	15.20	3.360	0.166	2.109				
End of port 4 point 1									
Nov 6 2018	08:53:00	15.14	3.356	0.159	2.011				
Nov 6 2018	08:54:00	14.95	3.370	0.150	2.133				
End of port 4 point 2									
Nov 6 2018	08:55:00	15.08	3.374	0.171	2.195				
Nov 6 2018	08:56:00	15.05	3.378	0.147	2.230				
End of port 4 point 3									

	Average:	15.05	3.368	0.168	2.007				
	Max:	15.20	3.382	0.177	2.230				
	Min:	14.92	3.356	0.147	1.803				

Stratification Results

Port	Point	O2	CO2	CO	NOx				
1	1	15.26	3.370	0.173	1.946				
1	2	15.05	3.364	0.169	2.014				
1	3	15.29	3.363	0.143	1.961				
2	1	14.97	3.371	0.187	1.973				

MAQDAQ 1.0			
Project Name: Ethos SPA COGEN	Project Number: 005AS-218872	CEMS Operator: N. Ohlendorf	Unit/Condition: Turbine
Run Length: 24	Record Interval: 6	Average Interval: 60	Triplicate Sampling: False
Traverse: True	Ports: 4	Points per port: 3	DAQ Device: DT9803(00)

2	2	15.01	3.370	0.158	2.057				
2	3	14.95	3.369	0.173	2.135				
3	1	15.08	3.370	0.144	1.841				
3	2	14.97	3.378	0.168	1.952				
3	3	15.22	3.378	0.148	1.934				
4	1	15.01	3.357	0.162	2.096				
4	2	15.08	3.368	0.141	2.090				
4	3	15.20	3.375	0.167	2.198				
	Strat diff:	0.199	0.009	0.026	0.182				
	Strat %:	1.320	0.369	8.122	9.005				

MAQDAQ 1.0			
Project Name: Ethos SPA COGEN	Project Number: 005AS-218872	CEMS Operator: N. Ohlendorf	Unit/Condition: Turbine
Run Length: 24	Record Interval: 6	Average Interval: 60	Triplicate Sampling: False
Traverse: True	Ports: 4	Points per port: 3	DAQ Device: DT9803(00)

Run 1 Post run bias

08:20:00 - 08:56:00

	Name:	O2	CO2	CO	NOx				
	Make/Model:								
	25A or 7E:	7E	7E	7E	7E				
	Run summary data								
	Raw Avg:	15.05	3.368	0.168	2.007				
	Max:	15.20	3.382	0.177	2.230				
	Min:	14.92	3.356	0.147	1.803				
	Cylinder Concentrations								
	Zero:	0.000	0.000	0.000	0.000				
	Low:								
	Mid:	11.53	3.991	4.654	2.380				
	High:	20.98	8.323	9.562	4.737				
	Calibration Readings								
	Zero reading:	0.057	0.017	0.028	0.002				
	Low reading:								
	Mid reading:	11.53	4.057	4.771	2.353				
	High reading:	21.04	8.328	9.510	4.756				
	EPA Method 7E Error Calculations								
Zero %Err:	**<2.0**	0.272	0.204	0.293	0.042				
Mid %Err:	**<2.0**	0.000	0.793	1.224	-0.570				
High %Err:	**<2.0**	0.286	0.060	-0.544	0.401				
	Initial Bias Data								
	Zero reading:	0.018	0.047	0.067	0.002				
	Span reading:	11.45	4.036	4.790	2.329				
Zero % bias:	**<5.0**	-0.186	0.360	0.408	0.000				
Span % bias:	**<5.0**	-0.381	-0.252	0.199	-0.507				
	Final Bias Data								
	Zero reading:	-0.076	0.054	0.018	0.111				
	Span reading:	11.46	4.043	4.761	2.336				
Zero % bias:	**<5.0**	-0.634	0.445	-0.105	2.301				
Span % bias:	**<5.0**	-0.334	-0.168	-0.105	-0.359				
Zero % drift:	**<3.0**	0.448	0.085	0.513	2.301				
Span % drift:	**<3.0**	0.047	0.084	0.304	0.148				
	Bias Corrected Averages								
	Cor Avg:	15.14	3.319	0.123	2.040				

MAQDAQ 1.0			
Project Name: Ethos SPA COGEN	Project Number: 005AS-218872	CEMS Operator: N. Ohlendorf	Unit/Condition: Turbine
Run Length: 21	Record Interval: 6	Average Interval: 60	Triplicate Sampling: False
Traverse: True	Ports: 1	Points per port: 3	DAQ Device: DT9803(00)

Run 2 Average Results
09:28:00 - 09:49:00

	Name:	O2	CO2	CO	NOx				
	Make/Model:								
Nov 6 2018	09:29:00	14.98	3.408	0.167	2.029				
Nov 6 2018	09:30:00	14.98	3.404	0.167	2.098				
Nov 6 2018	09:31:00	14.98	3.406	0.150	2.083				
Nov 6 2018	09:32:00	15.09	3.404	0.157	2.084				
Nov 6 2018	09:33:00	14.95	3.396	0.166	2.085				
Nov 6 2018	09:34:00	15.04	3.403	0.160	2.035				
Nov 6 2018	09:35:00	15.09	3.408	0.160	2.155				
End of port 1 point 1									
Nov 6 2018	09:36:00	15.06	3.400	0.164	2.099				
Nov 6 2018	09:37:00	15.09	3.408	0.156	2.159				
Nov 6 2018	09:38:00	14.99	3.403	0.152	2.183				
Nov 6 2018	09:39:00	14.97	3.402	0.149	2.146				
Nov 6 2018	09:40:00	15.03	3.402	0.149	2.103				
Nov 6 2018	09:41:00	14.92	3.399	0.142	2.112				
Nov 6 2018	09:42:00	15.05	3.402	0.150	2.125				
End of port 1 point 2									
Nov 6 2018	09:43:00	14.95	3.407	0.149	2.215				
Nov 6 2018	09:44:00	14.95	3.404	0.140	2.217				
Nov 6 2018	09:45:00	14.82	3.405	0.144	2.199				
Nov 6 2018	09:46:00	15.00	3.405	0.146	2.227				
Nov 6 2018	09:47:00	14.88	3.399	0.151	2.180				
Nov 6 2018	09:48:00	14.97	3.409	0.149	2.254				
Nov 6 2018	09:49:00	15.02	3.399	0.147	2.192				
End of port 1 point 3									

	Average:	14.99	3.403	0.153	2.142				
	Max:	15.09	3.409	0.167	2.254				
	Min:	14.82	3.396	0.140	2.029				

Stratification Results

Port	Point	O2	CO2	CO	NOx				
1	1	15.02	3.400	0.167	2.093				
1	2	14.95	3.401	0.152	2.143				
1	3	14.77	3.401	0.147	2.225				
	Strat diff:	0.107	0.000	0.012	0.071				
	Strat %:	0.961	0.020	7.511	3.312				

MAQDAQ 1.0			
Project Name: Ethos SPA COGEN	Project Number: 005AS-218872	CEMS Operator: N. Ohlendorf	Unit/Condition: Turbine
Run Length: 21	Record Interval: 6	Average Interval: 60	Triplicate Sampling: False
Traverse: True	Ports: 1	Points per port: 3	DAQ Device: DT9803(00)

Run 2 Post run bias

09:28:00 - 09:49:00

	Name:	O2	CO2	CO	NOx				
	Make/Model:								
	25A or 7E:	7E	7E	7E	7E				
	Run summary data								
	Raw Avg:	14.99	3.403	0.153	2.142				
	Max:	15.09	3.409	0.167	2.254				
	Min:	14.82	3.396	0.140	2.029				
	Cylinder Concentrations								
	Zero:	0.000	0.000	0.000	0.000				
	Low:								
	Mid:	11.53	3.991	4.654	2.380				
	High:	20.98	8.323	9.562	4.737				
	Calibration Readings								
	Zero reading:	0.057	0.017	0.028	0.002				
	Low reading:								
	Mid reading:	11.53	4.057	4.771	2.353				
	High reading:	21.04	8.328	9.510	4.756				
	EPA Method 7E Error Calculations								
Zero %Err:	**<2.0**	0.272	0.204	0.293	0.042				
Mid %Err:	**<2.0**	0.000	0.793	1.224	-0.570				
High %Err:	**<2.0**	0.286	0.060	-0.544	0.401				
	Initial Bias Data								
	Zero reading:	-0.076	0.054	0.018	0.111				
	Span reading:	11.46	4.043	4.761	2.336				
Zero % bias:	**<5.0**	-0.634	0.445	-0.105	2.301				
Span % bias:	**<5.0**	-0.334	-0.168	-0.105	-0.359				
	Final Bias Data								
	Zero reading:	0.003	0.052	0.097	0.154				
	Span reading:	11.45	4.026	4.779	2.372				
Zero % bias:	**<5.0**	-0.257	0.421	0.722	3.209				
Span % bias:	**<5.0**	-0.381	-0.373	0.084	0.401				
Zero % drift:	**<3.0**	0.377	0.024	0.827	0.908				
Span % drift:	**<3.0**	0.047	0.204	0.189	0.760				
	Bias Corrected Averages								
	Cor Avg:	15.08	3.358	0.094	2.153				

MAQDAQ 1.0			
Project Name: Ethos SPA COGEN	Project Number: 005AS-218872	CEMS Operator: N. Ohlendorf	Unit/Condition: Turbine
Run Length: 24	Record Interval: 6	Average Interval: 60	Triplicate Sampling: False
Traverse: True	Ports: 4	Points per port: 3	DAQ Device: DT9803(00)

Run 3 Average Results
10:25:00 - 10:59:00

	Name:	O2	CO2	CO	NOx				
	Make/Model:								
Nov 6 2018	10:26:00	14.72	3.562	0.470	1.950				
Nov 6 2018	10:27:00	14.70	3.566	0.473	1.955				
End of port 1 point 1									
Nov 6 2018	10:28:00	14.72	3.572	0.480	2.087				
Nov 6 2018	10:29:00	14.66	3.591	0.493	2.271				
End of port 1 point 2									
Nov 6 2018	10:30:00	14.67	3.598	0.517	2.329				
Nov 6 2018	10:31:00	14.65	3.606	0.525	2.386				
End of port 1 point 3									
Nov 6 2018	10:36:00	14.80	3.551	0.442	2.118				
Nov 6 2018	10:37:00	14.75	3.542	0.443	1.991				
End of port 2 point 1									
Nov 6 2018	10:38:00	14.61	3.556	0.439	1.976				
Nov 6 2018	10:39:00	14.90	3.565	0.440	2.053				
End of port 2 point 2									
Nov 6 2018	10:40:00	14.78	3.576	0.446	2.032				
Nov 6 2018	10:41:00	14.57	3.593	0.435	2.061				
End of port 2 point 3									
Nov 6 2018	10:45:00	14.73	3.528	0.392	1.912				
Nov 6 2018	10:46:00	14.72	3.534	0.391	1.938				
End of port 3 point 1									
Nov 6 2018	10:47:00	14.73	3.537	0.388	1.924				
Nov 6 2018	10:48:00	14.80	3.565	0.438	2.151				
End of port 3 point 2									
Nov 6 2018	10:49:00	14.80	3.571	0.446	2.200				
Nov 6 2018	10:50:00	14.61	3.605	0.449	2.339				
End of port 3 point 3									
Nov 6 2018	10:54:00	14.82	3.558	0.453	2.017				
Nov 6 2018	10:55:00	14.80	3.559	0.448	2.056				
End of port 4 point 1									
Nov 6 2018	10:56:00	14.67	3.568	0.448	2.090				
Nov 6 2018	10:57:00	14.80	3.579	0.459	2.142				
End of port 4 point 2									
Nov 6 2018	10:58:00	14.73	3.581	0.478	2.158				
Nov 6 2018	10:59:00	14.63	3.595	0.502	2.268				
End of port 4 point 3									

	Average:	14.72	3.569	0.454	2.100				
	Max:	14.90	3.606	0.525	2.386				
	Min:	14.57	3.528	0.388	1.912				

Stratification Results

Port	**Point**	O2	CO2	CO	NOx				
1	1	14.54	3.574	0.458	1.991				
1	2	15.03	3.575	0.508	2.209				
1	3	14.59	3.603	0.533	2.387				
2	1	14.92	3.549	0.433	2.033				

MAQDAQ 1.0			
Project Name: Ethos SPA COGEN	Project Number: 005AS-218872	CEMS Operator: N. Ohlendorf	Unit/Condition: Turbine
Run Length: 24	Record Interval: 6	Average Interval: 60	Triplicate Sampling: False
Traverse: True	Ports: 4	Points per port: 3	DAQ Device: DT9803(00)

2	2	14.70	3.563	0.453	1.992				
2	3	14.67	3.587	0.445	2.079				
3	1	14.93	3.530	0.387	1.925				
3	2	14.88	3.550	0.413	2.024				
3	3	14.61	3.597	0.434	2.300				
4	1	14.90	3.566	0.442	2.064				
4	2	14.91	3.581	0.477	2.159				
4	3	14.70	3.591	0.499	2.216				
	Strat diff:	0.248	0.031	0.076	0.272				
	Strat %:	1.680	1.180	9.595	8.980				

MAQDAQ 1.0			
Project Name: Ethos SPA COGEN	Project Number: 005AS-218872	CEMS Operator: N. Ohlendorf	Unit/Condition: Turbine
Run Length: 24	Record Interval: 6	Average Interval: 60	Triplicate Sampling: False
Traverse: True	Ports: 4	Points per port: 3	DAQ Device: DT9803(00)

Run 3 Post run bias
10:25:00 - 10:59:00

	Name:	O2	CO2	CO	NOx				
	Make/Model:								
	25A or 7E:	7E	7E	7E	7E				
	Run summary data								
	Raw Avg:	14.72	3.569	0.454	2.100				
	Max:	14.90	3.606	0.525	2.386				
	Min:	14.57	3.528	0.388	1.912				
	Cylinder Concentrations								
	Zero:	0.000	0.000	0.000	0.000				
	Low:								
	Mid:	11.53	3.991	4.654	2.380				
	High:	20.98	8.323	9.562	4.737				
	Calibration Readings								
	Zero reading:	0.057	0.017	0.028	0.002				
	Low reading:								
	Mid reading:	11.53	4.057	4.771	2.353				
	High reading:	21.04	8.328	9.510	4.756				
EPA Method 7E Error Calculations									
Zero %Err:	**<2.0**	0.272	0.204	0.293	0.042				
Mid %Err:	**<2.0**	0.000	0.793	1.224	-0.570				
High %Err:	**<2.0**	0.286	0.060	-0.544	0.401				
Initial Bias Data									
	Zero reading:	0.003	0.052	0.097	0.154				
	Span reading:	11.45	4.026	4.779	2.372				
Zero % bias:	**<5.0**	-0.257	0.421	0.722	3.209				
Span % bias:	**<5.0**	-0.381	-0.373	0.084	0.401				
Final Bias Data									
	Zero reading:	0.034	0.068	0.057	0.130				
	Span reading:	11.50	4.043	4.750	2.330				
Zero % bias:	**<5.0**	-0.110	0.613	0.303	2.702				
Span % bias:	**<5.0**	-0.143	-0.168	-0.220	-0.486				
Zero % drift:	**<3.0**	0.147	0.192	0.419	0.507				
Span % drift:	**<3.0**	0.238	0.204	0.304	0.887				
Bias Corrected Averages									
	Cor Avg:	14.80	3.524	0.374	2.110				

MAQDAQ 1.0			
Project Name: Ethos SPA COGEN	Project Number: 005AS-218872	CEMS Operator: N. Ohlendorf	Unit/Condition: Turbine
Run Length: 21	Record Interval: 6	Average Interval: 60	Triplicate Sampling: False
Traverse: True	Ports: 1	Points per port: 3	DAQ Device: DT9803(00)

Run 4 Average Results
11:09:00 - 11:30:00

	Name:	O2	CO2	CO	NOx				
	Make/Model:								
Nov 6 2018	11:10:00	14.70	3.581	0.487	2.161				
Nov 6 2018	11:11:00	14.75	3.549	0.442	1.986				
Nov 6 2018	11:12:00	14.74	3.554	0.442	2.063				
Nov 6 2018	11:13:00	14.74	3.557	0.435	2.133				
Nov 6 2018	11:14:00	14.74	3.561	0.438	2.197				
Nov 6 2018	11:15:00	14.75	3.554	0.439	2.165				
Nov 6 2018	11:16:00	14.75	3.552	0.429	2.133				
End of port 1 point 1									
Nov 6 2018	11:17:00	14.74	3.555	0.448	2.168				
Nov 6 2018	11:18:00	14.73	3.555	0.436	2.201				
Nov 6 2018	11:19:00	14.72	3.561	0.443	2.262				
Nov 6 2018	11:20:00	14.69	3.585	0.473	2.390				
Nov 6 2018	11:21:00	14.69	3.582	0.475	2.327				
Nov 6 2018	11:22:00	14.69	3.584	0.467	2.355				
Nov 6 2018	11:23:00	14.69	3.583	0.477	2.374				
End of port 1 point 2									
Nov 6 2018	11:24:00	14.68	3.589	0.477	2.404				
Nov 6 2018	11:25:00	14.69	3.582	0.481	2.361				
Nov 6 2018	11:26:00	14.69	3.583	0.480	2.397				
Nov 6 2018	11:27:00	14.69	3.582	0.481	2.342				
Nov 6 2018	11:28:00	14.68	3.592	0.483	2.410				
Nov 6 2018	11:29:00	14.67	3.598	0.483	2.490				
Nov 6 2018	11:30:00	14.68	3.592	0.498	2.426				
End of port 1 point 3									

	Average:	14.71	3.573	0.463	2.274				
	Max:	14.75	3.598	0.498	2.490				
	Min:	14.67	3.549	0.429	1.986				

Stratification Results

Port	Point	O2	CO2	CO	NOx				
1	1	14.74	3.555	0.445	2.108				
1	2	14.70	3.573	0.472	2.316				
1	3	14.68	3.586	0.479	2.393				
	Strat diff:	0.033	0.015	0.014	0.121				
	Strat %:	0.227	0.457	4.370	7.232				

MAQDAQ 1.0			
Project Name: Ethos SPA COGEN	Project Number: 005AS-218872	CEMS Operator: N. Ohlendorf	Unit/Condition: Turbine
Run Length: 21	Record Interval: 6	Average Interval: 60	Triplicate Sampling: False
Traverse: True	Ports: 1	Points per port: 3	DAQ Device: DT9803(00)

Run 4 Post run bias
11:09:00 - 11:30:00

	Name:	O2	CO2	CO	NOx				
	Make/Model:								
	25A or 7E:	7E	7E	7E	7E				
	Run summary data								
	Raw Avg:	14.71	3.573	0.463	2.274				
	Max:	14.75	3.598	0.498	2.490				
	Min:	14.67	3.549	0.429	1.986				
	Cylinder Concentrations								
	Zero:	0.000	0.000	0.000	0.000				
	Low:								
	Mid:	11.53	3.991	4.654	2.380				
	High:	20.98	8.323	9.562	4.737				
	Calibration Readings								
	Zero reading:	0.057	0.017	0.028	0.002				
	Low reading:								
	Mid reading:	11.53	4.057	4.771	2.353				
	High reading:	21.04	8.328	9.510	4.756				
	EPA Method 7E Error Calculations								
Zero %Err:	**<2.0**	0.272	0.204	0.293	0.042				
Mid %Err:	**<2.0**	0.000	0.793	1.224	-0.570				
High %Err:	**<2.0**	0.286	0.060	-0.544	0.401				
	Initial Bias Data								
	Zero reading:	0.034	0.068	0.057	0.130				
	Span reading:	11.50	4.043	4.750	2.330				
Zero % bias:	**<5.0**	-0.110	0.613	0.303	2.702				
Span % bias:	**<5.0**	-0.143	-0.168	-0.220	-0.486				
	Final Bias Data								
	Zero reading:	0.057	0.053	0.048	0.148				
	Span reading:	11.44	4.023	4.758	2.348				
Zero % bias:	**<5.0**	0.000	0.433	0.209	3.082				
Span % bias:	**<5.0**	-0.429	-0.409	-0.136	-0.106				
Zero % drift:	**<3.0**	0.110	0.180	0.094	0.380				
Span % drift:	**<3.0**	0.286	0.241	0.084	0.380				
	Bias Corrected Averages								
	Cor Avg:	14.80	3.529	0.406	2.310				

MAQDAQ 1.0			
Project Name: Ethos SPA COGEN	Project Number: 005AS-218872	CEMS Operator: N. Ohlendorf	Unit/Condition: Turbine
Run Length: 21	Record Interval: 6	Average Interval: 60	Triplicate Sampling: False
Traverse: True	Ports: 1	Points per port: 3	DAQ Device: DT9803(00)

Run 5 Average Results
11:47:00 - 12:08:00

	Name:	O2	CO2	CO	NOx				
	Make/Model:								
Nov 6 2018	11:48:00	14.74	3.556	0.461	2.030				
Nov 6 2018	11:49:00	14.71	3.567	0.468	2.154				
Nov 6 2018	11:50:00	14.73	3.563	0.463	2.154				
Nov 6 2018	11:51:00	14.73	3.556	0.459	2.091				
Nov 6 2018	11:52:00	14.73	3.559	0.458	2.156				
Nov 6 2018	11:53:00	14.73	3.559	0.456	2.118				
Nov 6 2018	11:54:00	14.73	3.555	0.458	2.122				
End of port 1 point 1									
Nov 6 2018	11:55:00	14.73	3.557	0.477	2.100				
Nov 6 2018	11:56:00	14.72	3.560	0.467	2.132				
Nov 6 2018	11:57:00	14.69	3.577	0.499	2.237				
Nov 6 2018	11:58:00	14.69	3.576	0.499	2.216				
Nov 6 2018	11:59:00	14.68	3.584	0.505	2.206				
Nov 6 2018	12:00:00	14.69	3.580	0.490	2.238				
Nov 6 2018	12:01:00	14.68	3.583	0.497	2.245				
End of port 1 point 2									
Nov 6 2018	12:02:00	14.69	3.578	0.502	2.262				
Nov 6 2018	12:03:00	14.70	3.573	0.498	2.208				
Nov 6 2018	12:04:00	14.69	3.577	0.507	2.205				
Nov 6 2018	12:05:00	14.69	3.576	0.491	2.218				
Nov 6 2018	12:06:00	14.69	3.578	0.509	2.254				
Nov 6 2018	12:07:00	14.69	3.577	0.505	2.208				
Nov 6 2018	12:08:00	14.69	3.577	0.498	2.253				
End of port 1 point 3									

	Average:	14.71	3.570	0.484	2.181				
	Max:	14.74	3.584	0.509	2.262				
	Min:	14.68	3.555	0.456	2.030				

Stratification Results

Port	Point	O2	CO2	CO	NOx				
1	1	14.73	3.557	0.457	2.123				
1	2	14.70	3.577	0.495	2.207				
1	3	14.70	3.576	0.506	2.227				
	Strat diff:	0.020	0.007	0.020	0.041				
	Strat %:	0.136	0.364	5.967	2.867				

MAQDAQ 1.0			
Project Name: Ethos SPA COGEN	Project Number: 005AS-218872	CEMS Operator: N. Ohlendorf	Unit/Condition: Turbine
Run Length: 21	Record Interval: 6	Average Interval: 60	Triplicate Sampling: False
Traverse: True	Ports: 1	Points per port: 3	DAQ Device: DT9803(00)

Run 5 Post run bias
11:47:00 - 12:08:00

	Name:	O2	CO2	CO	NOx				
	Make/Model:								
	25A or 7E:	7E	7E	7E	7E				
	Run summary data								
	Raw Avg:	14.71	3.570	0.484	2.181				
	Max:	14.74	3.584	0.509	2.262				
	Min:	14.68	3.555	0.456	2.030				
	Cylinder Concentrations								
	Zero:	0.000	0.000	0.000	0.000				
	Low:								
	Mid:	11.53	3.991	4.654	2.380				
	High:	20.98	8.323	9.562	4.737				
	Calibration Readings								
	Zero reading:	0.057	0.017	0.028	0.002				
	Low reading:								
	Mid reading:	11.53	4.057	4.771	2.353				
	High reading:	21.04	8.328	9.510	4.756				
	EPA Method 7E Error Calculations								
Zero %Err:	**<2.0**	0.272	0.204	0.293	0.042				
Mid %Err:	**<2.0**	0.000	0.793	1.224	-0.570				
High %Err:	**<2.0**	0.286	0.060	-0.544	0.401				
	Initial Bias Data								
	Zero reading:	0.057	0.053	0.048	0.148				
	Span reading:	11.44	4.023	4.758	2.348				
Zero % bias:	**<5.0**	0.000	0.433	0.209	3.082				
Span % bias:	**<5.0**	-0.429	-0.409	-0.136	-0.106				
	Final Bias Data								
	Zero reading:	0.102	0.082	0.079	0.135				
	Span reading:	11.49	4.032	4.759	2.318				
Zero % bias:	**<5.0**	0.215	0.781	0.533	2.808				
Span % bias:	**<5.0**	-0.191	-0.300	-0.126	-0.739				
Zero % drift:	**<3.0**	0.214	0.348	0.324	0.274				
Span % drift:	**<3.0**	0.238	0.109	0.011	0.633				
	Bias Corrected Averages								
	Cor Avg:	14.82	3.530	0.417	2.215				

MAQDAQ 1.0			
Project Name: Ethos SPA COGEN	Project Number: 005AS-218872	CEMS Operator: N. Ohlendorf	Unit/Condition: Turbine
Run Length: 21	Record Interval: 6	Average Interval: 60	Triplicate Sampling: False
Traverse: True	Ports: 1	Points per port: 3	DAQ Device: DT9803(00)

Run 6 Average Results

12:19:00 - 12:40:00

	Name:	O2	CO2	CO	NOx				
	Make/Model:								
Nov 6 2018	12:20:00	14.73	3.548	0.454	2.132				
Nov 6 2018	12:21:00	14.73	3.547	0.453	2.103				
Nov 6 2018	12:22:00	14.72	3.544	0.441	2.089				
Nov 6 2018	12:23:00	14.72	3.555	0.452	2.130				
Nov 6 2018	12:24:00	14.70	3.564	0.457	2.221				
Nov 6 2018	12:25:00	14.72	3.555	0.453	2.145				
Nov 6 2018	12:26:00	14.71	3.561	0.454	2.198				
End of port 1 point 1									
Nov 6 2018	12:27:00	14.71	3.559	0.451	2.175				
Nov 6 2018	12:28:00	14.69	3.570	0.462	2.279				
Nov 6 2018	12:29:00	14.70	3.566	0.457	2.199				
Nov 6 2018	12:30:00	14.69	3.565	0.462	2.166				
Nov 6 2018	12:31:00	14.69	3.574	0.462	2.200				
Nov 6 2018	12:32:00	14.69	3.574	0.468	2.164				
Nov 6 2018	12:33:00	14.69	3.571	0.454	2.195				
End of port 1 point 2									
Nov 6 2018	12:34:00	14.68	3.575	0.458	2.193				
Nov 6 2018	12:35:00	14.70	3.563	0.458	2.124				
Nov 6 2018	12:36:00	14.69	3.569	0.453	2.125				
Nov 6 2018	12:37:00	14.69	3.569	0.452	2.126				
Nov 6 2018	12:38:00	14.70	3.566	0.459	2.108				
Nov 6 2018	12:39:00	14.69	3.571	0.451	2.153				
Nov 6 2018	12:40:00	14.70	3.569	0.456	2.122				
End of port 1 point 3									

	Average:	14.70	3.564	0.456	2.159				
	Max:	14.73	3.575	0.468	2.279				
	Min:	14.68	3.544	0.441	2.089				

Stratification Results

Port	Point	O2	CO2	CO	NOx				
1	1	14.72	3.554	0.442	2.145				
1	2	14.69	3.573	0.464	2.207				
1	3	14.69	3.567	0.447	2.130				
	Strat diff:	0.020	0.008	0.013	0.046				
	Strat %:	0.136	0.299	2.882	2.144				

MAQDAQ 1.0			
Project Name: Ethos SPA COGEN	Project Number: 005AS-218872	CEMS Operator: N. Ohlendorf	Unit/Condition: Turbine
Run Length: 21	Record Interval: 6	Average Interval: 60	Triplicate Sampling: False
Traverse: True	Ports: 1	Points per port: 3	DAQ Device: DT9803(00)

Run 6 Post run bias
12:19:00 - 12:40:00

	Name:	O2	CO2	CO	NOx				
	Make/Model:								
	25A or 7E:	7E	7E	7E	7E				
	Run summary data								
	Raw Avg:	14.70	3.564	0.456	2.159				
	Max:	14.73	3.575	0.468	2.279				
	Min:	14.68	3.544	0.441	2.089				
	Cylinder Concentrations								
	Zero:	0.000	0.000	0.000	0.000				
	Low:								
	Mid:	11.53	3.991	4.654	2.380				
	High:	20.98	8.323	9.562	4.737				
	Calibration Readings								
	Zero reading:	0.057	0.017	0.028	0.002				
	Low reading:								
	Mid reading:	11.53	4.057	4.771	2.353				
	High reading:	21.04	8.328	9.510	4.756				
	EPA Method 7E Error Calculations								
Zero %Err:	**<2.0**	0.272	0.204	0.293	0.042				
Mid %Err:	**<2.0**	0.000	0.793	1.224	-0.570				
High %Err:	**<2.0**	0.286	0.060	-0.544	0.401				
	Initial Bias Data								
	Zero reading:	0.102	0.082	0.079	0.135				
	Span reading:	11.49	4.032	4.759	2.318				
Zero % bias:	**<5.0**	0.215	0.781	0.533	2.808				
Span % bias:	**<5.0**	-0.191	-0.300	-0.126	-0.739				
	Final Bias Data								
	Zero reading:	0.057	0.059	0.078	0.070				
	Span reading:	11.42	3.998	4.749	2.365				
Zero % bias:	**<5.0**	0.000	0.505	0.523	1.436				
Span % bias:	**<5.0**	-0.524	-0.709	-0.230	0.253				
Zero % drift:	**<3.0**	0.214	0.276	0.010	1.372				
Span % drift:	**<3.0**	0.333	0.409	0.105	0.992				
	Bias Corrected Averages								
	Cor Avg:	14.82	3.535	0.376	2.186				

MAQDAQ 1.0			
Project Name: Ethos SPA COGEN	Project Number: 005AS-218872	CEMS Operator: N. Ohlendorf	Unit/Condition: Turbine
Run Length: 21	Record Interval: 6	Average Interval: 60	Triplicate Sampling: False
Traverse: True	Ports: 1	Points per port: 3	DAQ Device: DT9803(00)

Run 7 Average Results

12:47:00 - 13:08:00

	Name:	O2	CO2	CO	NOx				
	Make/Model:								
Nov 6 2018	12:48:00	14.73	3.547	0.453	2.221				
Nov 6 2018	12:49:00	14.74	3.541	0.433	2.116				
Nov 6 2018	12:50:00	14.72	3.551	0.453	2.200				
Nov 6 2018	12:51:00	14.72	3.552	0.440	2.224				
Nov 6 2018	12:52:00	14.72	3.553	0.436	2.227				
Nov 6 2018	12:53:00	14.72	3.552	0.443	2.242				
Nov 6 2018	12:54:00	14.72	3.554	0.442	2.249				
End of port 1 point 1									
Nov 6 2018	12:55:00	14.73	3.545	0.447	2.224				
Nov 6 2018	12:56:00	14.73	3.548	0.437	2.237				
Nov 6 2018	12:57:00	14.72	3.554	0.433	2.282				
Nov 6 2018	12:58:00	14.73	3.548	0.446	2.286				
Nov 6 2018	12:59:00	14.71	3.557	0.441	2.300				
Nov 6 2018	13:00:00	14.68	3.572	0.451	2.337				
Nov 6 2018	13:01:00	14.69	3.570	0.466	2.322				
End of port 1 point 2									
Nov 6 2018	13:02:00	14.68	3.575	0.468	2.318				
Nov 6 2018	13:03:00	14.69	3.567	0.465	2.211				
Nov 6 2018	13:04:00	14.67	3.578	0.460	2.290				
Nov 6 2018	13:05:00	14.63	3.597	0.473	2.352				
Nov 6 2018	13:06:00	14.64	3.591	0.473	2.379				
Nov 6 2018	13:07:00	14.65	3.587	0.476	2.299				
Nov 6 2018	13:08:00	14.70	3.567	0.452	2.219				
End of port 1 point 3									
	Average:	14.70	3.562	0.452	2.264				
	Max:	14.74	3.597	0.476	2.379				
	Min:	14.63	3.541	0.433	2.116				

Stratification Results

Port	Point	O2	CO2	CO	NOx				
1	1	14.72	3.552	0.433	2.226				
1	2	14.70	3.558	0.442	2.289				
1	3	14.67	3.578	0.462	2.269				
	Strat diff:	0.023	0.015	0.016	0.028				
	Strat %:	0.181	0.430	3.665	1.563				

MAQDAQ 1.0			
Project Name: Ethos SPA COGEN	Project Number: 005AS-218872	CEMS Operator: N. Ohlendorf	Unit/Condition: Turbine
Run Length: 21	Record Interval: 6	Average Interval: 60	Triplicate Sampling: False
Traverse: True	Ports: 1	Points per port: 3	DAQ Device: DT9803(00)

Run 7 Post run bias

12:47:00 - 13:08:00

	Name:	O2	CO2	CO	NOx				
	Make/Model:								
	25A or 7E:	7E	7E	7E	7E				
	Run summary data								
	Raw Avg:	14.70	3.562	0.452	2.264				
	Max:	14.74	3.597	0.476	2.379				
	Min:	14.63	3.541	0.433	2.116				
	Cylinder Concentrations								
	Zero:	0.000	0.000	0.000	0.000				
	Low:								
	Mid:	11.53	3.991	4.654	2.380				
	High:	20.98	8.323	9.562	4.737				
	Calibration Readings								
	Zero reading:	0.057	0.017	0.028	0.002				
	Low reading:								
	Mid reading:	11.53	4.057	4.771	2.353				
	High reading:	21.04	8.328	9.510	4.756				
	EPA Method 7E Error Calculations								
Zero %Err:	**<2.0**	0.272	0.204	0.293	0.042				
Mid %Err:	**<2.0**	0.000	0.793	1.224	-0.570				
High %Err:	**<2.0**	0.286	0.060	-0.544	0.401				
	Initial Bias Data								
	Zero reading:	0.057	0.059	0.078	0.070				
	Span reading:	11.42	3.998	4.749	2.365				
Zero % bias:	**<5.0**	0.000	0.505	0.523	1.436				
Span % bias:	**<5.0**	-0.524	-0.709	-0.230	0.253				
	Final Bias Data								
	Zero reading:	0.002	0.077	0.057	0.160				
	Span reading:	11.47	4.030	4.739	2.330				
Zero % bias:	**<5.0**	-0.262	0.721	0.303	3.335				
Span % bias:	**<5.0**	-0.286	-0.324	-0.335	-0.486				
Zero % drift:	**<3.0**	0.262	0.216	0.220	1.899				
Span % drift:	**<3.0**	0.238	0.385	0.105	0.739				
	Bias Corrected Averages								
	Cor Avg:	14.82	3.534	0.383	2.291				

MAQDAQ 1.0			
Project Name: Ethos SPA COGEN	Project Number: 005AS-218872	CEMS Operator: N. Ohlendorf	Unit/Condition: Turbine
Run Length: 21	Record Interval: 6	Average Interval: 60	Triplicate Sampling: False
Traverse: True	Ports: 1	Points per port: 3	DAQ Device: DT9803(00)

Run 8 Average Results
13:15:00 - 13:36:00

	Name:	O2	CO2	CO	NOx				
	Make/Model:								
Nov 6 2018	13:16:00	14.66	3.543	0.456	2.086				
Nov 6 2018	13:17:00	14.65	3.550	0.454	2.105				
Nov 6 2018	13:18:00	14.70	3.553	0.444	2.125				
Nov 6 2018	13:19:00	14.75	3.547	0.435	2.126				
Nov 6 2018	13:20:00	14.65	3.547	0.447	2.112				
Nov 6 2018	13:21:00	14.63	3.544	0.447	2.060				
Nov 6 2018	13:22:00	14.56	3.555	0.437	2.136				
End of port 1 point 1									
Nov 6 2018	13:23:00	14.73	3.548	0.442	2.094				
Nov 6 2018	13:24:00	14.80	3.553	0.442	2.124				
Nov 6 2018	13:25:00	14.79	3.553	0.435	2.143				
Nov 6 2018	13:26:00	14.75	3.546	0.440	2.134				
Nov 6 2018	13:27:00	14.71	3.554	0.435	2.153				
Nov 6 2018	13:28:00	14.63	3.542	0.432	2.077				
Nov 6 2018	13:29:00	14.67	3.550	0.444	2.113				
End of port 1 point 2									
Nov 6 2018	13:30:00	14.61	3.555	0.450	2.154				
Nov 6 2018	13:31:00	14.72	3.554	0.459	2.145				
Nov 6 2018	13:32:00	14.68	3.547	0.439	2.096				
Nov 6 2018	13:33:00	14.63	3.555	0.443	2.147				
Nov 6 2018	13:34:00	14.73	3.554	0.453	2.158				
Nov 6 2018	13:35:00	14.76	3.553	0.445	2.157				
Nov 6 2018	13:36:00	14.73	3.558	0.430	2.215				
End of port 1 point 3									

	Average:	14.69	3.551	0.443	2.127				
	Max:	14.80	3.558	0.459	2.215				
	Min:	14.56	3.542	0.430	2.060				

Stratification Results

Port	**Point**	O2	CO2	CO	NOx				
1	1	14.64	3.551	0.444	2.113				
1	2	14.69	3.553	0.432	2.132				
1	3	14.59	3.553	0.444	2.168				
	Strat diff:	0.050	0.001	0.004	0.030				
	Strat %:	0.342	0.038	1.818	1.419				

MAQDAQ 1.0			
Project Name: Ethos SPA COGEN	Project Number: 005AS-218872	CEMS Operator: N. Ohlendorf	Unit/Condition: Turbine
Run Length: 21	Record Interval: 6	Average Interval: 60	Triplicate Sampling: False
Traverse: True	Ports: 1	Points per port: 3	DAQ Device: DT9803(00)

Run 8 Post run bias
13:15:00 - 13:36:00

	Name:	O2	CO2	CO	NOx				
	Make/Model:								
	25A or 7E:	7E	7E	7E	7E				
	Run summary data								
	Raw Avg:	14.69	3.551	0.443	2.127				
	Max:	14.80	3.558	0.459	2.215				
	Min:	14.56	3.542	0.430	2.060				
	Cylinder Concentrations								
	Zero:	0.000	0.000	0.000	0.000				
	Low:								
	Mid:	11.53	3.991	4.654	2.380				
	High:	20.98	8.323	9.562	4.737				
	Calibration Readings								
	Zero reading:	0.057	0.017	0.028	0.002				
	Low reading:								
	Mid reading:	11.53	4.057	4.771	2.353				
	High reading:	21.04	8.328	9.510	4.756				
	EPA Method 7E Error Calculations								
Zero %Err:	**<2.0**	0.272	0.204	0.293	0.042				
Mid %Err:	**<2.0**	0.000	0.793	1.224	-0.570				
High %Err:	**<2.0**	0.286	0.060	-0.544	0.401				
	Initial Bias Data								
	Zero reading:	0.002	0.077	0.057	0.160				
	Span reading:	11.47	4.030	4.739	2.330				
Zero % bias:	**<5.0**	-0.262	0.721	0.303	3.335				
Span % bias:	**<5.0**	-0.286	-0.324	-0.335	-0.486				
	Final Bias Data								
	Zero reading:	0.063	0.066	0.069	0.118				
	Span reading:	11.40	4.033	4.738	2.324				
Zero % bias:	**<5.0**	0.029	0.589	0.429	2.449				
Span % bias:	**<5.0**	-0.620	-0.288	-0.345	-0.612				
Zero % drift:	**<3.0**	0.291	0.132	0.126	0.886				
Span % drift:	**<3.0**	0.334	0.036	0.010	0.126				
	Bias Corrected Averages								
	Cor Avg:	14.82	3.507	0.378	2.162				

MAQDAQ 1.0			
Project Name: Ethos SPA COGEN	Project Number: 005AS-218872	CEMS Operator: N. Ohlendorf	Unit/Condition: Turbine
Run Length: 21	Record Interval: 6	Average Interval: 60	Triplicate Sampling: False
Traverse: True	Ports: 1	Points per port: 3	DAQ Device: DT9803(00)

Run 9 Average Results
13:45:00 - 14:06:00

	Name:	O2	CO2	CO	NOx				
	Make/Model:								
Nov 6 2018	13:46:00	14.60	3.597	0.477	2.383				
Nov 6 2018	13:47:00	14.68	3.588	0.476	2.399				
Nov 6 2018	13:48:00	14.54	3.584	0.466	2.359				
Nov 6 2018	13:49:00	14.70	3.587	0.474	2.383				
Nov 6 2018	13:50:00	14.62	3.589	0.475	2.442				
Nov 6 2018	13:51:00	14.62	3.588	0.484	2.440				
Nov 6 2018	13:52:00	14.64	3.581	0.474	2.395				
End of port 1 point 1									
Nov 6 2018	13:53:00	14.76	3.560	0.439	2.237				
Nov 6 2018	13:54:00	14.77	3.559	0.448	2.269				
Nov 6 2018	13:55:00	14.60	3.552	0.430	2.199				
Nov 6 2018	13:56:00	14.67	3.547	0.436	2.169				
Nov 6 2018	13:57:00	14.63	3.548	0.433	2.143				
Nov 6 2018	13:58:00	14.71	3.573	0.456	2.314				
Nov 6 2018	13:59:00	14.64	3.584	0.476	2.416				
End of port 1 point 2									
Nov 6 2018	14:00:00	14.71	3.575	0.471	2.350				
Nov 6 2018	14:01:00	14.68	3.580	0.463	2.352				
Nov 6 2018	14:02:00	14.67	3.580	0.456	2.394				
Nov 6 2018	14:03:00	14.71	3.577	0.466	2.342				
Nov 6 2018	14:04:00	14.72	3.574	0.478	2.339				
Nov 6 2018	14:05:00	14.63	3.579	0.462	2.356				
Nov 6 2018	14:06:00	14.60	3.587	0.474	2.445				
End of port 1 point 3									

	Average:	14.66	3.576	0.463	2.339				
	Max:	14.77	3.597	0.484	2.445				
	Min:	14.54	3.547	0.430	2.143				

Stratification Results

Port	**Point**	O2	CO2	CO	NOx				
1	1	14.70	3.584	0.475	2.384				
1	2	14.66	3.563	0.454	2.251				
1	3	14.78	3.576	0.466	2.358				
	Strat diff:	0.067	0.010	0.010	0.053				
	Strat %:	0.453	0.317	2.366	3.432				

MAQDAQ 1.0			
Project Name: Ethos SPA COGEN	Project Number: 005AS-218872	CEMS Operator: N. Ohlendorf	Unit/Condition: Turbine
Run Length: 21	Record Interval: 6	Average Interval: 60	Triplicate Sampling: False
Traverse: True	Ports: 1	Points per port: 3	DAQ Device: DT9803(00)

Run 9 Post run bias

13:45:00 - 14:06:00

	Name:	O2	CO2	CO	NOx				
	Make/Model:								
	25A or 7E:	7E	7E	7E	7E				
	Run summary data								
	Raw Avg:	14.66	3.576	0.463	2.339				
	Max:	14.77	3.597	0.484	2.445				
	Min:	14.54	3.547	0.430	2.143				
	Cylinder Concentrations								
	Zero:	0.000	0.000	0.000	0.000				
	Low:								
	Mid:	11.53	3.991	4.654	2.380				
	High:	20.98	8.323	9.562	4.737				
	Calibration Readings								
	Zero reading:	0.057	0.017	0.028	0.002				
	Low reading:								
	Mid reading:	11.53	4.057	4.771	2.353				
	High reading:	21.04	8.328	9.510	4.756				
	EPA Method 7E Error Calculations								
Zero %Err:	**<2.0**	0.272	0.204	0.293	0.042				
Mid %Err:	**<2.0**	0.000	0.793	1.224	-0.570				
High %Err:	**<2.0**	0.286	0.060	-0.544	0.401				
	Initial Bias Data								
	Zero reading:	0.063	0.066	0.069	0.118				
	Span reading:	11.40	4.033	4.738	2.324				
Zero % bias:	**<5.0**	0.029	0.589	0.429	2.449				
Span % bias:	**<5.0**	-0.620	-0.288	-0.345	-0.612				
	Final Bias Data								
	Zero reading:	0.088	0.072	0.049	0.148				
	Span reading:	11.48	4.022	4.750	2.329				
Zero % bias:	**<5.0**	0.148	0.661	0.220	3.082				
Span % bias:	**<5.0**	-0.238	-0.421	-0.220	-0.507				
Zero % drift:	**<3.0**	0.119	0.072	0.209	0.633				
Span % drift:	**<3.0**	0.382	0.133	0.125	0.105				
	Bias Corrected Averages								
	Cor Avg:	14.80	3.536	0.401	2.394				

MAQDAQ 1.0			
Project Name: Ethos SPA COGEN	Project Number: 005AS-218872	CEMS Operator: N. Ohlendorf	Unit/Condition: Turbine
Run Length: 21	Record Interval: 6	Average Interval: 60	Triplicate Sampling: False
Traverse: True	Ports: 1	Points per port: 3	DAQ Device: DT9803(00)

Run 10 Average Results
14:14:00 - 14:35:00

	Name:	O2	CO2	CO	NOx				
	Make/Model:								
Nov 6 2018	14:15:00	14.69	3.562	0.452	2.283				
Nov 6 2018	14:16:00	14.73	3.542	0.425	2.198				
Nov 6 2018	14:17:00	14.71	3.543	0.428	2.166				
Nov 6 2018	14:18:00	14.71	3.540	0.444	2.113				
Nov 6 2018	14:19:00	14.70	3.547	0.434	2.157				
Nov 6 2018	14:20:00	14.71	3.545	0.442	2.164				
Nov 6 2018	14:21:00	14.72	3.540	0.455	2.147				
End of port 1 point 1									
Nov 6 2018	14:22:00	14.71	3.548	0.437	2.138				
Nov 6 2018	14:23:00	14.71	3.545	0.429	2.149				
Nov 6 2018	14:24:00	14.71	3.544	0.443	2.079				
Nov 6 2018	14:25:00	14.71	3.549	0.438	2.141				
Nov 6 2018	14:26:00	14.68	3.559	0.450	2.181				
Nov 6 2018	14:27:00	14.66	3.572	0.461	2.301				
Nov 6 2018	14:28:00	14.65	3.576	0.462	2.303				
End of port 1 point 2									
Nov 6 2018	14:29:00	14.66	3.575	0.473	2.264				
Nov 6 2018	14:30:00	14.65	3.577	0.463	2.274				
Nov 6 2018	14:31:00	14.66	3.574	0.465	2.247				
Nov 6 2018	14:32:00	14.66	3.575	0.455	2.321				
Nov 6 2018	14:33:00	14.67	3.571	0.461	2.262				
Nov 6 2018	14:34:00	14.67	3.566	0.450	2.239				
Nov 6 2018	14:35:00	14.67	3.568	0.443	2.267				
End of port 1 point 3									

	Average:	14.69	3.558	0.448	2.209				
	Max:	14.73	3.577	0.473	2.321				
	Min:	14.65	3.540	0.425	2.079				

Stratification Results

Port	**Point**	O2	CO2	CO	NOx				
1	1	14.70	3.541	0.434	2.149				
1	2	14.69	3.558	0.442	2.199				
1	3	14.66	3.572	0.452	2.273				
	Strat diff:	0.017	0.015	0.009	0.066				
	Strat %:	0.159	0.450	2.108	2.990				

MAQDAQ 1.0			
Project Name: Ethos SPA COGEN	Project Number: 005AS-218872	CEMS Operator: N. Ohlendorf	Unit/Condition: Turbine
Run Length: 21	Record Interval: 6	Average Interval: 60	Triplicate Sampling: False
Traverse: True	Ports: 1	Points per port: 3	DAQ Device: DT9803(00)

Run 10 Post run bias

14:14:00 - 14:35:00

	Name:	O2	CO2	CO	NOx				
	Make/Model:								
	25A or 7E:	7E	7E	7E	7E				
	Run summary data								
	Raw Avg:	14.69	3.558	0.448	2.209				
	Max:	14.73	3.577	0.473	2.321				
	Min:	14.65	3.540	0.425	2.079				
	Cylinder Concentrations								
	Zero:	0.000	0.000	0.000	0.000				
	Low:								
	Mid:	11.53	3.991	4.654	2.380				
	High:	20.98	8.323	9.562	4.737				
	Calibration Readings								
	Zero reading:	0.057	0.017	0.028	0.002				
	Low reading:								
	Mid reading:	11.53	4.057	4.771	2.353				
	High reading:	21.04	8.328	9.510	4.756				
	EPA Method 7E Error Calculations								
Zero %Err:	**<2.0**	0.272	0.204	0.293	0.042				
Mid %Err:	**<2.0**	0.000	0.793	1.224	-0.570				
High %Err:	**<2.0**	0.286	0.060	-0.544	0.401				
	Initial Bias Data								
	Zero reading:	0.088	0.072	0.049	0.148				
	Span reading:	11.48	4.022	4.750	2.329				
Zero % bias:	**<5.0**	0.148	0.661	0.220	3.082				
Span % bias:	**<5.0**	-0.238	-0.421	-0.220	-0.507				
	Final Bias Data								
	Zero reading:	0.071	0.066	0.059	0.136				
	Span reading:	11.46	3.998	4.769	2.360				
Zero % bias:	**<5.0**	0.067	0.589	0.324	2.829				
Span % bias:	**<5.0**	-0.334	-0.709	-0.021	0.148				
Zero % drift:	**<3.0**	0.081	0.072	0.104	0.253				
Span % drift:	**<3.0**	0.096	0.288	0.199	0.655				
	Bias Corrected Averages								
	Cor Avg:	14.79	3.533	0.390	2.234				

MAQDAQ 1.0			
Project Name: Ethos SPA COGEN	Project Number: 005AS-218872	CEMS Operator: N. Ohlendorf	Unit/Condition: Turbine
Run Length: 21	Record Interval: 6	Average Interval: 60	Triplicate Sampling: False
Traverse: True	Ports: 1	Points per port: 3	DAQ Device: DT9803(00)

Run 11 Average Results

14:42:00 - 15:03:00

	Name:	O2	CO2	CO	NOx				
	Make/Model:								
Nov 6 2018	14:43:00	14.61	3.545	0.443	2.161				
Nov 6 2018	14:44:00	14.82	3.535	0.447	2.094				
Nov 6 2018	14:45:00	14.65	3.545	0.440	2.131				
Nov 6 2018	14:46:00	14.67	3.544	0.448	2.147				
Nov 6 2018	14:47:00	14.71	3.547	0.445	2.143				
Nov 6 2018	14:48:00	14.78	3.542	0.434	2.162				
Nov 6 2018	14:49:00	14.69	3.553	0.452	2.215				
End of port 1 point 1									
Nov 6 2018	14:50:00	14.74	3.545	0.431	2.197				
Nov 6 2018	14:51:00	14.81	3.542	0.448	2.174				
Nov 6 2018	14:52:00	14.76	3.539	0.425	2.177				
Nov 6 2018	14:53:00	14.67	3.544	0.419	2.193				
Nov 6 2018	14:54:00	14.57	3.546	0.435	2.235				
Nov 6 2018	14:55:00	14.67	3.544	0.443	2.212				
Nov 6 2018	14:56:00	14.65	3.541	0.439	2.184				
End of port 1 point 2									
Nov 6 2018	14:57:00	14.68	3.538	0.438	2.134				
Nov 6 2018	14:58:00	14.72	3.547	0.425	2.168				
Nov 6 2018	14:59:00	14.76	3.546	0.430	2.226				
Nov 6 2018	15:00:00	14.78	3.539	0.423	2.195				
Nov 6 2018	15:01:00	14.77	3.550	0.433	2.232				
Nov 6 2018	15:02:00	14.71	3.537	0.428	2.201				
Nov 6 2018	15:03:00	14.67	3.540	0.435	2.167				
End of port 1 point 3									
	Average:	14.71	3.543	0.436	2.178				
	Max:	14.82	3.553	0.452	2.235				
	Min:	14.57	3.535	0.419	2.094				

Stratification Results

Port	Point	O2	CO2	CO	NOx				
1	1	14.69	3.542	0.453	2.142				
1	2	14.78	3.540	0.425	2.186				
1	3	14.68	3.541	0.435	2.193				
	Strat diff:	0.063	0.001	0.015	0.019				
	Strat %:	0.430	0.028	3.503	1.457				

MAQDAQ 1.0			
Project Name: Ethos SPA COGEN	Project Number: 005AS-218872	CEMS Operator: N. Ohlendorf	Unit/Condition: Turbine
Run Length: 21	Record Interval: 6	Average Interval: 60	Triplicate Sampling: False
Traverse: True	Ports: 1	Points per port: 3	DAQ Device: DT9803(00)

Run 11 Post run bias

14:42:00 - 15:03:00

	Name:	O2	CO2	CO	NOx				
	Make/Model:								
	25A or 7E:	7E	7E	7E	7E				
	Run summary data								
	Raw Avg:	14.71	3.543	0.436	2.178				
	Max:	14.82	3.553	0.452	2.235				
	Min:	14.57	3.535	0.419	2.094				
	Cylinder Concentrations								
	Zero:	0.000	0.000	0.000	0.000				
	Low:								
	Mid:	11.53	3.991	4.654	2.380				
	High:	20.98	8.323	9.562	4.737				
	Calibration Readings								
	Zero reading:	0.057	0.017	0.028	0.002				
	Low reading:								
	Mid reading:	11.53	4.057	4.771	2.353				
	High reading:	21.04	8.328	9.510	4.756				
	EPA Method 7E Error Calculations								
Zero %Err:	**<2.0**	0.272	0.204	0.293	0.042				
Mid %Err:	**<2.0**	0.000	0.793	1.224	-0.570				
High %Err:	**<2.0**	0.286	0.060	-0.544	0.401				
	Initial Bias Data								
	Zero reading:	0.071	0.066	0.059	0.136				
	Span reading:	11.46	3.998	4.769	2.360				
Zero % bias:	**<5.0**	0.067	0.589	0.324	2.829				
Span % bias:	**<5.0**	-0.334	-0.709	-0.021	0.148				
	Final Bias Data								
	Zero reading:	0.002	0.042	0.076	0.112				
	Span reading:	11.47	4.018	4.760	2.383				
Zero % bias:	**<5.0**	-0.262	0.300	0.502	2.322				
Span % bias:	**<5.0**	-0.286	-0.469	-0.115	0.633				
Zero % drift:	**<3.0**	0.329	0.289	0.178	0.507				
Span % drift:	**<3.0**	0.048	0.240	0.094	0.485				
	Bias Corrected Averages								
	Cor Avg:	14.80	3.522	0.365	2.175				

MAQDAQ 1.0			
Project Name: Ethos SPA COGEN	Project Number: 005AS-218872	CEMS Operator: N. Ohlendorf	Unit/Condition: Turbine
Run Length: 21	Record Interval: 6	Average Interval: 60	Triplicate Sampling: False
Traverse: True	Ports: 1	Points per port: 3	DAQ Device: DT9803(00)

Run 12 Average Results
15:11:00 - 15:32:00

	Name:	O2	CO2	CO	NOx				
	Make/Model:								
Nov 6 2018	15:12:00	14.53	3.590	0.474	2.457				
Nov 6 2018	15:13:00	14.67	3.550	0.451	2.242				
Nov 6 2018	15:14:00	14.72	3.544	0.431	2.222				
Nov 6 2018	15:15:00	14.79	3.537	0.431	2.141				
Nov 6 2018	15:16:00	14.63	3.537	0.432	2.173				
Nov 6 2018	15:17:00	14.67	3.536	0.435	2.199				
Nov 6 2018	15:18:00	14.73	3.541	0.423	2.227				
End of port 1 point 1									
Nov 6 2018	15:19:00	14.62	3.544	0.426	2.250				
Nov 6 2018	15:20:00	14.75	3.542	0.435	2.242				
Nov 6 2018	15:21:00	14.65	3.558	0.432	2.336				
Nov 6 2018	15:22:00	14.76	3.563	0.453	2.342				
Nov 6 2018	15:23:00	14.58	3.570	0.445	2.308				
Nov 6 2018	15:24:00	14.59	3.575	0.443	2.376				
Nov 6 2018	15:25:00	14.61	3.570	0.452	2.376				
End of port 1 point 2									
Nov 6 2018	15:26:00	14.61	3.570	0.449	2.359				
Nov 6 2018	15:27:00	14.58	3.569	0.446	2.389				
Nov 6 2018	15:28:00	14.61	3.579	0.460	2.440				
Nov 6 2018	15:29:00	14.62	3.585	0.455	2.482				
Nov 6 2018	15:30:00	14.65	3.578	0.464	2.450				
Nov 6 2018	15:31:00	14.71	3.583	0.467	2.465				
Nov 6 2018	15:32:00	14.69	3.586	0.456	2.499				
End of port 1 point 3									

	Average:	14.66	3.562	0.446	2.332				
	Max:	14.79	3.590	0.474	2.499				
	Min:	14.53	3.536	0.423	2.141				

Stratification Results

Port	Point	O2	CO2	CO	NOx				
1	1	14.78	3.545	0.441	2.230				
1	2	14.57	3.557	0.441	2.316				
1	3	14.51	3.582	0.456	2.473				
	Strat diff:	0.160	0.021	0.010	0.133				
	Strat %:	1.094	0.580	2.242	5.699				

MAQDAQ 1.0			
Project Name: Ethos SPA COGEN	Project Number: 005AS-218872	CEMS Operator: N. Ohlendorf	Unit/Condition: Turbine
Run Length: 21	Record Interval: 6	Average Interval: 60	Triplicate Sampling: False
Traverse: True	Ports: 1	Points per port: 3	DAQ Device: DT9803(00)

Run 12 Post run bias

15:11:00 - 15:32:00

	Name:	O2	CO2	CO	NOx				
	Make/Model:								
	25A or 7E:	7E	7E	7E	7E				
	Run summary data								
	Raw Avg:	14.66	3.562	0.446	2.332				
	Max:	14.79	3.590	0.474	2.499				
	Min:	14.53	3.536	0.423	2.141				
	Cylinder Concentrations								
	Zero:	0.000	0.000	0.000	0.000				
	Low:								
	Mid:	11.53	3.991	4.654	2.380				
	High:	20.98	8.323	9.562	4.737				
	Calibration Readings								
	Zero reading:	0.057	0.017	0.028	0.002				
	Low reading:								
	Mid reading:	11.53	4.057	4.771	2.353				
	High reading:	21.04	8.328	9.510	4.756				
	EPA Method 7E Error Calculations								
Zero %Err:	**<2.0**	0.272	0.204	0.293	0.042				
Mid %Err:	**<2.0**	0.000	0.793	1.224	-0.570				
High %Err:	**<2.0**	0.286	0.060	-0.544	0.401				
	Initial Bias Data								
	Zero reading:	0.002	0.042	0.076	0.112				
	Span reading:	11.47	4.018	4.760	2.383				
Zero % bias:	**<5.0**	-0.262	0.300	0.502	2.322				
Span % bias:	**<5.0**	-0.286	-0.469	-0.115	0.633				
	Final Bias Data								
	Zero reading:	0.059	0.026	0.088	0.148				
	Span reading:	11.44	4.017	4.791	2.341				
Zero % bias:	**<5.0**	0.010	0.108	0.628	3.082				
Span % bias:	**<5.0**	-0.429	-0.481	0.209	-0.253				
Zero % drift:	**<3.0**	0.272	0.192	0.125	0.760				
Span % drift:	**<3.0**	0.143	0.012	0.324	0.886				
	Bias Corrected Averages								
	Cor Avg:	14.76	3.535	0.361	2.348				

APPENDIX C
LABORATORY ANALYSIS DATA

Appendix C.1
Ammonia Analyses

MONTROSE
AIR QUALITY SERVICES

AMMONIA RESULTS

Client: EthosEnergy

Project: 218872

NH_3 Calibration:
Standards: 1.216 ppm, 12.16 ppm, 121.6 ppm NH_3
Slope: -59.0
pH Calibration Check (pH = 5.00): 4.97

NH_3 Audit (Ricca Chemical):
Lot No. 1808C17
Recovery: 99%

Test Number	Reagent	Sample Volume (mL)	pH	Dilution Factor	Meter Reading (ppm NH_3)	Blank Corrected (ppm NH_3)	Average
Lab Blank (0.1 N HCl)		--	--	1	0.00	--	0.00
					0.00	--	
NH_3 Audit (10.00 ppm)		--	--	1	9.95	9.95	9.94
					9.93	9.93	
FB-NH_3	0.1 N HCl	234.4	1.64	1	0.00	--	< 0.5
					0.00	--	
1-NH_3	0.1 N HCl	343.3	1.63	1	0.15	0.15	< 0.5
					0.18	0.18	
2-NH_3	0.1 N HCl	290.1	1.62	1	0.04	0.04	< 0.5
					0.02	0.02	
3-NH_3	0.1 N HCl	300.6	1.61	1	0.00	0.00	< 0.5
					0.00	0.00	

NOTES: Reporting Limits: 0.5 ppm (mg/L) ammonia
Units: ppm = mg/L

Meter: Orion 4-Star, S/N G08388
Ammonia Probe: Orion TY1-18435

Analyzed by: Melissa Stofer
Melissa Stofer
Laboratory Manager

Date: 11/9/18

MONTROSE
AIR QUALITY SERVICES

LABORATORY NARRATIVE
BAAQMD METHOD ST-1B
Client: EthosEnergy
Project: 218872

Custody

Three samples collected in 0.1 N HCl were received on November 6, 2018. A field blank was also received. According to the Chain of Custody, these samples were collected November 6, 2018. All samples were received in good condition with no signs of loss.

Sample Analysis Notes

Samples were analyzed for ammonia based on the analytical procedures in BAAQMD ST-1A (Determination of Ammonia Effluents Collected in Acid Media using the Specific Ion Electrode). These samples were analyzed on November 9, 2018 (within 5 days of sample receipt). All samples had a pH measurement below 1.7. Immediately before ammonia analysis, the pH of each sample was raised above 11 using a pH/ionic strength adjusting solution.

Calibration Notes

Prior to analysis, the calibration was checked with a 10.00 ppm audit sample. The measured value was within 5% of the certified concentration.

MONTROSE
AIR QUALITY SERVICES

CHAIN OF CUSTODY

Antioch Location
2825 Verne Roberts Circle
Antioch, CA 94509
Phone (925) 680-4300 | Fax (925) 680-4416

Lab info:

Client / Project: EthosEnergy SPA COGEN III	**Project / Sample Location:** Turbine	**Test / Analytical Method:** BAAQMD ST-1B (combine impingers)
Project No.: 005AS-218872	**Purchase Order No:**	**Special Analysis / Reporting Instructions:**
Send Analytical Report To: Antioch QA/QC: AntiochQA-QC@montrose-env.com nohlendorf@montrose-env.com	**Sampler or PM Signature:** N-Q-f	Please Hold 4-NH3 and do not analyze at this time.

Run / Sample No.	Date	Time	Containers	Sample Fraction	Reagent	Lab / Sample ID No.
1-NH3	11/6/18		1	Container 1 - Impingers 1 & 2 contents and rinses	0.1N HCl	
2-NH3	11/6/18		1	Same as Run 1	"	
3-NH3	11/6/18		1	Same as Run 1	"	
4-NH3- (DB off)	11/6/18		1	Same as Run 1	"	
FB-NH3	11/6/18		1	Field blank - same as Run 1	"	
Total Containers			5			

Relinquished by	Date	Time	Received by	Date	Time	Temp.
N-Q-f	11/6/18	1800	Melissa Stolz	11/6/18	1800	
Relinquished by	Date	Time	Received by	Date	Time	Temp.
Relinquished by	Date	Time	Received by	Date	Time	Temp.

Key: FB = Field Blank

Appendix C.2
Fuel Analyses

Atmospheric Analysis & Consulting, Inc.

CLIENT	: Montrose AQS
PROJECT NAME	: EthosEnergy SPA COGEN III
PROJECT NUMBER	: 005AS-218872
AAC PROJECT NO.	: 181728
REPORT DATE	: 11/19/2018

On November 8, 2018, Atmospheric Analysis & Consulting, Inc. received one (1) Six-Liter Silonite Canister for BTU analysis by ASTM-D3588. Upon receipt, the sample was assigned a unique Laboratory ID number as follows:

Client ID	Lab No.	Initial Pressure (mmHg)
1-Fuel	181728-114633	550.3

All of the analyses mentioned above were performed in accordance with AAC's ISO/IEC 17025:2005 and NELAP approved Quality Assurance Plan. For detailed information pertaining to specific EPA, NCASI, ASTM and SCAQMD accreditations (Methods & Analytes), please visit our website at www.aaclab.com.

I certify that this data is technically accurate, complete, and in compliance with the terms and conditions of the contract. No problems were encountered during receiving, preparation, and/or analysis of this sample. The Laboratory Director or his/her designee, as verified by the following signature, has authorized release of the data contained in this hardcopy report.

If you have any questions or require further explanation of data results, please contact the undersigned.

Marcus Hueppe
Laboratory Director

This report consists of 7 pages.

1534 Eastman Ave., Ste. A • Ventura, • CA 93003 www.aaclab.com • (805) 650-1642

Atmospheric Analysis & Consulting, Inc.

Laboratory Analysis Report
ASTM-D3588 (BTU and F-Factor)

CLIENT Montrose AQS
PROJECT NO. 181728

SAMPLING DATE 11/6/2018
ANALYSIS DATE 11/16/2018

	Client ID:	1-Fuel
	AAC ID:	181728-114633
	Component	Mole %	Weight %
FIXED GASES	H_2	0.00	0.00
	O_2	0.08	0.16
	N_2	0.87	1.44
	CO	0.00	0.00
	CO_2	0.58	1.50
	CH_4	94.60	89.71
	He	NM	NM
	Ar	NM	NM
HYDROCARBONS	C_2 (as Ethane)	3.6079	6.4131
	C_3 (as Propane)	0.1942	0.5062
	C_4 (as Butane)	0.0557	0.1914
	C_5 (as Pentane)	0.0134	0.0572
	C_6 (as Hexane)	0.0021	0.0109
	C_{6+} (as Hexane)	0.0030	0.0152
TRS	TRS as H2S	0.0002	0.0003
H2O	Moisture content	NM	NM

All results have been normalized to 100% on a dry basis.

Fuel Gas Specifications				
Atomic Breakdown - (scf/lb) / %			*HHV Btu/lb*	23033
Carbon (C)	73.3		*LHV Btu/lb*	20757
Hydrogen (H)	24.0		*HHV Btu/dscf*	1027
Oxygen (O)	1.2		*LHV Btu/dscf*	926
Nitrogen (N)	1.4		*F-Factor*	8644
Helium (He)	0.00		*Relative Density*	0.5841
Argon (Ar)	0.00		*C2-C6+ Weight %*	7.1941
Sulfur (S)	0.00		*MW lb/lb-mole*	16.917
Motor Octane Number	131.65		*Methane Number*	94.70

Marcus Hueppe
Laboratory Director

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LABORATORY ANALYSIS REPORT

CLIENT Montrose AQS
PROJECT NO. 181728
MATRIX AIR
UNITS ppmV

SAMPLING DATE 11/06/18
ANALYSIS DATE 11/09/18

Total Reduced Sulfur Compounds Analysis by ASTM D-5504

Client ID	1-Fuel
AAC ID	181728-114633
Canister Dil. Fac.	1.7
Analyte	Result
Hydrogen Sulfide	**0.384**
Carbonyl Sulfide	**0.635**
Sulfur Dioxide	< 0.083
Methyl Mercaptan	< 0.083
Ethyl Mercaptan	< 0.083
Dimethyl Sulfide	< 0.083
Carbon Disulfide	< 0.083
Isopropyl Mercaptan	< 0.083
tert-Butyl Mercaptan	**0.146**
n-Propyl Mercaptan	< 0.083
Methylethylsulfide	< 0.083
sec-Butyl Mercaptan / Thiophene	< 0.083
iso-Butyl Mercaptan	< 0.083
Diethyl Sulfide	< 0.083
n-Butyl Mercaptan	< 0.083
Dimethyl Disulfide	< 0.083
2-Methylthiophene	< 0.083
3-Methylthiophene	< 0.083
Tetrahydrothiophene	**1.26**
Bromothiophene	< 0.083
Thiophenol	< 0.083
Diethyl Disulfide	< 0.083
Total Unidentified Sulfur	< 0.083
Total Reduced Sulfurs	**1.79**

All unidentified compound's concentrations expressed in terms of H_2S (TRS does not include COS and SO_2)
Sample Reporting Limit (SRL) is equal to Reporting Limit x Canister Dil. Fac. x Analysis Dil. Fac.

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Atmospheric Analysis & Consulting, Inc.

Quality Control/Quality Assurance Report

Date Analyzed : 11/16/2018
Analyst : DL
Units : %

Instrument ID : TCD #1
Calb Date : 08/28/18
Reporting Limit : 0.1%

I - Opening Continuing Calibration Verification - BTU/ASTM D-1945

AAC ID	Analyte	H_2	O_2	N_2	CH_4	CO	CO_2
CCV	Spike Conc	9.5	10.4	19.9	10.3	10.2	10.2
	Result	10.0	10.5	20.2	10.4	10.1	9.9
	% Rec *	105.6	100.5	101.8	101.7	99.0	97.2

II - Method Blank - BTU/ASTM D-1945

AAC ID	Analyte	H_2	O_2	N_2	CH_4	CO	CO_2
MB	Concentration	ND	ND	ND	ND	ND	ND

III - Laboratory Control Spike & Duplicate - BTU/ASTM D-1945

AAC ID	Analyte	H_2	O_2	N_2	CH_4	CO	CO_2
Lab Control Standards	Sample Conc	0.0	0.0	0.0	0.0	0.0	0.0
	Spike Conc	9.5	10.4	19.9	10.3	10.2	10.2
	LCS Result	10.1	10.4	20.2	10.4	10.1	9.9
	LCSD Result	9.8	10.6	20.6	10.6	10.3	10.2
	LCS % Rec *	105.6	100.4	101.5	101.5	99.0	97.3
	LCSD % Rec *	102.8	102.3	103.7	103.4	100.9	99.4
	% RPD ***	2.7	1.9	2.1	1.9	1.9	2.1

IV -Sample & Sample Duplicate - BTU/ASTM D-1945

AAC ID	Analyte	H_2	O_2	N_2	CH_4	CO	CO_2
181747-114705	Sample	0.0	6.7	40.1	0.0	0.0	2.0
	Sample Dup	0.0	6.6	39.8	0.0	0.0	2.0
	Mean	0.0	6.7	40.0	0.0	0.0	2.0
	% RPD ***	0.0	0.7	0.7	0.0	0.0	0.0

V - Matrix Spike & Duplicate- BTU/ASTM D-1945

AAC ID	Analyte	H_2	N_2	CH_4	CO	CO_2
181747-114705	Sample Conc	0.0	20.0	0.0	0.0	1.0
	Spike Conc	9.5	9.8	10.3	10.2	10.2
	MS Result	9.3	30.4	10.5	10.1	10.9
	MSD Result	9.6	30.0	10.5	10.2	11.1
	MS % Rec **	98.2	106.4	101.8	99.5	97.2
	MSD % Rec **	100.4	102.3	102.6	100.2	98.3
	% RPD ***	2.2	3.9	0.8	0.7	1.1

VI - Closing Continuing Calibration Verification - BTU/ASTM D-1945

AAC ID	Analyte	H_2	O_2	N_2	CH_4	CO	CO_2
CCV	Spike Conc	9.5	10.4	19.9	10.3	10.2	10.2
	Result	9.4	10.5	20.3	10.4	10.1	10.0
	% Rec *	99.0	100.8	101.9	101.6	99.3	98.2

** Must be 85-115%*
*** Must be 75-125%*
**** Must be < 25%*
ND = Not Detected
<RL = less than Reporting Limit

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Laboratory Director

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Atmospheric Analysis & Consulting, Inc.

Quality Control/Quality Assurance Report

Date Analyzed : 11/16/2018
Analyst : DL
Units : ppmv

Instrument ID : FID #3
Calb Date : 02/27/18
Reporting Limit : 0.5 ppmv

I - Opening Continuing Calibration Verification - BTU/ASTM D-1945

AAC ID	Analyte	Methane	Ethane	Propane	Butane	Pentane	Hexane
CCV	Spike Conc	99.7	100.1	99.9	99.8	100.0	99.9
	Result	93.8	94.5	93.3	93.5	92.6	90.8
	% Rec *	94.1	94.4	93.3	93.7	92.6	90.8

II - Method Blank - BTU/ASTM D-1945

AAC ID	Analyte	Methane	Ethane	Propane	Butane	Pentane	Hexane
MB	Concentration	ND	ND	ND	ND	ND	ND

III - Laboratory Control Spike & Duplicate - BTU/ASTM D-1945

AAC ID	Analyte	Methane	Ethane	Propane	Butane	Pentane	Hexane
Lab Control Standards	Sample Conc	0.0	0.0	0.0	0.0	0.0	0.0
	Spike Conc	99.7	100.1	99.9	99.8	100.0	99.9
	LCS Result	93.4	94.9	94.4	93.0	92.4	91.3
	LCSD Result	94.6	96.4	95.0	94.4	93.4	91.6
	LCS % Rec *	93.7	94.8	94.4	93.2	92.4	91.4
	LCSD % Rec *	94.9	96.2	95.1	94.5	93.4	91.7
	% RPD ***	1.3	1.5	0.7	1.4	1.1	0.4

IV - Sample & Sample Duplicate - BTU/ASTM D-1945

AAC ID	Analyte	Methane	Ethane	Propane	Butane	Pentane	Hexane
181757-114772	Sample	5.3	4.3	0.0	0.0	0.0	0.0
	Sample Dup	5.1	4.3	0.0	0.0	0.0	0.0
	Mean	5.2	4.3	0.0	0.0	0.0	0.0
	% RPD ***	3.0	0.2	0.0	0.0	0.0	0.0

V - Matrix Spike & Duplicate - BTU/ASTM D-1945

AAC ID	Analyte	Methane	Ethane	Propane	Butane	Pentane	Hexane
181757-114772	Sample Conc	2.6	2.1	0.0	0.0	0.0	0.0
	Spike Conc	49.8	50.1	50.0	49.9	50.0	50.0
	MS Result	51.3	49.1	48.6	48.8	48.8	48.5
	MSD Result	53.2	50.8	50.5	50.4	50.3	49.6
	MS % Rec **	97.7	93.8	97.2	97.7	97.7	97.1
	MSD % Rec **	101.6	97.2	101.1	101.1	100.6	99.3
	% RPD ***	3.9	3.6	4.0	3.4	2.9	2.3

VI - Closing Continuing Calibration Verification - BTU/ASTM D-1945

AAC ID	Analyte	Methane	Ethane	Propane	Butane	Pentane	Hexane
CCV	Spike Conc	99.7	100.1	99.9	99.8	100.0	99.9
	Result	93.8	94.4	85.9	93.8	92.8	91.0
	% Rec *	94.1	94.3	85.9	93.9	92.8	91.1

** Must be 85-115%*

*** Must be 75-125%*

**** Must be < 25%*

ND = Not Detected

<RL = less than Reporting Limit

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Quality Control/Quality Assurance Report
ASTM D-5504

Date Analyzed: 11/9/2018
Analyst: ZB
Units: ppbV

Instrument ID: SCD#10
Calb. Date: 10/29/2018

Opening Calibration Verification Standard

465.3 ppbV H2S (SS1099)

H_2S	Resp. (area)	Result	% Rec *	% RPD ****
Initial	2711	482	103.5	0.0
Duplicate	2702	480	103.2	0.4
Triplicate	2722	483	103.9	0.4

452.0 ppbV H2S (SS1099)

MeSH	Resp. (area)	Result	% Rec *	% RPD ****
Initial	3465	461	101.9	1.5
Duplicate	3355	446	98.7	1.7
Triplicate	3420	455	100.6	0.2

476.3 ppbV H2S (SS1099)

DMS	Resp. (area)	Result	% Rec *	% RPD ****
Initial	4556	477	100.2	0.6
Duplicate	4463	468	98.2	1.4
Triplicate	4562	478	100.4	0.8

Method Blank

Analyte	Result
H_2S	<PQL
MeSH	<PQL
DMS	<PQL

Duplicate Analysis **Sample ID** 181696-114416

Analyte	Sample Result	Duplicate Result	Mean	% RPD ***
H_2S	353167.6	342331.3	347749.5	3.1
MeSH	<PQL	<PQL	0.0	0.0
DMS	<PQL	<PQL	0.0	0.0

Matrix Spike & Duplicate **Sample ID** 181696-114416 x800

Analyte	Sample Conc.	Spike Added	MS Result	MSD Result	MS % Rec **	MSD % Rec **	% RPD ***
H_2S	434.7	232.6	723.5	701.0	108.4	105.0	3.2
MeSH	<PQL	226.0	239.0	248.3	105.8	109.9	3.8
DMS	<PQL	238.1	248.5	253.7	104.4	106.5	2.1

Closing Calibration Verification Standard

Analyte	Std. Conc.	Result	% Rec **
H_2S	465.3	470.3	101.1
MeSH	452.0	425.8	94.2
DMS	476.3	439.0	92.2

** Must be 95-105%, ** Must be 90-110%, *** Must be < 10%, **** Must be < 5% RPD from Mean result.*

H2S: PQL = 10.0 ppbV, MDL = 0.95 ppbV
MeSH: PQL = 10.0 ppbV, MDL = 1.40 ppbV
DMS: PQL = 10.0 ppbV, MDL = 1.46 ppbV

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MONTROSE AIR QUALITY SERVICES

CHAIN OF CUSTODY

#181728

Antioch Location
2825 Verne Roberts Circle
Antioch, CA 94509
Phone (925) 680-4300 | Fax (925) 680-4416

Lab info: AAC

Client / Project: EthosEnergy SPA COGEN III	**Project / Sample Location:** Turbine	**Test / Analytical Method:** ASTM D-1945, D-5504
Project No.: 005AS-218872	**Purchase Order No:** PO ~~1027440~~ 1027420	**Special Analysis / Reporting Instructions:** Please analyze for HHV and total Sulfur
Send Analytical Report To: Antioch QA/QC: AntiochQA-QC@montrose-env.com; nohlendorf@montrose-env.com	**Sampler or PM Signature:** N Ohlendorf	

Run / Sample No.	Date	Time	Containers	Sample Fraction	Reagent	Lab / Sample ID No.
1-Fuel	11/6/18	1400	1	Natural Gas in SUMMA Canister	114633	750
Total Containers			1			

Relinquished by	Date	Time	Received by	Date	Time	Temp.
N Ohlendorf	11/6/18	1830	Melissa Stefan	11/7/18	1300	
Melissa Stefan TO FedEx	11/7/18	1300		Date	Time	Temp.
Relinquished by	Date	Time	Received by	Date	Time	Temp.
				11/8/18	0945	

Fuel Sulfur Content Calculations

EthosEnergy - SPA Cogen III

Sample:	1-Fuel, 11/6/2018		
	ppmv	#S atoms/mole	ppmv as S
Compound			
Hydrogen Sulfide	0.384	1	0.384
Carbonyl Sulfide	0.635	1	0.635
Methyl Mercaptan	0	1	0
Ethyl Mercaptan	0	1	0
Dimethyl Sulfide	0	1	0
Carbon Disulfide	0	2	0
Isopropyl Mercaptan	0	1	0
tert-Butyl Mercaptan	0.146	1	0.146
n-Propyl Mercaptan	0	1	0
Ethyl Methyl Sulfide	0	1	0
Thiophene	0	1	0
Isobutyl Mercaptan	0	1	0
Diethyl Sulfide	0	1	0
Butyl Mercaptan	0	1	0
Dimethyl Disulfide	0	2	0
3-Methylthiophene	0	1	0
Tetrahydrothiophene	1.26	1	1.26
2-Ethylthiophene	0	1	0
2,5-Dimethylthiophene	0	1	0
Diethyl Disulfide	0	2	0
Total:			2.425

Average ppmv as Sulfur: 2.425
Sulfur, grains/100scf: 0.1434

APPENDIX D
CLIENT CEMS AND PROCESS DATA

Date/Time	UNIT1 CO#/HR Value	UNIT1 COPPMC Value	UNIT1 FD Value	UNIT1 GASFLOW Value	UNIT1 GASGCV Value	UNIT1 LOADMW Value	UNIT1 NOX#/H60 Value	UNIT1 NOX#/MM Value	UNIT1 NOXPPMC Value	UNIT1 O2 Value
11/06/2018 08:25	0	0	8710	11444	1036.6	100	10.05	0.008	2.3	15
11/06/2018 08:26	0	0	8710	11426.7	1036.6	100	10.16	0.008	2.3	15
11/06/2018 08:27	0	0	8710	11429.3	1036.6	100	10.16	0.008	2.3	15
11/06/2018 08:28	0	0	8710	11435.2	1036.6	100	10.18	0.009	2.3	15.1
11/06/2018 08:29	0	0	8710	11415.7	1036.6	100	10.2	0.009	2.3	15.1
11/06/2018 08:30	0	0	8710	11439.6	1036.6	100	10.08	0.009	2.3	15.1
11/06/2018 08:31	0	0	8710	11418.1	1036.6	100	10.25	0.009	2.4	15.1
11/06/2018 08:32	0	0	8710	11429	1036.6	100	10.21	0.009	2.3	15.1
11/06/2018 08:33	0	0	8710	11441.8	1036.6	100	10.12	0.009	2.3	15.1
11/06/2018 08:34	0	0	8710	11416.4	1036.6	100	10.31	0.009	2.4	15.1
11/06/2018 08:35	0	0	8710	11392.7	1036.6	99	10.34	0.009	2.4	15.1
11/06/2018 08:36	0	0	8710	11401	1036.6	100	10.09	0.009	2.3	15.1
11/06/2018 08:37	0	0	8710	11412.3	1036.6	100	10.2	0.009	2.3	15.1
11/06/2018 08:38	0	0	8710	11400.4	1036.6	99	10.18	0.009	2.3	15.1
11/06/2018 08:39	0	0	8710	11376.8	1036.6	99	10.12	0.009	2.3	15.1
11/06/2018 08:40	0	0	8710	11382.2	1036.6	99	10.02	0.008	2.3	15
11/06/2018 08:41	0	0	8710	11388.3	1036.6	99	9.77	0.008	2.2	15
11/06/2018 08:42	0	0	8710	11388.1	1036.6	99	9.83	0.008	2.3	15
11/06/2018 08:43	0	0	8710	11384.1	1036.6	99	9.9	0.008	2.3	15
11/06/2018 08:44	0	0	8710	11407	1036.6	99	9.86	0.008	2.3	15
11/06/2018 08:45	0	0	8710	11362.9	1036.6	99	9.85	0.008	2.3	15
11/06/2018 08:46	0	0	8710	11387.7	1036.6	99	9.92	0.008	2.3	15
11/06/2018 08:47	0	0	8710	11391.9	1036.6	99	10.32	0.009	2.4	15
11/06/2018 08:48	0	0	8710	11409.1	1036.6	99	10.44	0.009	2.4	15
11/06/2018 08:49	0	0	8710	11384.8	1036.6	99	10.74	0.009	2.5	15
11/06/2018 08:50	0	0	8710	11340.5	1036.6	99	10.68	0.009	2.5	15
11/06/2018 08:51	0	0	8710	11323.2	1036.6	99	10.55	0.009	2.4	15.1
11/06/2018 08:52	0	0	8710	11368	1036.6	99	10.23	0.009	2.4	15.1
11/06/2018 08:53	0	0	8710	11374.9	1036.6	99	10.59	0.009	2.4	15
11/06/2018 08:54	0	0	8710	11390.4	1036.6	99	10.77	0.009	2.5	15
11/06/2018 08:55	0	0	8710	11374.6	1036.6	99	10.89	0.009	2.5	15.1
11/06/2018 08:56	0	0	8710	11349.1	1036.6	99	10.83	0.009	2.5	15.1
AVERAGE	**0**	**0**	**8710**	**11396.4**	**1036.6**	**99.4**	**10.25**	**0.009**	**2.4**	**15.1**

Date/Time	UNIT1 CO#/HR Value	UNIT1 COPPMC Value	UNIT1 FD Value	UNIT1 GASFLOW Value	UNIT1 GASGCV Value	UNIT1 LOADMW Value	UNIT1 NOX#/H60 Value	UNIT1 NOX#/MM Value	UNIT1 NOXPPMC Value	UNIT1 O2 Value
11/06/2018 09:28	0	0	8710	11570	1036.6	102	10.52	0.009	2.4	15
11/06/2018 09:29	0	0	8710	11587.9	1036.6	102	10.68	0.009	2.4	15
11/06/2018 09:30	0	0	8710	11577.5	1036.6	102	10.68	0.009	2.4	15
11/06/2018 09:31	0	0	8710	11541.8	1036.6	101	10.7	0.009	2.4	15
11/06/2018 09:32	0	0	8710	11567.5	1036.6	102	10.52	0.009	2.4	15
11/06/2018 09:33	0	0	8710	11588	1036.6	102	10.45	0.009	2.4	15
11/06/2018 09:34	0	0	8710	11547.9	1036.6	101	10.75	0.009	2.4	15
11/06/2018 09:35	0	0	8710	11592.9	1036.6	102	10.59	0.009	2.4	15
11/06/2018 09:36	0	0	8710	11571.2	1036.6	101	10.76	0.009	2.4	15
11/06/2018 09:37	0	0	8710	11567.7	1036.6	101	10.65	0.009	2.4	15
11/06/2018 09:38	0	0	8710	11575.1	1036.6	102	10.59	0.009	2.4	15
11/06/2018 09:39	0	0	8710	11578.6	1036.6	102	10.57	0.009	2.4	15
11/06/2018 09:40	0	0	8710	11586.1	1036.6	102	10.5	0.009	2.4	15
11/06/2018 09:41	0	0	8710	11586.2	1036.6	102	10.53	0.009	2.4	15
11/06/2018 09:42	0	0	8710	11590	1036.6	102	10.74	0.009	2.4	15
11/06/2018 09:43	0	0	8710	11585.2	1036.6	102	10.72	0.009	2.4	15
11/06/2018 09:44	0	0	8710	11583.1	1036.6	102	10.64	0.009	2.4	15
11/06/2018 09:45	0	0	8710	11592	1036.6	102	10.8	0.009	2.4	15
11/06/2018 09:46	0	0	8710	11586.6	1036.6	102	10.67	0.009	2.4	15
11/06/2018 09:47	0	0	8710	11557.4	1036.6	101	10.78	0.009	2.4	15
11/06/2018 09:48	0	0	8710	11580.8	1036.6	102	10.49	0.009	2.4	15
11/06/2018 09:49	0	0	8710	11564.2	1036.6	101	10.67	0.009	2.4	15
AVERAGE	**0**	**0**	**8710**	**11576.3**	**1036.6**	**101.7**	**10.64**	**0.009**	**2.4**	**15**

Date/Time	UNIT1 CO#/HR Value	UNIT1 COPPMC Value	UNIT1 FD Value	UNIT1 GASFLOW Value	UNIT1 GASGCV Value	UNIT1 LOADMW Value	UNIT1 NOX#/H60 Value	UNIT1 NOX#/MM Value	UNIT1 NOXPPMC Value	UNIT1 O2 Value
11/06/2018 10:25	0.69	0.2	8710	12225.4	1036.6	178	10.25	0.008	2.2	14.6
11/06/2018 10:26	0.69	0.2	8710	12245.8	1036.6	178	10.42	0.008	2.2	14.6
11/06/2018 10:27	0.66	0.2	8710	12256.5	1036.6	178	10.96	0.009	2.3	14.6
11/06/2018 10:28	0.63	0.2	8710	12253.6	1036.6	178	11.38	0.009	2.4	14.6
11/06/2018 10:29	0.64	0.2	8710	12255.9	1036.6	178	11.36	0.009	2.4	14.6
11/06/2018 10:30	0.65	0.2	8710	12237.6	1036.6	178	11.58	0.009	2.5	14.6
11/06/2018 10:31	0.64	0.2	8710	12229.8	1036.6	178	11.54	0.009	2.5	14.6
11/06/2018 10:32	0.67	0.2	8710	12241.9	1036.6	178	11.71	0.009	2.5	14.6
11/06/2018 10:33	0.63	0.2	8710	12227.4	1036.6	178	11.72	0.009	2.5	14.6
11/06/2018 10:34	0.61	0.2	8710	12213.7	1037.2	178	11.62	0.009	2.5	14.7
11/06/2018 10:35	0.61	0.2	8710	12201.7	1037.3	177	11.66	0.009	2.5	14.7
11/06/2018 10:36	0.6	0.2	8710	12243.6	1037.3	178	11.18	0.009	2.4	14.7
11/06/2018 10:37	0.59	0.2	8710	12270.5	1037.3	178	11.11	0.009	2.4	14.7
11/06/2018 10:38	0.59	0.2	8710	12238.9	1037.3	178	11.45	0.009	2.4	14.7
11/06/2018 10:39	0.6	0.2	8710	12218.1	1036.8	178	11.23	0.009	2.4	14.7
11/06/2018 10:40	0.56	0.2	8710	12211.9	1036.6	178	11.06	0.009	2.4	14.7
11/06/2018 10:41	0.58	0.2	8710	12247.3	1036.6	178	10.78	0.008	2.3	14.7
11/06/2018 10:42	0.61	0.2	8710	12236.2	1036.6	178	10.99	0.009	2.4	14.7
11/06/2018 10:43	0.64	0.2	8710	12225.9	1036.6	178	11.15	0.009	2.4	14.7
11/06/2018 10:44	0.66	0.2	8710	12213.9	1036.6	178	10.91	0.009	2.3	14.7
11/06/2018 10:45	0.67	0.2	8710	12228.3	1036.6	178	10.81	0.009	2.3	14.7
11/06/2018 10:46	0.67	0.2	8710	12220.3	1036.6	178	10.73	0.008	2.3	14.6
11/06/2018 10:47	0.68	0.2	8710	12229.2	1036.6	178	10.7	0.008	2.3	14.6
11/06/2018 10:48	0.72	0.3	8710	12277.4	1036.6	178	10.76	0.008	2.3	14.6
11/06/2018 10:49	0.68	0.2	8710	12214.4	1036.6	177	11.1	0.009	2.4	14.6
11/06/2018 10:50	0.67	0.2	8710	12217.8	1036.6	178	10.86	0.009	2.3	14.6
11/06/2018 10:51	0.67	0.2	8710	12220.3	1036.6	178	10.54	0.008	2.3	14.6
11/06/2018 10:52	0.65	0.2	8710	12242.1	1036.5	178	10.83	0.009	2.3	14.6
11/06/2018 10:53	0.64	0.2	8710	12222.2	1036.5	178	10.66	0.008	2.3	14.6
11/06/2018 10:54	0.64	0.2	8710	12243.3	1036.5	178	10.7	0.008	2.3	14.6
11/06/2018 10:55	0.6	0.2	8710	12204.5	1036.5	177	10.83	0.009	2.3	14.6
11/06/2018 10:56	0.63	0.2	8710	12204.8	1036.6	177	10.66	0.008	2.3	14.6
11/06/2018 10:57	0.58	0.2	8710	12219.5	1036.5	178	10.63	0.008	2.3	14.6
11/06/2018 10:58	0.6	0.2	8710	12230	1036.6	178	10.81	0.009	2.3	14.7
11/06/2018 10:59	0.59	0.2	8710	12210.1	1036.5	178	10.68	0.008	2.3	14.7
AVERAGE	0.64	0.2	8710	12230.9	1036.7	178	11.01	0.009	2.4	14.6

Date/Time	UNIT1 CO#/HR Value	UNIT1 COPPMC Value	UNIT1 FD Value	UNIT1 GASFLOW Value	UNIT1 GASGCV Value	UNIT1 LOADMW Value	UNIT1 NOX#/H60 Value	UNIT1 NOX#/MM Value	UNIT1 NOXPPMC Value	UNIT1 O2 Value
11/06/2018 11:09	0.66	0.2	8710	12191.8	1036.5	177	10.51	0.008	2.3	14.6
11/06/2018 11:10	0.68	0.2	8710	12224.5	1036.5	178	10.64	0.008	2.3	14.6
11/06/2018 11:11	0.72	0.3	8710	12215.5	1036.5	178	10.99	0.009	2.4	14.6
11/06/2018 11:12	0.7	0.2	8710	12229.6	1036.5	178	11.13	0.009	2.4	14.6
11/06/2018 11:13	0.66	0.2	8710	12203.7	1036.5	177	11.43	0.009	2.5	14.6
11/06/2018 11:14	0.65	0.2	8710	12192.1	1036.6	177	11.16	0.009	2.4	14.6
11/06/2018 11:15	0.61	0.2	8710	12187.5	1036.6	177	11.11	0.009	2.4	14.6
11/06/2018 11:16	0.61	0.2	8710	12224.8	1036.5	178	11.21	0.009	2.4	14.6
11/06/2018 11:17	0.62	0.2	8710	12216.3	1036.6	178	11.43	0.009	2.5	14.6
11/06/2018 11:18	0.61	0.2	8710	12177.3	1036.6	177	11.51	0.009	2.5	14.6
11/06/2018 11:19	0.59	0.2	8710	12191.2	1036.6	177	11.41	0.009	2.5	14.6
11/06/2018 11:20	0.59	0.2	8710	12197	1036.6	177	11.23	0.009	2.4	14.6
11/06/2018 11:21	0.57	0.2	8710	12196.7	1036.6	177	11.37	0.009	2.4	14.7
11/06/2018 11:22	0.57	0.2	8710	12220.1	1036.6	177	11.34	0.009	2.4	14.7
11/06/2018 11:23	0.55	0.2	8710	12222.2	1036.6	178	11.52	0.009	2.5	14.7
11/06/2018 11:24	0.56	0.2	8710	12196.4	1036.6	177	11.32	0.009	2.4	14.7
11/06/2018 11:25	0.56	0.2	8710	12215.8	1036.6	177	11.38	0.009	2.4	14.7
11/06/2018 11:26	0.55	0.2	8710	12224.3	1036.6	178	11.27	0.009	2.4	14.7
11/06/2018 11:27	0.57	0.2	8710	12208.9	1036.6	177	11.49	0.009	2.5	14.7
11/06/2018 11:28	0.58	0.2	8710	12190	1036.6	177	11.59	0.009	2.5	14.7
11/06/2018 11:29	0.61	0.2	8710	12175.7	1036.6	177	11.22	0.009	2.4	14.7
11/06/2018 11:30	0.63	0.2	8710	12198.1	1036.6	177	10.74	0.008	2.3	14.7
AVERAGE	0.61	0.2	8710	12204.5	1036.6	177	11.23	0.009	2.4	14.6

Date/Time	UNIT1 CO#/HR Value	UNIT1 COPPMC Value	UNIT1 FD Value	UNIT1 GASFLOW Value	UNIT1 GASGCV Value	UNIT1 LOADMW Value	UNIT1 NOX#/H60 Value	UNIT1 NOX#/MM Value	UNIT1 NOXPPMC Value	UNIT1 O2 Value
11/06/2018 11:47	0.53	0.2	8710	12218	1036.6	178	10.88	0.009	2.3	14.7
11/06/2018 11:48	0.51	0.2	8710	12179	1036.6	177	11.18	0.009	2.4	14.7
11/06/2018 11:49	0.53	0.2	8710	12192.2	1036.6	177	11.11	0.009	2.4	14.7
11/06/2018 11:50	0.53	0.2	8710	12172.5	1036.6	177	11.1	0.009	2.4	14.7
11/06/2018 11:51	0.53	0.2	8710	12171.9	1036.6	177	11.23	0.009	2.4	14.7
11/06/2018 11:52	0.6	0.2	8710	12170.3	1036.6	177	11.16	0.009	2.4	14.7
11/06/2018 11:53	0.6	0.2	8710	12183.4	1036.6	177	11.15	0.009	2.4	14.7
11/06/2018 11:54	0.61	0.2	8710	12175.2	1036.6	177	10.95	0.009	2.4	14.7
11/06/2018 11:55	0.64	0.2	8710	12193.7	1036.6	177	11.05	0.009	2.4	14.7
11/06/2018 11:56	0.65	0.2	8710	12166.8	1036.6	177	11.01	0.009	2.4	14.6
11/06/2018 11:57	0.65	0.2	8710	12205.8	1036.6	177	11.04	0.009	2.4	14.6
11/06/2018 11:58	0.67	0.2	8710	12183.6	1036.6	177	11.11	0.009	2.4	14.6
11/06/2018 11:59	0.64	0.2	8710	12201.5	1036.6	177	11.19	0.009	2.4	14.6
11/06/2018 12:00	0.62	0.2	8710	12179	1036.6	177	11.21	0.009	2.4	14.6
11/06/2018 12:01	0.61	0.2	8710	12157.4	1036.6	177	11.18	0.009	2.4	14.6
11/06/2018 12:02	0.6	0.2	8710	12172.4	1036.6	177	10.92	0.009	2.3	14.6
11/06/2018 12:03	0.62	0.2	8710	12165.3	1036.6	177	10.96	0.009	2.4	14.6
11/06/2018 12:04	0.62	0.2	8710	12148.9	1036.6	176	10.97	0.009	2.4	14.6
11/06/2018 12:05	0.55	0.2	8710	12170	1036.6	177	11.09	0.009	2.4	14.6
11/06/2018 12:06	0.56	0.2	8710	12177.1	1036.6	177	10.99	0.009	2.4	14.6
11/06/2018 12:07	0.55	0.2	8710	12174.7	1036.6	177	11.18	0.009	2.4	14.6
11/06/2018 12:08	0.56	0.2	8710	12134.6	1036.6	176	11.22	0.009	2.4	14.6
AVERAGE	0.59	0.2	8710	12177.0	1036.6	177	11.09	0.009	2.4	14.6

Date/Time	UNIT1 CO#/HR Value	UNIT1 COPPMC Value	UNIT1 FD Value	UNIT1 GASFLOW Value	UNIT1 GASGCV Value	UNIT1 LOADMW Value	UNIT1 NOX#/H60 Value	UNIT1 NOX#/MM Value	UNIT1 NOXPPMC Value	UNIT1 O2 Value
11/06/2018 12:19	0.64	0.2	8710	12141.8	1036.6	176	10.91	0.009	2.4	14.6
11/06/2018 12:20	0.66	0.2	8710	12158.3	1036.6	176	10.76	0.009	2.3	14.6
11/06/2018 12:21	0.66	0.2	8710	12182.5	1036.6	177	10.75	0.009	2.3	14.6
11/06/2018 12:22	0.62	0.2	8710	12181.1	1036.6	177	10.83	0.009	2.3	14.6
11/06/2018 12:23	0.61	0.2	8710	12139.7	1036.6	176	11.03	0.009	2.4	14.6
11/06/2018 12:24	0.59	0.2	8710	12163.2	1036.6	177	10.78	0.009	2.3	14.6
11/06/2018 12:25	0.58	0.2	8710	12143.6	1036.6	176	10.89	0.009	2.3	14.6
11/06/2018 12:26	0.59	0.2	8710	12124.5	1036.6	176	10.69	0.009	2.3	14.6
11/06/2018 12:27	0.56	0.2	8710	12163	1036.6	176	10.86	0.009	2.3	14.7
11/06/2018 12:28	0.55	0.2	8710	12128.1	1036.6	176	10.73	0.009	2.3	14.6
11/06/2018 12:29	0.58	0.2	8710	12121.8	1036.6	176	10.6	0.008	2.3	14.6
11/06/2018 12:30	0.56	0.2	8710	12175.9	1036.6	177	10.81	0.009	2.3	14.7
11/06/2018 12:31	0.55	0.2	8710	12143.6	1036.6	176	10.74	0.009	2.3	14.6
11/06/2018 12:32	0.54	0.2	8710	12148.8	1036.6	176	10.8	0.009	2.3	14.7
11/06/2018 12:33	0.52	0.2	8710	12117.1	1036.6	176	10.8	0.009	2.3	14.7
11/06/2018 12:34	0.52	0.2	8710	12148.3	1036.6	176	10.57	0.008	2.3	14.7
11/06/2018 12:35	0.51	0.2	8710	12127.1	1036.6	176	10.64	0.008	2.3	14.7
11/06/2018 12:36	0.56	0.2	8710	12111.8	1036.6	176	10.61	0.008	2.3	14.7
11/06/2018 12:37	0.59	0.2	8710	12124.3	1036.6	176	10.52	0.008	2.3	14.7
11/06/2018 12:38	0.59	0.2	8710	12123.2	1036.6	176	10.5	0.008	2.3	14.6
11/06/2018 12:39	0.6	0.2	8710	12130.4	1036.6	176	10.45	0.008	2.3	14.7
11/06/2018 12:40	0.62	0.2	8710	12120.7	1036.6	176	10.52	0.008	2.3	14.6
AVERAGE	0.58	0.2	8710	12141.8	1036.6	176	10.72	0.009	2.3	14.6

Date/Time	UNIT1 CO#/HR Value	UNIT1 COPPMC Value	UNIT1 FD Value	UNIT1 GASFLOW Value	UNIT1 GASGCV Value	UNIT1 LOADMW Value	UNIT1 NOX#/H60 Value	UNIT1 NOX#/MM Value	UNIT1 NOXPPMC Value	UNIT1 O2 Value
11/06/2018 12:47	0.58	0.2	8710	12098.8	1036.6	176	11.14	0.009	2.4	14.6
11/06/2018 12:48	0.55	0.2	8710	12145.9	1036.6	176	10.97	0.009	2.4	14.6
11/06/2018 12:49	0.57	0.2	8710	12118	1036.6	176	11.25	0.009	2.4	14.6
11/06/2018 12:50	0.55	0.2	8710	12109.6	1036.6	176	11.21	0.009	2.4	14.6
11/06/2018 12:51	0.52	0.2	8710	12109.1	1036.6	176	11.28	0.009	2.4	14.6
11/06/2018 12:52	0.53	0.2	8710	12139.3	1036.6	176	11.34	0.009	2.4	14.6
11/06/2018 12:53	0.51	0.2	8710	12098.7	1036.6	175	11.38	0.009	2.5	14.6
11/06/2018 12:54	0.52	0.2	8710	12105.3	1036.6	175	11.22	0.009	2.4	14.7
11/06/2018 12:55	0.51	0.2	8710	12139.8	1036.6	176	11.2	0.009	2.4	14.7
11/06/2018 12:56	0.52	0.2	8710	12113.8	1036.6	176	11.52	0.009	2.5	14.7
11/06/2018 12:57	0.54	0.2	8710	12136.6	1036.6	176	11.29	0.009	2.4	14.7
11/06/2018 12:58	0.55	0.2	8710	12107.2	1036.6	176	11.41	0.009	2.5	14.6
11/06/2018 12:59	0.58	0.2	8710	12097.3	1036.6	175	11.28	0.009	2.4	14.7
11/06/2018 13:00	0.6	0.2	8710	12088.1	1036.6	175	10.95	0.009	2.4	14.7
11/06/2018 13:01	0.6	0.2	8710	12103.8	1036.6	176	10.94	0.009	2.4	14.7
11/06/2018 13:02	0.61	0.2	8710	12115.6	1036.6	176	10.63	0.008	2.3	14.6
11/06/2018 13:03	0.64	0.2	8710	12143.2	1036.6	176	10.93	0.009	2.4	14.6
11/06/2018 13:04	0.62	0.2	8710	12102.7	1036.6	175	10.74	0.009	2.3	14.6
11/06/2018 13:05	0.63	0.2	8710	12106.6	1036.6	175	10.79	0.009	2.3	14.6
11/06/2018 13:06	0.61	0.2	8710	12117.8	1036.6	176	10.63	0.008	2.3	14.6
11/06/2018 13:07	0.58	0.2	8710	12116.1	1036.6	176	10.65	0.009	2.3	14.6
11/06/2018 13:08	0.57	0.2	8710	12093.9	1036.6	175	10.64	0.009	2.3	14.6
AVERAGE	0.57	0.2	8710	12114.0	1036.6	176	11.06	0.009	2.4	14.6

Date/Time	UNIT1 CO#/HR Value	UNIT1 COPPMC Value	UNIT1 FD Value	UNIT1 GASFLOW Value	UNIT1 GASGCV Value	UNIT1 LOADMW Value	UNIT1 NOX#/H60 Value	UNIT1 NOX#/MM Value	UNIT1 NOXPPMC Value	UNIT1 O2 Value
11/06/2018 13:15	0.53	0.2	8710	12121.7	1036.6	176	10.74	0.009	2.3	14.6
11/06/2018 13:16	0.52	0.2	8710	12121.6	1036.6	176	10.72	0.009	2.3	14.6
11/06/2018 13:17	0.48	0.2	8710	12100.5	1036.6	176	10.79	0.009	2.3	14.7
11/06/2018 13:18	0.5	0.2	8710	12100	1036.6	175	10.77	0.009	2.3	14.7
11/06/2018 13:19	0.5	0.2	8710	12085.4	1036.6	175	10.67	0.008	2.3	14.7
11/06/2018 13:20	0.54	0.2	8710	12139.1	1036.6	176	10.5	0.008	2.3	14.7
11/06/2018 13:21	0.56	0.2	8710	12114.3	1036.6	176	10.79	0.009	2.3	14.6
11/06/2018 13:22	0.61	0.2	8710	12103.8	1036.6	176	10.62	0.008	2.3	14.6
11/06/2018 13:23	0.59	0.2	8710	12102.5	1036.6	175	10.67	0.009	2.3	14.6
11/06/2018 13:24	0.63	0.2	8710	12116.6	1036.6	176	10.77	0.009	2.3	14.6
11/06/2018 13:25	0.62	0.2	8710	12098.7	1036.6	176	10.66	0.009	2.3	14.6
11/06/2018 13:26	0.63	0.2	8710	12083.1	1036.6	175	10.72	0.009	2.3	14.6
11/06/2018 13:27	0.61	0.2	8710	12112.7	1036.5	176	10.41	0.008	2.2	14.6
11/06/2018 13:28	0.59	0.2	8710	12110.5	1035.9	176	10.57	0.008	2.3	14.6
11/06/2018 13:29	0.6	0.2	8710	12109.9	1035.9	175	10.72	0.009	2.3	14.6
11/06/2018 13:30	0.57	0.2	8710	12089.3	1035.9	175	10.75	0.009	2.3	14.6
11/06/2018 13:31	0.55	0.2	8710	12097.9	1035.9	175	10.48	0.008	2.3	14.6
11/06/2018 13:32	0.55	0.2	8710	12091.8	1035.9	175	10.73	0.009	2.3	14.6
11/06/2018 13:33	0.52	0.2	8710	12096.1	1035.9	175	10.69	0.009	2.3	14.6
11/06/2018 13:34	0.52	0.2	8710	12124.1	1035.9	176	10.71	0.009	2.3	14.6
11/06/2018 13:35	0.5	0.2	8710	12087.9	1035.9	175	11.01	0.009	2.4	14.6
11/06/2018 13:36	0.52	0.2	8710	12097.7	1035.9	175	11.06	0.009	2.4	14.6
AVERAGE	0.56	0.2	8710	12104.8	1036.3	176	10.71	0.009	2.3	14.6

Date/Time	UNIT1 CO#/HR Value	UNIT1 COPPMC Value	UNIT1 FD Value	UNIT1 GASFLOW Value	UNIT1 GASGCV Value	UNIT1 LOADMW Value	UNIT1 NOX#/H60 Value	UNIT1 NOX#/MM Value	UNIT1 NOXPPMC Value	UNIT1 O2 Value
11/06/2018 13:45	0.6	0.2	8710	12079.1	1035.9	175	11.11	0.009	2.4	14.6
11/06/2018 13:46	0.61	0.2	8710	12093.4	1035.8	175	10.98	0.009	2.4	14.6
11/06/2018 13:47	0.61	0.2	8710	12091.8	1035.9	175	10.88	0.009	2.4	14.6
11/06/2018 13:48	0.62	0.2	8710	12088.6	1035.9	175	10.88	0.009	2.4	14.6
11/06/2018 13:49	0.62	0.2	8710	12080.7	1035.9	175	10.96	0.009	2.4	14.6
11/06/2018 13:50	0.59	0.2	8710	12064	1035.9	175	10.89	0.009	2.4	14.6
11/06/2018 13:51	0.58	0.2	8710	12119.4	1035.9	176	10.78	0.009	2.3	14.6
11/06/2018 13:52	0.58	0.2	8710	12114.4	1035.9	175	10.87	0.009	2.4	14.6
11/06/2018 13:53	0.56	0.2	8710	12097	1035.9	175	11.14	0.009	2.4	14.6
11/06/2018 13:54	0.53	0.2	8710	12074.3	1036.6	175	10.98	0.009	2.4	14.6
11/06/2018 13:55	0.54	0.2	8710	12086	1036.7	175	10.91	0.009	2.4	14.6
11/06/2018 13:56	0.54	0.2	8710	12116.5	1036.6	176	10.82	0.009	2.3	14.6
11/06/2018 13:57	0.51	0.2	8710	12096.8	1036.6	175	11.04	0.009	2.4	14.6
11/06/2018 13:58	0.49	0.2	8710	12091	1036.6	175	11.05	0.009	2.4	14.6
11/06/2018 13:59	0.48	0.2	8710	12103.2	1036.1	175	11.02	0.009	2.4	14.6
11/06/2018 14:00	0.5	0.2	8710	12093.1	1035.9	175	11.1	0.009	2.4	14.6
11/06/2018 14:01	0.49	0.2	8710	12078.2	1035.9	175	11.26	0.009	2.4	14.7
11/06/2018 14:02	0.5	0.2	8710	12066.4	1035.9	175	10.98	0.009	2.4	14.7
11/06/2018 14:03	0.51	0.2	8710	12092.2	1035.9	175	10.89	0.009	2.4	14.7
11/06/2018 14:04	0.54	0.2	8710	12087.7	1035.9	175	10.94	0.009	2.4	14.6
11/06/2018 14:05	0.56	0.2	8710	12093	1035.9	175	11.09	0.009	2.4	14.6
11/06/2018 14:06	0.56	0.2	8710	12069	1035.9	175	10.99	0.009	2.4	14.6
AVERAGE	0.55	0.2	8710	12089.8	1036.1	175	10.98	0.009	2.4	14.6

Date/Time	UNIT1 CO#/HR Value	UNIT1 COPPMC Value	UNIT1 FD Value	UNIT1 GASFLOW Value	UNIT1 GASGCV Value	UNIT1 LOADMW Value	UNIT1 NOX#/H60 Value	UNIT1 NOX#/MM Value	UNIT1 NOXPPMC Value	UNIT1 O2 Value
11/06/2018 14:14	0.57	0.2	8710	12080.2	1035.9	175	10.71	0.009	2.3	14.6
11/06/2018 14:15	0.57	0.2	8710	12073.6	1035.9	175	10.87	0.009	2.4	14.6
11/06/2018 14:16	0.51	0.2	8710	12060.7	1035.9	175	10.75	0.009	2.3	14.6
11/06/2018 14:17	0.53	0.2	8710	12090.5	1035.9	175	10.73	0.009	2.3	14.6
11/06/2018 14:18	0.52	0.2	8710	12071.8	1035.9	175	10.95	0.009	2.4	14.6
11/06/2018 14:19	0.52	0.2	8710	12065.7	1035.9	175	10.91	0.009	2.4	14.6
11/06/2018 14:20	0.5	0.2	8710	12070.9	1035.9	175	10.69	0.009	2.3	14.6
11/06/2018 14:21	0.5	0.2	8710	12062.9	1035.9	175	10.82	0.009	2.3	14.6
11/06/2018 14:22	0.49	0.2	8710	12059.8	1035.9	175	10.88	0.009	2.4	14.7
11/06/2018 14:23	0.5	0.2	8710	12070.5	1035.9	175	10.71	0.009	2.3	14.6
11/06/2018 14:24	0.47	0.2	8710	12060.4	1035.9	175	10.93	0.009	2.4	14.7
11/06/2018 14:25	0.53	0.2	8710	12044.2	1035.9	174	10.82	0.009	2.4	14.6
11/06/2018 14:26	0.53	0.2	8710	12063.2	1035.9	175	10.73	0.009	2.3	14.7
11/06/2018 14:27	0.57	0.2	8710	12048.4	1035.9	175	10.77	0.009	2.3	14.6
11/06/2018 14:28	0.58	0.2	8710	12056	1035.9	175	10.57	0.008	2.3	14.6
11/06/2018 14:29	0.57	0.2	8710	12053.2	1035.8	175	10.68	0.009	2.3	14.6
11/06/2018 14:30	0.59	0.2	8710	12067.2	1035.9	175	10.63	0.009	2.3	14.6
11/06/2018 14:31	0.62	0.2	8710	12062.5	1035.9	175	10.86	0.009	2.4	14.6
11/06/2018 14:32	0.64	0.2	8710	12045.2	1035.9	174	10.63	0.009	2.3	14.6
11/06/2018 14:33	0.59	0.2	8710	12044.7	1035.9	175	10.65	0.009	2.3	14.6
11/06/2018 14:34	0.57	0.2	8710	12040.9	1035.9	174	10.6	0.009	2.3	14.6
11/06/2018 14:35	0.56	0.2	8710	12040.4	1035.9	174	10.52	0.008	2.3	14.6
AVERAGE	0.55	0.2	8710	12060.6	1035.9	175	10.75	0.009	2.3	14.6

Date/Time	UNIT1 CO#/HR Value	UNIT1 COPPMC Value	UNIT1 FD Value	UNIT1 GASFLOW Value	UNIT1 GASGCV Value	UNIT1 LOADMW Value	UNIT1 NOX#/H60 Value	UNIT1 NOX#/MM Value	UNIT1 NOXPPMC Value	UNIT1 O2 Value
11/06/2018 14:42	0.53	0.2	8710	12016	1037.4	174	10.91	0.009	2.4	14.6
11/06/2018 14:43	0.5	0.2	8710	12047.9	1037.3	175	10.68	0.009	2.3	14.7
11/06/2018 14:44	0.48	0.2	8710	12056.2	1037.4	175	10.8	0.009	2.3	14.6
11/06/2018 14:45	0.49	0.2	8710	12057	1037.3	175	10.91	0.009	2.4	14.6
11/06/2018 14:46	0.47	0.2	8710	12041.8	1037.4	175	10.81	0.009	2.3	14.6
11/06/2018 14:47	0.49	0.2	8710	12068.2	1037.3	175	10.9	0.009	2.4	14.7
11/06/2018 14:48	0.52	0.2	8710	12062	1037.3	175	10.99	0.009	2.4	14.6
11/06/2018 14:49	0.54	0.2	8710	12049.7	1037.3	175	11.07	0.009	2.4	14.6
11/06/2018 14:50	0.56	0.2	8710	12033.2	1037.4	174	10.86	0.009	2.4	14.6
11/06/2018 14:51	0.56	0.2	8710	12067.7	1037.3	175	10.94	0.009	2.4	14.6
11/06/2018 14:52	0.6	0.2	8710	12048	1038.1	175	11.01	0.009	2.4	14.6
11/06/2018 14:53	0.6	0.2	8710	12040.1	1038.1	175	11.01	0.009	2.4	14.6
11/06/2018 14:54	0.62	0.2	8710	12023.2	1038.1	174	10.85	0.009	2.4	14.6
11/06/2018 14:55	0.61	0.2	8710	12035.9	1038.1	174	10.69	0.009	2.3	14.6
11/06/2018 14:56	0.59	0.2	8710	12065.1	1038.1	175	10.66	0.009	2.3	14.6
11/06/2018 14:57	0.55	0.2	8710	12064.3	1038.1	175	10.8	0.009	2.3	14.6
11/06/2018 14:58	0.56	0.2	8710	12070.1	1038.1	175	11	0.009	2.4	14.6
11/06/2018 14:59	0.54	0.2	8710	12055.2	1038.1	175	10.84	0.009	2.4	14.6
11/06/2018 15:00	0.52	0.2	8710	12044.4	1038.1	175	10.9	0.009	2.4	14.6
11/06/2018 15:01	0.51	0.2	8710	12068.1	1038.1	175	10.88	0.009	2.4	14.6
11/06/2018 15:02	0.52	0.2	8710	12045	1038.1	175	10.81	0.009	2.3	14.6
11/06/2018 15:03	0.51	0.2	8710	12092.2	1038.1	175	10.95	0.009	2.4	14.6
AVERAGE	0.54	0.2	8710	12052.3	1037.8	175	10.88	0.009	2.4	14.6

Date/Time	UNIT1 CO#/HR Value	UNIT1 COPPMC Value	UNIT1 FD Value	UNIT1 GASFLOW Value	UNIT1 GASGCV Value	UNIT1 LOADMW Value	UNIT1 NOX#/H60 Value	UNIT1 NOX#/MM Value	UNIT1 NOXPPMC Value	UNIT1 O2 Value
11/06/2018 15:11	0.52	0.2	8710	12040.1	1038.1	175	11.29	0.009	2.5	14.6
11/06/2018 15:12	0.53	0.2	8710	12062.4	1038.1	175	10.84	0.009	2.4	14.6
11/06/2018 15:13	0.55	0.2	8710	12035.3	1038.1	175	11.22	0.009	2.4	14.6
11/06/2018 15:14	0.57	0.2	8710	12038.9	1038.1	175	10.93	0.009	2.4	14.6
11/06/2018 15:15	0.58	0.2	8710	12023	1038.1	174	10.96	0.009	2.4	14.6
11/06/2018 15:16	0.59	0.2	8710	12035.9	1038.1	174	10.92	0.009	2.4	14.6
11/06/2018 15:17	0.62	0.2	8710	12039.3	1038.1	175	11.09	0.009	2.4	14.6
11/06/2018 15:18	0.61	0.2	8710	12039.3	1038.1	175	11.15	0.009	2.4	14.6
11/06/2018 15:19	0.6	0.2	8710	12025.1	1038.1	174	11.12	0.009	2.4	14.6
11/06/2018 15:20	0.57	0.2	8710	12009.4	1038.1	174	10.98	0.009	2.4	14.6
11/06/2018 15:21	0.55	0.2	8710	12047.7	1038.1	175	10.77	0.009	2.3	14.6
11/06/2018 15:22	0.55	0.2	8710	12068.4	1038.1	175	10.82	0.009	2.3	14.6
11/06/2018 15:23	0.53	0.2	8710	12045.1	1038.1	175	11.03	0.009	2.4	14.6
11/06/2018 15:24	0.51	0.2	8710	12047.6	1038.1	175	10.96	0.009	2.4	14.6
11/06/2018 15:25	0.53	0.2	8710	12040.4	1038.1	174	11.02	0.009	2.4	14.6
11/06/2018 15:26	0.51	0.2	8710	12032.4	1038.1	175	11.1	0.009	2.4	14.6
11/06/2018 15:27	0.5	0.2	8710	12038.1	1038.1	175	11.03	0.009	2.4	14.6
11/06/2018 15:28	0.48	0.2	8710	12042.6	1038.1	174	11.12	0.009	2.4	14.6
11/06/2018 15:29	0.49	0.2	8710	12046.8	1038.1	175	10.96	0.009	2.4	14.6
11/06/2018 15:30	0.49	0.2	8710	12044.9	1038.1	175	10.92	0.009	2.4	14.6
11/06/2018 15:31	0.49	0.2	8710	12033.2	1038.1	174	11.22	0.009	2.4	14.7
11/06/2018 15:32	0.49	0.2	8710	12060.2	1038.1	175	11.01	0.009	2.4	14.6
AVERAGE	0.54	0.2	8710	12040.7	1038.1	175	11.02	0.009	2.4	14.6

APPENDIX E
QUALITY ASSURANCE/QUALITY CONTROL

Appendix E.1
Quality Assurance Program Summary and Equipment Calibration Schedule

QUALITY ASSURANCE PROGRAM SUMMARY AND CERTIFICATIONS

Montrose Air Quality Services, LLC (Montrose) ensures the quality and validity of its emission measurement and reporting procedures through a rigorous quality assurance (QA) program. The program is developed and administered by internal QA personnel and encompasses eight major areas:

1. Development and use of an internal QA manual
2. QA reviews of reports, laboratory work, and field testing
3. Equipment calibration and maintenance
4. Chain of custody
5. Continuous training
6. Knowledge of current test methods
7. Agency certification
8. Uncertainty of results

Each of these areas is discussed individually below.

Quality Assurance Manual. Montrose has prepared a QA Manual according to EPA guidelines and ASTM D-7036. The manual serves to document and formalize all of Montrose's QA efforts. The manual is constantly updated, and each employee involved in technical services for emission measurements is required to read, understand its contents, and sign a statement that all work they perform will conform to its practices. The manual includes details on the other seven QA areas discussed below.

QA Reviews. Montrose 's review procedure includes review of each source test report by the QA Manager or equivalent position including data input, calculations and averages, and report text. The laboratory manager or equivalent reviews all laboratory work, and the qualified individual on-site reviews all field work and data sheets.

The most important review is the one that takes place before a test program begins. The QA Manager works with testing personnel to prepare and review test protocols. Test protocol review includes selection of appropriate test procedures, evaluation of any interferences or other restrictions that might preclude use of standard test procedures, and evaluation and/or development of alternate procedures.

Equipment Calibration and Maintenance. The equipment used to conduct the emission measurements is maintained according to the manufacturer's instructions to ensure proper operation. In addition to the maintenance program, calibrations are carried out on each measurement device according to the schedule outlined below. The schedules for maintenance and calibrations are given in Tables A-1 and A-2.

Quality control checks are also conducted in the field for each test program. A partial list of checks made as part of each continuous analyzer system test series is included below as an example of the field QA procedures.

- Sample acquisition and conditioning system leak check
- 3-point analyzer calibrations (all analyzers)

- Complete system calibration check ("dynamic calibration" through entire sample system)
- Periodic analyzer calibration checks are conducted at the start and end of each test run. Any change between pre- and post-test readings are recorded.
- All calibrations are conducted using EPA Protocol gases certified by the manufacturer
- Calibration and continuous analyzer performance data are fully documented, and are included in each source test report

Chain of Custody. Montrose maintains full chain of custody documentation on all samples and data sheets. In addition to normal documentation of changes between field sample custodians, laboratory personnel, and field test personnel, Montrose documents every individual who handles any test component in the field (e.g., probe wash, impinger loading and recovery, filter loading and recovery, etc.).

Samples are stored in a locked area to which only laboratory personnel have access. Neither other Montrose employees nor cleaning crews have keys to this area.

Training. Personnel training is essential to ensure quality testing. Montrose has formal and informal training programs which may include some or all of the following:

1. Attendance at EPA-sponsored training courses
2. A requirement for all technicians to read, understand, and sign Montrose 's QA Manual
3. In-house training and Montrose meetings on a regular basis
4. Maintenance of training records
5. Administration of internal qualified individual (QI) tests for all methods performed
6. Participation in the Qualified Source Testing Individual (QSTI) program administered by the Source Evaluation Society (SES)

Knowledge of Current Test Methods. With the constant updating of standard test methods and the wide variety of emerging test methods, it is essential that any qualified source tester keep abreast of new developments. Montrose subscribes to services which provide updates on EPA reference methods, and on EPA and local agency rules and regulations. Additionally, source test personnel regularly attend and present papers at testing and emission-related seminars and conferences.

Audit Program. Montrose participates in the TNI Stationary Source Audit Sample (SSAS) audit program for all methods for which audit samples are available.

Uncertainty of Results. Both qualitative and quantitative factors contribute to field measurement uncertainty and should be taken into consideration when interpreting the results contained within this report. Whenever possible, Montrose personnel reduce the impact of these uncertainty factors through the use of approved and validated test methods. In addition, Montrose personnel perform routine instrument and equipment calibrations and ensure that the calibration standards, instruments, and equipment used during test events meet, at a minimum, test method specifications as well as the specifications of our Quality Manual and ASTM D 7036-04.

The limitations of the various methods, instruments, equipment, and materials utilized during this test have been reasonably considered, but the ultimate impact of the cumulative uncertainty of this project is not fully identified within the results of this report.

TABLE A-1
SAMPLING INSTRUMENTS AND
EQUIPMENT CALIBRATION SCHEDULE

Instrument Type	Frequency of Calibration[1]	Standard of Comparison or Method of Calibration	Acceptance Limits
Orifice Meter(large)	12 months	Calibrated dry test meter	± 2% of volume measured
Dry Gas Meter	6 months or when repaired	Calibrated dry test meter	± 2% of volume measured
Critical Orifice	6 months	Calibrated dry test meter	± 0.5% of average K’
S-Type Pitot (for use with EPA-type sampling train)	6 months	EPA Method 2	Geometric measurements within method-specified ranges
Vacuum Gauges	12 months	NIST-traceable gauge	≤ 1.0 in Hg difference
Temperature Measurement (thermocouples)	12 months	NBS mercury thermometer or NBS calibrated platinum RTD	±4 °F for <400 °F ± 1.5% for >400 °F
Temperature Readout Devices	6 months	Thermocouple simulator	± 2% full scale reading
Analytical Balance	12 months (check prior to each use)	NIST-traceable weights	± 0.5 mg of stated weight
Probe Nozzles	12 months	Nozzle diameter check	Range <± 0.10 mm for micrometer three measurements
Continuous Analyzers	Every field day, Depends upon use, frequency and performance	As specified by manufacturers’ operating manuals, EPA NBS gases and/or reference methods	Satisfy all limits specified in operating specifications

[1] The tabulated calibration frequencies are minimum standards. In certain instances, calibrations are performed more frequently.

TABLE A-2
EQUIPMENT MAINTENANCE SCHEDULE
Based on Manufacturer's Specifications and Montrose's Experience

Equipment	Performance Requirement	Maintenance Interval[2]	Corrective Action
Pumps	1. Absence of leaks 2. Ability to draw manufacturer required vacuum and flow	6 months	1. Visual inspection 2. Clean 3. Replace worn parts 4. Leak check
Flow Measuring Device	1. Free mechanical movement 2. Absence of malfunction	6 months	1. Visual inspection 2. Clean 3. Calibrate
Sampling Instruments	1. Absence of malfunction 2. Proper response to zero, span gas	As required by the manufacturer	As recommended by manufacturer
Mobile Van Sampling Systems	Absence of leaks	Depends on nature of use	1. Change filters 2. Leak check 3. Check for system contamination
Sampling Lines	Sample degradation less than 2%	After each test or test series	Blow filtered air through line until dry

[2] The tabulated maintenance intervals are minimum standards. In certain instances, maintenance is performed more frequently.

Appendix E.2
ASTM D-7036 Accreditation, ARB Certification, and QI Certificates

STAC STACK TESTING ACCREDITATION COUNCIL

A2LA American Association for Laboratory Accreditation

Accredited Air Emission Testing Body

A2LA has accredited

MONTROSE AIR QUALITY SERVICES

In recognition of the successful completion of the joint A2LA and Stack Testing Accreditation Council (STAC) evaluation process, this laboratory is accredited to perform testing activities in compliance with ASTM D7036:2004 - Standard Practice for Competence of Air Emission Testing Bodies.

Presented this 5th day of March 2018.

President and CEO
For the Accreditation Council
Certificate Number 3925.01
Valid to February 29, 2020

This accreditation program is not included under the A2LA ILAC Mutual Recognition Arrangement.

January 5, 2018

Mr. Matt McCune
Montrose Air Quality Services, LLC
1631 East Saint Andrew Place
Santa Ana, California 92705

Dear Mr. McCune:

I am pleased to inform you that the California Air Resources Board (CARB) has renewed, by means of enclosed Executive Order (EO) I-18-002, Montrose Air Quality Services, LLC's approval to perform CARB Test Methods 1, 2, 3, 4, 5, 6, 8, 17, 20, and 100 (CO, CO_2, NOx, O_2, SO_2, THC), Visible Emission Evaluation, and U.S. Environmental Protection Agency Test Methods 201A, 202, and 205. This approval is valid through June 30, 2020, during which time additional audits of Montrose Air Quality Services, LLC's testing ability may be performed. I have also enclosed two certificates of approval that expire June 30, 2020.

If you have questions or need further assistance, please contact Kathryn Gugeler at (916) 322-0221 or via email at kathryn.gugeler@arb.ca.gov, or Angus MacPherson at (916) 445-4686 or via email at angus.macpherson@arb.ca.gov.

Sincerely,

Dr. Michael T. Benjamin, Chief
Monitoring and Laboratory Division

Enclosures (3)

cc: Angus MacPherson, Manager
Testing and Certification Section

Kathryn Gugeler
Monitoring and Laboratory Division

State of California
AIR RESOURCES BOARD

EXECUTIVE ORDER I-18-002

Approval of Independent Contractor Pursuant to California Code of Regulations, title 17, section 91207

Montrose Air Quality Services, LLC

WHEREAS, the California Air Resources Board (CARB), pursuant to California Health and Safety Code, section 41512, has established the procedures contained in California Code of Regulations, title 17, section 91200 and following, to allow the use of independent testers for compliance tests required by CARB;

WHEREAS, it has been determined that Montrose Air Quality Services, LLC meets the requirements of CARB for performing 1, 2, 3, 4, 5, 6, 8, 17, 20, and 100 (CO, CO_2, NO_x, O_2, SO_2, THC), Visible Emission Evaluation (VEE), and U.S. Environmental Protection Agency (U.S. EPA) Test Methods 201A, 202, and 205 pursuant to Cal. Code Regs., tit. 17, § 91200 and following, when the following conditions are met:

1. Montrose Air Quality Services, LLC permanently marks or engraves an identification number on the body of each of its pitot tubes in accordance with section 2.1 of CARB Test Method 2;

2. Montrose Air Quality Services, LLC calibrates its differential pressure gauges after each test series in accordance with section 2.2 of CARB Test Method 2, and establishes and maintains a log of the calibrations;

3. Montrose Air Quality Services, LLC calibrates its temperature gauges in accordance with section 4.3 of CARB Test Method 2, and establishes and maintains a log of the calibrations;

4. Montrose Air Quality Services, LLC calibrates its metering system in accordance with section 5.3 of CARB Test Method 5, and establishes and maintains a log of the calibrations;

5. Montrose Air Quality Services, LLC acquires and uses a 5-mL burette in accordance with section 2.3.3 of CARB Test Method 6 and section 4.2 of CARB Test Method 20;

6. Montrose Air Quality Services, LLC acquires and uses 300 to 500 mL glass beakers in accordance with Section 6.2.2(c) of U.S. EPA Test Method 202;

7. Montrose Air Quality Services, LLC uses desiccant in accordance with section 3.3.2 of CARB Test Methods 5 and 17, section 7.2.2 of U.S. EPA Test Method 201A, and section 7.2.4 of U.S. EPA Test Method 202;

State of California

Air Resources Board

Approved Independent Contractor

Montrose Air Quality Services, LLC

This is to certify that the company listed above has been approved by the California Air Resources Board to conduct compliance testing pursuant to California Code of Regulations, title 17, section 91207, through June 30, 2020, for those test methods listed below:

CARB Source Test Methods:
1, 2, 3, 4, 5, 6, 8, 17, 20
100 (CO, CO_2, NO_x, O_2, SO_2, THC)

Dr. Michael T. Benjamin, Chief
Monitoring and Laboratory Division

State of California

Air Resources Board

Approved Independent Contractor

Montrose Air Quality Services, LLC

This is to certify that the company listed above has been approved by the California Air Resources Board to conduct compliance testing pursuant to California Code of Regulations, title 17, section 91207, through June 30, 2020, for those test methods listed below:

U.S. EPA Source Test Methods 201A, 202 and 205
Visible Emissions Evaluation

Dr. Michael T. Benjamin, Chief
Monitoring and Laboratory Division

SOURCE EVALUATION SOCIETY

Qualified Source Testing Individual

LET IT BE KNOWN THAT

NEAL L. OHLENDORF

HAS SUCCESSFULLY PASSED A COMPREHENSIVE EXAMINATION AND SATISFIED EXPERIENCE REQUIREMENTS IN ACCORDANCE WITH THE GUIDELINES ISSUED BY THE SES QUALIFIED SOURCE TEST INDIVIDUAL REVIEW BOARD FOR

GASEOUS POLLUTANTS INSTRUMENTAL SAMPLING METHODS

ISSUED THIS 9TH DAY OF OCTOBER 2015 AND EFFECTIVE UNTIL OCTOBER 8TH, 2020

Peter R. Westlin, QSTI/QSTO Review Board

Peter S. Pakalnis, QSTI/QSTO Review Board

Theresa Lowe, QSTI/QSTO Review Board

C. David Bagwell, QSTI/QSTO Review Board

Karen D. Kajiya-Mills , QSTI/QSTO Review Board

Bruce Randall QSTI/QSTO Review Board

CERTIFICATE NO. 2016-933

SOURCE EVALUATION SOCIETY

Qualified Source Testing Individual

LET IT BE KNOWN THAT

NEAL L. OHLENDORF

HAS SUCCESSFULLY PASSED A COMPREHENSIVE EXAMINATION AND SATISFIED EXPERIENCE REQUIREMENTS IN ACCORDANCE WITH THE GUIDELINES ISSUED BY THE SES QUALIFIED SOURCE TEST INDIVIDUAL REVIEW BOARD FOR

MANUAL GASEOUS POLLUTANTS SOURCE SAMPLING METHODS

ISSUED THIS 1ST DAY OF JULY 2016 AND EFFECTIVE UNTIL JUNE 30TH, 2021

Peter R. Westlin, QSTI/QSTO Review Board

Peter S. Pakalnis, QSTI/QSTO Review Board

Theresa Lowe, QSTI/QSTO Review Board

J. Wade Bice, QSTI/QSTO Review Board

Karen D. Kajiya-Mills , QSTI/QSTO Review Board

Bruce Randall QSTI/QSTO Review Board

CERTIFICATE NO. 2016-933

SOURCE EVALUATION SOCIETY

Qualified Source Testing Individual

LET IT BE KNOWN THAT

NEAL L. OHLENDORF

HAS SUCCESSFULLY PASSED A COMPREHENSIVE EXAMINATION AND SATISFIED EXPERIENCE REQUIREMENTS IN ACCORDANCE WITH THE GUIDELINES ISSUED BY THE SES QUALIFIED SOURCE TEST INDIVIDUAL REVIEW BOARD FOR

MANUAL GAS VOLUME MEASUREMENTS AND ISOKINETIC PARTICULATE SAMPLING METHODS

ISSUED THIS 9TH DAY OF OCTOBER 2015 AND EFFECTIVE UNTIL OCTOBER 8TH, 2020

Peter R. Westlin, QSTI/QSTO Review Board

C. David Bagwell, QSTI/QSTO Review Board

Peter S. Pakalnis, QSTI/QSTO Review Board

Karen D. Kajiya-Mills , QSTI/QSTO Review Board

Theresa Lowe, QSTI/QSTO Review Board

Bruce Randall QSTI/QSTO Review Board

CERTIFICATE NO. 2016-933

Appendix E.3
Reference Method Analyzer Calibration Data

MONTROSE AIR QUALITY SERVICES

CEMS CONFIGURATION DATA

Project Information

Client / Facility: Ethos SPA COGEN III — Project No. 218872

Source / Location: Turbine — Method(s): 3, 7E, 10

Test Dates: 11/6/18 — Project Manager / Team (initials): JO MK KS

Analyzers In Service

Please circle all applicable: (O2) (CO2) (CO) (NOx) (SO2) _____ _____ TRS THC

Response Time (seconds): ___ ___ ___ ___ ___ ___ ___ ___ ___

Filtration (circle)

Filter Type	In-Stack	Out-of-Stack	Sintered	Other _____	_____	_____
Filter Material	Glass	Quartz	Steel	(N/A)	Other _____	_____	_____

Sample Probe (circle)

Length	4'	6'	8'	(10')	12'	14'	Other _____	_____	_____
Material	Steel	Glass	Teflon	(Titanium)	Quartz	Inconel	Other _____	_____	_____
Heated	Yes	No							
Probe Temperature	_____ °F	(N/A)							

Conditioner / Moisture Knock-Out (circle)

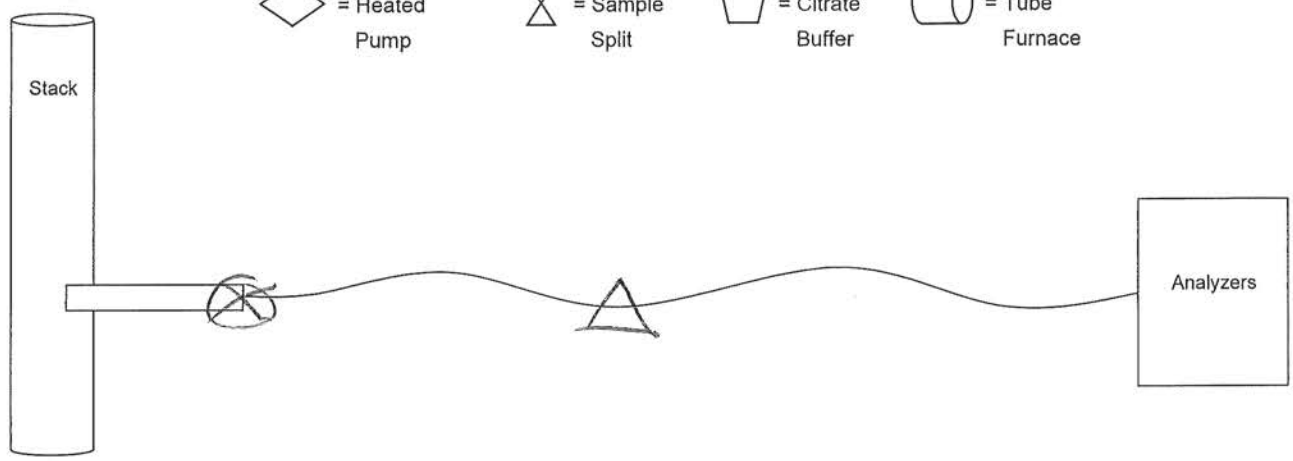
In Use?	(Yes)	No					
Coolant	Ice and Water	Anti-Freeze	(Electric)	Other _____	_____	_____
Trap Material	(Steel)	Glass	Teflon	Other _____	_____	_____

Leak Checks

Pre-Test	<0.1 cfh @ N/A in. Hg	_____ cfh @ _____ in. Hg
Post-Test	<0.1 cfh @ N/A in. Hg	_____ cfh @ _____ in. Hg
System Flow Rate	7 cfh	_____ cfh
Leak Rate	Post-Test (cfh) / System Flow Rate (cfh) * 100 = _____ %	_____ %

Fill in locations of elements of the CEM system, as applicable

Legend: ⊗ = Cal Tee; □ = Filter; △ = Gas Conditioner; ◇ = Heated Pump; ⧖ = Sample Split; ▽ = Citrate Buffer; ⬭ = Tube Furnace



Upstream of conditioner

Sample Line Length: 102 feet

Sample Line Material: teflon

Sample Line Temp.: 249 deg. F

Downstream of conditioner

Sample Line Length: 100 feet

Sample Line Material: teflon

Sample Line Temp.: N/A deg. F

If this information is not accurate for all runs, note exceptions here.

MAQDAQ 1.0			
Project Name: Ethos SPA COGEN	Project Number: 005AS-218872	CEMS Operator: N. Ohlendorf	Unit/Condition: Turbine
Run Length: 21	Record Interval: 6	Average Interval: 60	Triplicate Sampling: False
Traverse: True	Ports: 1	Points per port: 3	DAQ Device: DT9803(00)

Analyzer Configuration

Name:	O2	CO2	CO	NOx				
Make/Model:								
25A or 7E:	7E	7E	7E	7E				
Voltage max:	10	10	10	10				
Voltage offset:	0	0	0	0				
Range:	10	10	10	10				
Upscale:								
Downscale:								

Cylinder Information

Zero Number:	EB0108856	EB0108856	EB0108856	EB0108856				
Zero Conc:	0	0	0	0				
Low Number:								
Low Conc:								
Mid Number:	CC318548	CC318548	EB0095873	EB0095873				
Mid Conc:	11.53	3.991	4.654	2.38				
High Number:	EB0095269	EB0095269	CC437246	CC437246				
High Conc:	20.98	8.323	9.562	4.737				
Bias Number:	CC318548	CC318548	EB0095873	EB0095873				
Bias Conc:	11.53	3.991	4.654	2.38				

MAQDAQ 1.0			
Project Name: Ethos SPA COGEN	Project Number: 005AS-218872	CEMS Operator: N. Ohlendorf	Unit/Condition: Turbine
Run Length: 24	Record Interval: 6	Average Interval: 60	Triplicate Sampling: False
Traverse: True	Ports: 4	Points per port: 3	DAQ Device: DT9803(00)

Calibration

	Name:	O2	CO2	CO	NOx				
	Make/Model:								
	25A or 7E:	7E	7E	7E	7E				

Cylinder Concentrations									
	Zero:	0.000	0.000	0.000	0.000				
	Low:								
	Mid:	11.53	3.991	4.654	2.380				
	High:	20.98	8.323	9.562	4.737				

Calibration Readings									
	Zero reading:	0.057	0.017	0.028	0.001				
	Low reading:	0.000	0.000	0.000	0.000				
	Mid reading:	11.53	4.057	4.771	2.455				
	High reading:	21.04	8.328	9.510	4.726				

EPA Method 7E Error Calculations									
Zero %Err:	**<2.0**	0.272	0.204	0.293	0.021				
Mid %Err:	**<2.0**	0.000	0.793	1.224	1.583				
High %Err:	**<2.0**	0.286	0.060	-0.544	-0.232				

MAQDAQ 1.0			
Project Name: Ethos SPA COGEN	Project Number: 005AS-218872	CEMS Operator: N. Ohlendorf	Unit/Condition: Turbine
Run Length: 24	Record Interval: 6	Average Interval: 60	Triplicate Sampling: False
Traverse: True	Ports: 4	Points per port: 3	DAQ Device: DT9803(00)

Calibration

	Name:	O2	CO2	CO	NOx				
	Make/Model:								
	25A or 7E:	7E	7E	7E	7E				

Cylinder Concentrations									
	Zero:	0.000	0.000	0.000	0.000				
	Low:								
	Mid:	11.53	3.991	4.654	2.380				
	High:	20.98	8.323	9.562	4.737				

Calibration Readings									
	Zero reading:	0.057	0.017	0.028	0.002				
	Low reading:	0.000	0.000	0.000	0.000				
	Mid reading:	11.53	4.057	4.771	2.353				
	High reading:	21.04	8.328	9.510	4.756				

EPA Method 7E Error Calculations									
Zero %Err:	**<2.0**	0.272	0.204	0.293	0.042				
Mid %Err:	**<2.0**	0.000	0.793	1.224	-0.570				
High %Err:	**<2.0**	0.286	0.060	-0.544	0.401				

Air Emission Testing Body (AETB) data

Test Date	November 6, 2018
Project Name	EthosEnergy Group – SPA Cogen III 2018 Emission Compliance Tests
Project Number	005AS-218872-RT-301

For EPA's ECMPS

Entry to ECMPS (EDR) software:	
QI Last Name	Ohlendorf
QI First Name	Neal
QI Middle Initial	L
AETB Name	Montrose Air Quality Services
AETB Phone Number	(925) 680-4300
AETB Email	info@montrose-env.com
Exam Date	October 9, 2015
Provider Name	Source Evaluation Society
Provider Email	qstiprogram@gmail.com

PGVP Data

For EPA's ECMPS

Entry to ECMPS software:			
Calibration Gases	NO_x		
Gas Level Code	High	Mid	Zero
Gas Type Code	CO, NO, NOX	CO, NO, NOX	ZERO
Gas Balance	BALN	BALN	--
Vendor ID	B32017	B72018	--
Cylinder ID number	CC437246	EB0095873	EB0108856
Expiration Date	10/13/2020	02/21/2021	07/16/2026

Calibration Gases	O_2		
Gas Level Code	High	Mid	Zero
Gas Type Code	CO2, O2	CO2, O2	ZERO
Gas Balance	BALN	BALN	--
Vendor ID	B72017	B72018	--
Cylinder ID Number	EB0095269	CC318548	EB0108856
Expiration Date	04/18/2025	04/09/2026	07/16/2026

Appendix E.4
Span Gas Certificates

Airgas
an Air Liquide company

Airgas Specialty Gases
Airgas USA, LLC
11711 S. Alameda Street
Los Angeles, CA 90059
Airgas.com

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Part Number:	E03NI99E15A0079	Reference Number:	48-401014428-1
Cylinder Number:	CC437246	Cylinder Volume:	144.3 CF
Laboratory:	124 - Los Angeles (SAP) - CA	Cylinder Pressure:	2015 PSIG
PGVP Number:	B32017	Valve Outlet:	660
Gas Code:	CO,NO,NOX,BALN	Certification Date:	Oct 13, 2017

Expiration Date: Oct 13, 2020

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 600/R-12/531, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.

Do Not Use This Cylinder below 100 psig, i.e. 0.7 megapascals.

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
NOX	4.750 PPM	4.737 PPM	G1	+/- 1.4% NIST Traceable	10/06/2017, 10/13/2017
NITRIC OXIDE	4.750 PPM	4.567 PPM	G1	+/- 1.4% NIST Traceable	10/06/2017, 10/13/2017
CARBON MONOXIDE	9.500 PPM	9.562 PPM	G1	+/- 0.4% NIST Traceable	10/06/2017
NITROGEN	Balance			-	

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	103107A	KAL004222	5.08 PPM NITRIC OXIDE/NITROGEN	+/- 1.0%	Jun 02, 2018
NTRM	103107A	KAL004222-NOx	5.08 PPM NOx/NITROGEN	+/- 1.0%	Jun 02, 2018
NTRM	12062825	CC366934	9.766 PPM CARBON MONOXIDE/NITROGEN	+/- 0.3%	Sep 07, 2018

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Thermo 48i-TLE 1132250557 CO	NDIR	Oct 03, 2017
Thermo 42-iLS 1115848421 NO	Chemiluminescence	Sep 29, 2017
Thermo 42-iLS 1115848421 NOx	Chemiluminescence	Sep 29, 2017

Triad Data Available Upon Request

Signature on file

Approved for Release

Airgas
an Air Liquide company

Airgas Specialty Gases
Airgas USA, LLC
525 North Industrial Loop Road
Tooele, UT 84074
Airgas.com

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Part Number:	E03NI99E15A73F4	Reference Number:	153-401102425-1A
Cylinder Number:	EB0095873	Cylinder Volume:	144.3 CF
Laboratory:	124 - Tooele (SAP) - UT	Cylinder Pressure:	2015 PSIG
PGVP Number:	B72018	Valve Outlet:	660
Gas Code:	CO,NO,NOX,BALN	Certification Date:	Feb 21, 2018

Expiration Date: Feb 21, 2021

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 600/R-12/531, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.

Do Not Use This Cylinder below 100 psig, i.e. 0.7 megapascals.

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
NOX	2.500 PPM	2.380 PPM	G1	+/- 1.4% NIST Traceable	02/14/2018, 02/21/2018
NITRIC OXIDE	2.500 PPM	2.374 PPM	G1	+/- 1.4% NIST Traceable	02/14/2018, 02/21/2018
CARBON MONOXIDE	4.750 PPM	4.654 PPM	G1	+/- 0.5% NIST Traceable	02/14/2018
NITROGEN	Balance			-	

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	08012121A	KAL004278	5.08 PPM NITRIC OXIDE/NITROGEN	1.0%	Jun 02, 2018
NTRM	08012121A	KAL004278-NOX	5.08 PPM NOx/NITROGEN	1.0%	Jun 02, 2018
NTRM	12062816	CC366702	9.766 PPM CARBON MONOXIDE/NITROGEN	0.3%	Sep 07, 2018

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Thermo 48i-TLE 1163640031 CO	CO NDIR (Mason)	Feb 13, 2018
Thermo 42i-LS 1123749327 NO	Chemiluminescence (Mason)	Jan 25, 2018
Thermo 42i-LS 1123749327 NOx	Chemiluminescence (Mason)	Jan 25, 2018

Triad Data Available Upon Request

Signature on file

Approved for Release

Airgas
an Air Liquide company

Airgas Specialty Gases
Airgas USA, LLC
525 North Industrial Loop Road
Tooele, UT 84074
Airgas.com

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Part Number:	E03NI70E15A7420	Reference Number:	153-124614168-3
Cylinder Number:	EB0095269	Cylinder Volume:	151.2 CF
Laboratory:	124 - Tooele - UT	Cylinder Pressure:	2015 PSIG
PGVP Number:	B72017	Valve Outlet:	590
Gas Code:	CO2,O2,BALN	Certification Date:	Apr 18, 2017

Expiration Date: Apr 18, 2025

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 600/R-12/531, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.

Do Not Use This Cylinder below 100 psig, i.e. 0.7 megapascals.

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
CARBON DIOXIDE	8.500 %	8.323 %	G1	+/- 0.5% NIST Traceable	04/18/2017
OXYGEN	21.00 %	20.98 %	G1	+/- 0.4% NIST Traceable	04/18/2017
NITROGEN	Balance				

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	10060114	CC281303	5.027 % CARBON DIOXIDE/NITROGEN	0.4	Dec 02, 2021
NTRM	09061433	CC282486	22.53 % OXYGEN/NITROGEN	0.4%	Mar 08, 2019

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Horiba VIA-510 SV4MEUTJ CO2	CO2 NDIR (Dixon)	Apr 12, 2017
Horiba MPA-510 X9A4UGL8 O2	O2 Paramagnetic (Dixon)	Apr 12, 2017

Triad Data Available Upon Request

Signature on file

Approved for Release

Airgas Specialty Gases
Airgas USA, LLC
525 North Industrial Loop Road
Tooele, UT 84074
Airgas.com

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Part Number:	E03NI84E15A7419	Reference Number:	153-401165378-1A
Cylinder Number:	CC318548	Cylinder Volume:	147.5 CF
Laboratory:	124 - Tooele (SAP) - UT	Cylinder Pressure:	2015 PSIG
PGVP Number:	B72018	Valve Outlet:	590
Gas Code:	CO2,O2,BALN	Certification Date:	Apr 09, 2018

Expiration Date: Apr 09, 2026

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 600/R-12/531, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.

Do Not Use This Cylinder below 100 psig, i.e. 0.7 megapascals.

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
CARBON DIOXIDE	4.000 %	3.991 %	G1	+/- 0.5% NIST Traceable	04/09/2018
OXYGEN	11.50 %	11.53 %	G1	+/- 0.8% NIST Traceable	04/09/2018
NITROGEN	Balance			-	

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	10060106	CC281264	5.027 % CARBON DIOXIDE/NITROGEN	0.4%	Dec 02, 2021
NTRM	98051014	SG9162888BAL	12.05 % OXYGEN/NITROGEN	0.7%	Dec 14, 2023

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Horiba VIA-510 SV4MEUTJ CO2	CO2 NDIR (Dixon)	Mar 22, 2018
Horiba MPA-510 X9A4UGL8 O2	O2 Paramagnetic (Dixon)	Mar 21, 2018

Triad Data Available Upon Request

Signature on file

Approved for Release

Airgas
an Air Liquide company

Airgas Specialty Gases
Airgas USA, LLC
525 North Industrial Loop Road
Tooele, UT 84074
Airgas.com

CERTIFICATE OF BATCH ANALYSIS

Grade of Product: CEM-CAL ZERO

Part Number:	NI CZ15A	Reference Number:	153-401255095-1
Cylinder Analyzed:	EB0108953	Cylinder Volume:	142.0 CF
Laboratory:	124 - Tooele (SAP) - UT	Cylinder Pressure:	2000 PSIG
Analysis Date:	Jul 16, 2018	Valve Outlet:	580
Lot Number:	153-401255095-1		

Expiration Date: Jul 16, 2026

ANALYTICAL RESULTS

Component	Requested Purity	Certified Concentration
NITROGEN	99.9995 %	99.9995 %
CARBON DIOXIDE	< 1.0 PPM	0.01 PPM
NOx	< 0.1 PPM	0.01 PPM
SO2	< 0.1 PPM	<LDL 0.1 PPM
THC	< 0.1 PPM	0.03 PPM
CARBON MONOXIDE	< 0.5 PPM	0.02 PPM

Permanent Notes: Airgas certifies that the contents of this cylinder meet the requirements of 40 CFR 72.2

Cylinders in Batch:

EB0108820, EB0108838, EB0108851, EB0108853, EB0108855, EB0108856, EB0108857, EB0108858, EB0108865, EB0108868, EB0108869, EB0108870, EB0108871, EB0108872, EB0108873, EB0108874, EB0108884, EB0108896, EB0108898, EB0108931, EB0108941, EB0108942, EB0108952, EB0108953, EB0108954, EB0108958, EB0108963, EB0108966, EB0108974

Impurities verified against analytical standards traceable to NIST by weight and/or analysis.

Signature on file
Approved for Release

Appendix E.5
Equipment Calibration Data

MONTROSE
ENVIRONMENTAL

EPA Method 5

Meter Box Calibration by Calibrated Critical Orifice, Leak Check, and Thermocouple Calibration Check English Meter Box Units, English K' Factor

Meter box ID:	CB-03
Meter ID (if applicable):	CB-03
Orifice set ID:	Antioch
Calibrated by:	SC
Expires:	**12/8/18**

Date:	6/8/18
Location:	Antioch
No. of orifices used (min. 3)	5
Barometric pressure (in. Hg):	29.95 in. Hg
Theoretical critical vacuum	14.13 in. Hg

Yd:	**1.0248**
ΔH@:	**1.775**

Meter Box Orifice Calibration

IMPORTANT For valid test results, the Actual Vacuum should be 1 to 2 in. Hg greater than the Theoretical Critical Vacuum shown above
IMPORTANT The Critical Orifice Coefficient, K', must be entered in English units, (ft)^3*(deg R)^0.5/((in.Hg)*(min)).

		Volume			Initial Temps.		Final Temps.		Orifice	K' Orifice		– Ambient Temperature –		
ΔH (in H2O)	Time (min)	Initial (cu ft)	Final (cu ft)	Net (cu ft)	Inlet (deg F)	Outlet (deg F)	Inlet (deg F)	Outlet (deg F)	Serial# (number)	Coefficient (see above)	Vacuum (in Hg)	Initial (deg F)	Final (deg F)	Average (deg F)
0.31	18.00	723.700	729.190	5.490	72.0	72.0	72.0	72.0	RG-40	0.2373	17.0	72.0	72.0	72.0
0.67	13.00	729.650	735.473	5.823	73.0	73.0	74.0	74.0	RG-48	0.3490	17.0	73.0	74.0	73.5
1.04	9.50	718.313	723.500	5.187	71.0	71.0	72.0	72.0	RG-55	0.4345	16.0	71.0	72.0	71.5
1.90	7.00	735.906	741.257	5.351	74.0	74.0	74.0	74.0	RG-63	0.6010	16.0	74.0	74.0	74.0
3.15	11.00	741.632	752.708	11.076	75.0	75.0	76.0	76.0	RG-73	0.7938	16.0	75.0	76.0	75.5

— SAMPLE RATE —
INDICATED VS. ACTUAL

ΔH (in. H2O)	Sample Rate (scfm)
0.31	0.308
0.67	0.453
1.04	0.564
1.90	0.779
3.15	1.027

— DRY GAS METER —
VOLUME CORRECTED

Vm(std) (cu ft)
5.456
5.776
5.169
5.319
11.012

— ORIFICE —

VOLUME CORRECTED Vcr(std) (cu ft)	VOLUME NOMINAL Vcr (cu ft)
5.546	5.585
5.883	5.941
5.362	5.395
5.453	5.511
11.301	11.455

– DRY GAS METER –
CALIBRATION FACTOR Yd

Value (number)	Variation (number)
1.0165	-0.008
1.0185	-0.006
1.0374	0.013
1.025	0.000
1.026	0.001

— ORIFICE —
CALIBRATION FACTOR ΔH@

Value (in H2O)	Variation (in H2O)
1.825	0.050
1.823	0.048
1.826	0.051
1.743	-0.031
1.657	-0.118

For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is +/-0.02.

For Orifice Calibration Factor ΔH@, the orifice differential pressure in inches of H20 that equates to 0.75 cfm of air at 68 F and 29.92 inches of Hg, acceptable tolerance of individual values from the average is +/-0.2.

QA Criteria:	
Average Yd	1.0248
Average ΔH@	1.7747
Variation of Yd's	PASS
Variation of ΔH@	PASS
Vacuum Criteria	PASS

Meter Box Pressure Leak Check

Test Pressure, (in H_2O):	7	Should be 5-7 in. H_2O
Leak Rate, (in H_2O/min):	0	Must be zero (manometer level stable for 1 minute)

Meter Box Vacuum Leak Check

Test Vacuum, (in. Hg):	25	Coarse adjust valve fully open, fine adjust fully closed, sample inlet plugged
Leak Rate, (cfm):	0	Must be zero (meter dial stable for 1 minute)

Meter Box Thermocouple Readout Calibration Check

Input Temperature	Allowable Temp. Dev.*	Low	High
30	7	23	37
70	8	62	78
120	9	111	129
250	11	239	261
350	12	338	362
500	14	486	514
700	17	683	717
900	20	880	920

Stack	Probe	Filter	Exit	Aux.	Meter In / Out
32	30	31	31	30	31
71	71	72	73	71	72
122	121	122	121	122	120
252	251	250			
351	350	350			
503					
702					
901					

Thermocouple simulator	
Make:	Omega
Model:	HH911T
Serial Number	1788
Cal Date:	4/6/2018

* Reading values must be within 1.5% of reference thermometer values (based on absolute temperature scale) for calibration to be acceptable.

Performed by: Name: STEVE OCCHIAN Singature: Date: 6/8/18

Approved by: Name: Todd Smith Singature: Date: 6/11/18

APPENDIX F
MISCELLANEOUS INFORMATION

Appendix F.1
Agency Correspondence

SACRAMENTO METROPOLITAN

AIR QUALITY
MANAGEMENT DISTRICT

September 20, 2018

Eddie McCormick
Ethos Energy
Sacramento Power Authority (SPA) Cogen
3215 47th Ave.
Sacramento, CA 95824

Subject: **SOURCE TEST FEE INVOICE, PERMIT NO.: 21738, TV2007-14-02B**
SOURCE TEST PLAN–APPROVAL

Dear Mr. McCormick:

The Sacramento Metropolitan Air Quality Management District (SMAQMD) is in receipt of the source test plan prepared by Montrose Air Quality Services (MAQS) dated September 13, 2018. The testing plan is approved subject to the following conditions:

1. In accordance with 40 CFR, Part 60, Appendix B, Specification 4A the CO relative accuracy may alternately be determined as the absolute average difference between the reference method (RM) and the continuous emissions monitoring system (CEM). This difference must be less than or equal to 5 ppmv.

2. During the course of emission testing, the turbine and duct burner shall be operated at maximum total firing capacity. Information to substantiate load during the test must be recorded and submitted with your test results.

3. The testing is scheduled for November 6, 2018. As per normal practice, representatives from the SMAQMD may be present to observe system operating conditions and test procedures. If there is any change to the specific **start time** of the test, one-week advance notice to SMAQMD staff is required.

4. As per SMAQMD Rule 301, section 311 a source test evaluation fee of $1919 will be charged against the owner or operator of a source whenever the Air Pollution Control Officer finds that a source test is required. When multiple source tests are performed and the result submitted in one consolidated report, the source test fee of $1919 shall apply to the first 10 hours of District work. Each additional hour or portion thereof required for reviewing the source test shall be charged the time and materials labor rate established in Section 308.12. Please attach the enclosed *Source Test Invoice* to your check, made out to the SMAQMD.

5. A scheduled source test may not be discontinued solely due to the failure of one or more runs to meet applicable standards.

6. The source test report must identify the manufacturer, model and serial number of

the analyzers used in the source (SPA/Ethos Energy) continuous emissions monitoring system.

7. Per 40 CFR Part 60, the tester may choose to perform more than nine RATA runs and reject a maximum of three test runs, so long as the total number of RATA test runs is nine or more. The tester must include all data, including the rejected test runs, in the final source test report. The tester may not drop different runs for different pollutants; any run that is eliminated from relative accuracy calculations must be eliminated from the calculations for all three pollutants (NOx, O_2, CO). Whether or not test runs are rejected for RATA, the SMAQMD will evaluate all runs for compliance with emission limits.

8. The source test report shall include a summary sheet including but not limited to the following information:
   A. Permitted emission limits.
   B. Measured emissions corrected to the appropriate standards.
   C. A statement indicating that all error analyses (drift, bias, etc.) required by the test methods were performed per the method, and that the tests were conducted within the allowed limits.

Please be advised the District may reject any source test that is not conducted in accordance with the appropriate (current) test methods, does not follow the conditions specified in your source test plan, or is not in accordance with SMAQMD rules or permit conditions.

If you have any questions concerning this matter, please contact me at (916) 874-2693.

Sincerely,

Don Dumaine
Associate Air Quality Specialist
ddumaine@airquality.org
cc: Todd Smith, Montrose Air Quality Services
2825 Verbe Roberts Cir. Antioch, CA 94509

Include this invoice with your check

For SMAQMD Use Only

SOURCE TEST INVOICE

Invoice # 21738ST **Due date:** submitted with final report

Permit # 21738

Amount Due: $1,919.00

SACRAMENTO METROPOLITAN AIR QUALITY MANAGEMENT DISTRICT

FINDINGS AND ORDERS

HEARING BOARD
SacMetro AQMD
777 12th Street, 3rd Floor
Sacramento, California 95814

Tuesday **January 16, 2018** **4:00 PM**

HEARING ITEMS

1. **Petitioner**

Sacramento Power Authority

Petition Number

2017-009

Petitioner's Address

3215 47th Avenue
Sacramento CA 95824

Equipment Location

3215 47th Avenue
Sacramento CA 95824

Petition for

The Sacramento Power Authority (SPA or Petitioner) has filed Interim and Regular Variance petitions. The petitions concern the carbon monoxide (CO) emissions from the natural gas fired turbine under Permits to Operate 21738, 14071, 11458, and 11459. On December 19, 2017, the District Hearing Board granted an Interim Variance for Petition 2017-008. This Interim Variance is valid from December 19, 2017 through January 16, 2018, which is the date of the hearing for the Regular Variance, Petition 2017-009. Both petitions requested an increase in the maximum allowable daily CO mass emissions under Condition 10 of the permits.

Hearing Attendees

Hearing Board Members	
Dr. Stephen Weyers, Chair	Present
John German	Present
Stacy Moak	Absent
Tim Olsen	Present
Darrell Woo	Present
Petitioner	
Jeff Adkins, Trinity Consultants	Sworn
Eric Poff, SMUD Manager of Thermal Generation Assets	Sworn
District Staff	
Don Dumaine, AQ Specialist	Sworn

Kathrine Pittard, District Counsel

Other Attendees
Kimon Manolius, Hearing Board Counsel
Virginia Muller, Clerk

Exhibits

1. Findings and Orders for Interim Variance No. 2017-008
2. Agenda for Tuesday, January 16, 2018 Hearing Board Meeting
3. Sacramento Power Authority's Power Point Presentation for Regular Variance Request Hearing 1/16/2018

HEARING

At the Interim Variance Hearing, the Board requested that the Petitioner report back on several different matters. Specifically, it asked that Petitioner: 1) discuss prior records concerning minute-by-minute readings; 2) provide information from Siemens regarding the basis for the original CO emission estimates and an explanation for the current deviation; and, 3) investigate whether the high CO emissions during start-up are representative and propose a new CO emission limit as part of the permit application process.

The Petitioner provided the Hearing Board with an overview of the SPA Cogen Plant, a cogeneration system schematic and the size/scale of the CO catalyst (see Exhibit 3). A view of the CEMs Dashboard on the control room computer shows that the CO readings are displayed on a cumulative hourly basis and not minute-by-minute. The hourly CO readings would not have allowed the plant operators to identify that the upper scale of CO analyzer was at the maximum value for approximately 15 minutes during start-up.

Petitioner received new data from the turbine manufacturer, Siemens, on January 14, 2018, from a plant located in Bergen, New Jersey using the same model turbine. The data shows both the Bergen, New Jersey and SPA CO start-up emissions are very similar during cold, warm and hot starts. The main take away from this information is that SPA's turbine is operating properly. Siemens did not provide an explanation as to why its initial CO startup estimates appear to be low compared to the current CO emissions data.

The Petitioner ran start-up tests at various ambient temperatures. The average startup period is approximately 17 minutes. The coldest test was at 39 degrees F and produced 439 pounds of CO. The warmest test was at 51 degrees F and produced 351 pounds of CO. The tests show that colder ambient air produces higher CO emissions. The petitioner estimated that an ambient temperature of 89 degrees F would produce 260 pounds of CO during start-up.

Finally, the current test results and the data from the New Jersey turbine indicate that the length of time for a cold start sequence has not significantly changed over the last eight years. A new, 550 lb CO daily limit would be adequate and accommodate normal daily start-ups. Even with an increased daily limit, the Petitioner will be well within the annual limits for CO emissions.

SPA is a public agency formed by the Sacramento Municipal Utility District (SMUD) and the Sacramento Municipal Utility District Financing Authority (SMUDFA) jointly exercising their specific powers for a common benefit as a joint powers authority, pursuant to Section 6500 et seq. of the California Government Code. SMUDFA is an agency previously formed by SMUD and the Modesto Irrigation District (MID).

FINDINGS

No variance may be granted unless the Hearing Board makes all of the six findings set forth

under Health and Safety Code section 42352(a). It is the Petitioner's burden to prove, by a preponderance of the evidence, facts sufficient to support the mandatory findings.

Finding 1 – Violation

"That the petitioner for a variance is, or will be, in violation of 41701 [opacity] or of any rule, regulation, or order of district."

Petitioner violates Condition 10 of Permits to Operate 21738, 14071, 11458, and 11459, by exceeding the carbon monoxide (CO) emission limit of 326.9 pounds per day, each time the turbine is started-up. Test results from various start up conditions during the interim variance period show the daily CO emission limit should be increased from 326.9 lbs per day to 550 lbs per day by applying for a modification to the permit to operate.

Finding 2 - Reasonable Control

"That, due to conditions beyond the reasonable control of petitioner, requiring compliance would result in either: (A) an arbitrary or unreasonable taking of property, or (B) the practical closing and elimination of a lawful business. In making those findings where the petitioner is a public agency, the hearing board shall consider whether or not immediate compliance would impose an unreasonable burden on an essential public service."

The new CO analyzer has a maximum range that will allow the Petitioner to measure CO emissions during start-up. The turbine and the CO reduction catalyst appear to be operating properly. Petitioner can apply for a modification to the permit to operate to increase the daily CO emission limit. This permit change will simply reflect the actual CO emissions from the turbine since initial start-up in 1997.

To Petitioner, “practical closing”, means the turbine must either run continuously or only be started-up when the ambient temperature is much greater than 50 degrees F. These restrictions can greatly increase the cost of operation due to electricity market changes and seasonal temperatures. Any start-up during mild temperatures will likely result in a violation of the permit to operate. The only solution is a permit change. There are no currently-identified air quality barriers to issuing a revised permit that increases CO start-up emissions.

Finding 3 - Relative Benefit to Air Quality

"That the closing or taking would be without a corresponding benefit in reducing air contaminants."

Requiring the turbine to operate when the electricity demand is not optimal (“practical closing”) will increase all non-CO criteria pollutant emissions in the area surrounding the facility.

Finding 4 - Curtailment of Operations

"That the applicant for the variance has given consideration to curtailing operations of the source in lieu of obtaining a variance."

Curtailing operations has no effect on the high emission levels that occur during start-up. Through testing, Petitioner determined that CO emissions when ambient air conditions were cooler produced more CO emissions during start-up. Petitioner will limit the number of start-ups per day to stay below a 550 lb per day CO emission limit.

Finding 5 - Reduction of Excess Emissions

"During the period the variance is in effect, that the applicant will reduce excess emissions to the maximum extent feasible."

1. Control of excess emissions:

The Petitioner will limit CO emissions to 550 pounds per day maximum. There will be no excess emissions for quarterly and annual CO permit limits.

2. Excess Emissions Fees:

The Petitioner paid the excess emission fees of $2,475 ($275 for 9 months) on January 23, 2018.

Finding 6 - Monitoring

"During the period the variance is in effect, that the applicant will monitor or otherwise quantify emission levels from the source, if requested to do so by the district, and report these emission levels to the district pursuant to a schedule established by the district."

The petitioner is required by Condition 19 of the permit to monitor turbine NOx and CO emissions using a CEMS. The CEMS will continue to operate during the variance period.

NUISANCE FINDING

"No variance shall be granted if the operation will result in a violation of Section 41700."

Staff has not identified any violation of 41700 that may result from the grant of this variance.

OTHER REQUIREMENTS

The Hearing Board may prescribe other requirements as set forth under Health and Safety Code 42353.

The Board has not prescribed any other requirements.

Motion
Motion to grant Regular Variance for one year from the date the Interim Variance was issued, December 19, 2017. The Regular Variance will cover the time period from January 17, 2018, through December 18, 2018, subject to the conditions listed in the Orders, and authorized the Chairperson to execute these Findings and Orders on behalf of the Board.

ACTION
Tim Olson Moved /Darrel Woo Seconded

Order
As a result of these findings, IT IS HEREBY ORDERED that Sacramento Power Authority's Petition 2017-009 for a Regular Variance is granted from January 16, 2018, through December 18, 2018, with the following conditions:

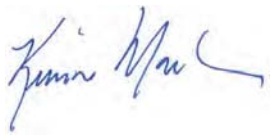
1. Limit CO emissions to less than 550 pounds per day.
2. Submit a permit application no later than June 19, 2018 (6 months after the interim

variance hearing), requesting an increase in the daily CO emission limit.

Report Approved February 15, 2018

Dr. Stephen Weyers, Chairman of the Hearing Board

Approved as to Form February 14, 2018



Kimon Manolius, Hearing Board Counsel

BOARD IDEAS AND COMMENTS

Attest by Virginia Muller

SACRAMENTO METROPOLITAN
AIR QUALITY
MANAGEMENT DISTRICT

Alberto Ayala, Ph.D., M.S.E.
EXECUTIVE DIRECTOR/AIR POLLUTION CONTROL OFFICER

August 13, 2018

Eddie McCormick
Facility Manager
Sacramento Power Authority
3215 47th Avenue
Sacramento, CA 95824

EDDIE MCCORMICK
8/16/18

Subject: **LIMITED WAIVER OF ROC and PM_{10} SOURCE TESTING REQUIREMENTS FOR SACRAMENTO POWER AUTHORITY**

Dear Mr. McCormick:

The Sacramento Metropolitan Air Quality Management District (SMAQMD) is in receipt or your letter dated July 25, 2018, requesting a waiver of testing for ROC and PM_{10} emissions from Sacramento Power Authority (SPA) for calendar year 2018.

Your request is based on language contained in SPA's Title V Permit #TV2007-14-02B. Condition 20.E on page 36 of the Title V Permit, in reference to the gas turbine, states:

> *"The SMAQMD Air Pollution Control Officer may waive the ROC and PM_{10} annual source test requirement every other year if the prior annual source test result indicates that the respective hourly emissions are less than or equal to 75% of the respective hourly emission limit."*

The SMAQMD has reviewed your submittal, which included source test results for the 2017 calendar year. SPA's source test results indicate that hourly ROC and PM_{10} emissions were less than or equal to 75% of the respective hourly emission limit. Given this, the SMAQMD hereby grants a limited waiver to SPA for ROC and PM_{10} source testing subject to the following conditions:

1) This waiver is good for a period of one year, covering source testing required for calendar year 2018.

2) In calendar year 2019, source testing for ROC and PM_{10} will resume in accordance with existing permit conditions.

3) SPA may submit a request to waive ROC and PM_{10} source testing again for calendar year 2020. The SMAQMD will, at that time, review test data submitted again for consideration of another one-year waiver if appropriate.

777 12th Street, 3rd Floor ▮ Sacramento, CA 95814-1908
916/874-4800 ▮ 916/874-4899 fax
www.airquality.org

If you have any questions regarding this matter, please contact Don Dumaine at (916) 874-2693.

Sincerely,

Alberto Ayala, Ph.D., M.S.E
Executive Director/Air Pollution Control Officer

L:\SSD FOLDERS\FIELD OPERATIONS\MSP\LETTERS\SPA waiver2018.docx

cc: Don Dumaine

Appendix F.2
Permit Excerpts

SACRAMENTO METROPOLITAN
AIR QUALITY
MANAGEMENT DISTRICT

Larry Greene
AIR POLLUTION CONTROL OFFICER

January 18, 2012

Dave Blevins
Facility Manager
Sacramento Power Authority
PO Box 15830, Mail Stop B355
Sacramento, CA 95852-1830

Subject: 2nd Administrative Amendment – Title V Permit for Sacramento Power Authority
Title V Federal Operating Permit TV2007-14-02B

Dear Mr. Blevins:

Enclosed is the approved Title V Federal Operating Permit No. TV2007-14-02B for the Sacramento Power Authority that incorporates the requested administrative amendment.

If you have any questions regarding the Title V permit requirements, please contact me.

Sincerely,

Michelle Joe
Air Quality Engineer
(916) 874-4853
mjoe@airquality.org

attachment

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777 12th Street 3rd Floor
Sacramento, CA 95814

(916) 874-4800

SACRAMENTO METROPOLITAN

AIR QUALITY
MANAGEMENT DISTRICT

TITLE V FEDERAL OPERATING PERMIT, TITLE IV ACID RAIN PROGRAM PERMIT AND SMAQMD RULE 201 PERMITS TO OPERATE

TITLE V PERMIT NO.: TV2007-14-02B

PERMIT ISSUED:	PERMIT LAST AMENDED:	PERMIT EXPIRES:
March 01, 2009	January 18, 2012	March 01, 2014

PERMIT ISSUED TO:
Sacramento Power Authority
PO Box 15830, Mail Stop B355
Sacramento, CA 95852-1830

FACILITY LOCATION:
Sacramento Power Authority
3215 47th Avenue
Sacramento, CA 95824

RESPONSIBLE OFFICIAL:
Paul Lau
SPA Representative
(916) 732-6252

CONTACT PERSON:
Dave Blevins
Facility Manager
(916) 391-2993

NATURE OF BUSINESS:
Municipal Electricity Generation
Process Steam Generation

STANDARD INDUSTRIAL CLASSIFICATION (SIC):
4931

Larry Greene
SMAQMD Air Pollution Control Officer

by: _____
Michelle Joe
Air Quality Engineer

TABLE OF CONTENTS

TABLE OF CONTENTS (continued)

PERMIT SUMMARY

This permit shall serve as a Permit to Operate pursuant to SMAQMD Rule No. 201 (General Permit Requirements) and SMAQMD Rule No. 207 (Title V - Federal Operating Permit Program). Requirements identified in the permit as non-federally enforceable are not enforceable by the U.S. EPA or the public. However, they are enforceable by the SMAQMD.

The permittee's application for this air quality Permit to Operate was evaluated for compliance with SMAQMD, State of California and federal air quality rules and regulations. The following listed rules are those that were found to be applicable at the time of permit review, based on the information submitted with the Title V permit application.

Citation	Description	Rule Adoption Date	Federally Enforceable ?
SMAQMD Rule 101	General Provisions and Definitions	09-03-1998	Yes
SMAQMD Rule 102	Circumvention	05-15-1972	Yes
SMAQMD Rule 105	Emission Statements	04-20-1993	Yes
SMAQMD Rule 201	General Permit Requirements (SIP approved)	11-20-1984	Yes
SMAQMD Rule 201	General Permit Requirements (not SIP approved)	08-24-2006	No
SMAQMD Rule 202	New Source Review (SIP approved)	11-20-1984	Yes
SMAQMD Rule 202	New Source Review (not SIP approved)	02-24-2005	No
SMAQMD Rule 207	Title V - Federal Operating Permit Program (not SIP approved but rule is applicable as part of U.S. EPA approval of the SMAQMD Title V program)	04-26-2001	Yes
SMAQMD Rule 301	Permit Fees - Stationary Source (not SIP approved but Title V fees in rule applicable as part of U.S. EPA approval of the SMAQMD Title V program)	07-02-2007	Yes (Title V provisions only)
SMAQMD Rule 306	Air Toxic Fees (not SIP approved)	03-27-2003	No

PERMIT SUMMARY (continued)

Citation	Description	Rule Adoption Date	Federally Enforceable ?
SMAQMD Rule 307	Clean Air Act Fees	09-26-2002	Yes
SMAQMD Rule 401	Ringelmann Chart	04-05-1983	Yes
SMAQMD Rule 402	Nuisance (not SIP approved)	08-03-1977	No
SMAQMD Rule 403	Fugitive Dust	11-29-1983	Yes
SMAQMD Rule 404	Particulate Matter (see permit shield for specified equipment)	11-20-1984	Yes
SMAQMD Rule 406	Specific Contaminants (see permit shield for specified equipment)	11-29-1983	Yes
SMAQMD Rule 413	Stationary Gas Turbines (see permit shield for specified equipment)	03-24-2005	Yes
SMAQMD Rule 420	Sulfur Content of Fuels (see permit shield for specified equipment)	11-29-1983	Yes
SMAQMD Rule 442	Architectural Coatings (SIP approved)	09-05-1996	Yes
SMAQMD Rule 442	Architectural Coatings (not SIP approved)	05-24-2001	No
SMAQMD Rule 466	Solvent Cleaning (not SIP approved)	09-25-2008	No
SMAQMD Rule 602	Breakdown Conditions: Emergency Variance (not SIP approved)	12-06-1978	No
SMAQMD Rule 801	New Source Performance Standards (not SIP approved)	03-27-2008	No
SMAQMD Rule 904	Airborne Toxic Control Measures (not SIP approved)	03-27-2008	No
CARB Air Toxic Control Measure	State of California Air Toxic Control Measure for Chromate Treated Cooling Towers [CCR 93103] (not SIP approved)	03-09-1989 (A)	No

PERMIT SUMMARY (continued)

Citation	Description	Rule Adoption Date	Federally Enforceable ?
U.S. EPA New Source Performance Standards (NSPS)	Standards of Performance for Industrial - Commercial - Institutional Steam Generating Units [40 CFR 60 Subpart Db (begin at 60.40b)] (see permit shield for specified equipment)	06-13-2007 (B)	Yes
U.S. EPA New Source Performance Standards (NSPS)	Standards of Performance for Stationary Gas Turbines [40 CFR 60 Subpart GG (begin at 60.330)] (see permit shield for specified equipment)	02-24-2006 (B)	Yes
U.S. EPA Acid Rain Program	Acid Rain Program [40 CFR 72-78 (begin at 72.1)]	10-19-2007 (B)	Yes

(A) California Air Resources Board adoption date
(B) U.S. EPA promulgation/amendment date

Future changes in prohibitory rules may establish more stringent requirements that may, at the SMAQMD level, supersede the conditions listed here. For Title V purposes however, the federally enforceable requirements are those found in the Title V permit. Federally enforceable provisions of the Title V permit do not change until the Title V permit is revised.

FACILITY DESCRIPTION

Title V Permit Background

Previous Permit Actions

The following permit actions have occurred since the initial Federal Operating Permit No. 1998-14-01 was issued:

Permit Action	Date Issued	Permit No.
Initial Title V Federal Operating Permit	03-01-2004	TV1998-14-01
1st Administrative Amendment	09-11-2006	TV1998-14-01A
2nd Administrative Amendment	05-22-2007	TV1998-14-01B
1st Renewal Permit	03-01-2009	TV2007-14-01
1st Significant Modification	09-14-2009	TV2007-14-02
1st Administrative Amendment	09-15-2009	TV2007-14-02A

Current Permit Action

This 2nd Administrative Amendment permit to the 1st Administrative Amendment will be assigned the following permit number: TV2007-14-02B.

Facility Description

The following facility description is for informational purposes only and does not contain any applicable federally enforceable requirements.

Sacramento Power Authority generates electricity for the Sacramento Municipal Utility District (SMUD) and produces process steam for use in the operations of Campbell Soup Company. The project is located on a 5.8-acre site adjacent to the Campbell Soup food processing facility at 3215 47th Avenue, Sacramento.

The cogeneration plant is a combined cycle power block. The combined cycle unit consists of the following components:

Combined Cycle Power System:

1. (1) Siemens V84.2 gas turbine, 1410 MMBTU/hour, natural gas fuel, with a nominal rating of 103 MW.
2. (1) duct burner, 200 MMBTU/hour, natural gas fuel.
3. (1) Heat recovery steam generator.
4. (1) 55.9 MW nominal capacity steam turbine generator.

FACILITY DESCRIPTION (continued)

5. (1) Selective catalytic reduction (SCR) NOx air pollution control system.

6. (1) Oxidation catalyst CO and ROC air pollution control system.

Support Equipment:

7. Cooling tower, 3 cell, 45,000 gallons of water/minute, 4,763,000 cfm air flowrate.

Emissions Control Technology

NOx emissions from the gas turbine are controlled with dry low NOx combustor technology and a SCR system to comply with the NOx concentration limit of 3 ppmvd at 15% O2.

ROC and CO emissions from the gas turbine are controlled with an oxidation catalyst system.

NOx emissions from the duct burner are controlled with low NOx burners and a SCR system to comply with the NOx concentration limit of 3 ppmvd at 15% O2.

SO2 and PM10 emissions from the gas turbine and duct burner are controlled by the use of natural gas fuel with no emergency use fuel.

Steam and Electrical Power Generation Process

Process steam for the Campbell Soup Company food processing plant is extracted from the steam turbine generator during the operation of the combined cycle power block. This process is capable of producing 250,000 pounds per hour of steam supply.

Electricity generated by the gas turbine power plant is interconnected with SMUD's transmission lines and distribution system.

FEDERALLY ENFORCEABLE REQUIREMENTS - GENERAL

TITLE V PERMIT MODIFICATIONS AND RENEWAL

1. The permittee shall submit to the SMAQMD Air Pollution Control Officer a complete Title V permit application for renewal no later than 12 months prior to the expiration date of the Title V permit.
   [SMAQMD Rule No. 207 Section 301.4]

2. The permittee shall submit to the SMAQMD Air Pollution Control Officer a complete Title V permit application for minor Title V permit modification when applicable. The application shall be submitted after receiving any required preconstruction permit from the SMAQMD and before commencing operation associated with the Minor Title V permit modification.
   [SMAQMD Rule No. 207 Section 301.6]

3. The permittee shall submit to the SMAQMD Air Pollution Control Officer a complete Title V permit application for Significant Title V permit modification when applicable. The application shall not be submitted prior to receiving any required preconstruction permit from the SMAQMD but no later than 12 months after commencing an operation associated with the Significant Title V permit modification. Where an existing federally enforceable Title V permit condition would prohibit such change in operation or the stationary source is not required to obtain a preconstruction permit, the owner or operator must obtain a Title V permit modification before commencing operation.
   [SMAQMD Rule No. 207 Section 301.7]

4. The permittee shall submit to the SMAQMD Air Pollution Control Officer timely updates to the Title V application as new applicable federal requirements become applicable to the source.
   [SMAQMD Rule No. 207 Section 302.1]

5. The permittee shall submit to the SMAQMD Air Pollution Control Officer any additional information necessary to correct any incorrect information in the Title V permit application upon becoming aware of such incorrect submittal or if the applicant is notified by the SMAQMD Air Pollution Control Officer of such incorrect submittal.
   [SMAQMD Rule No. 207 Section 302.2]

6. The permittee shall submit to the SMAQMD Air Pollution Control Officer any additional information relating to the Title V application within 30 days if such information is requested in writing by the SMAQMD Air Pollution Control Officer.
   [SMAQMD Rule No. 207 Section 302.3]

7. Title V permit expiration terminates the stationary source's right to operate unless a timely and complete Title V permit application for renewal has been submitted and the stationary source complies with SMAQMD Rule No. 207 Sections 303.1(a), (b), (c) and (d), in which case the existing Title V permit will remain in effect until the Title V permit renewal has been issued or denied.
   [SMAQMD Rule No. 207 Section 303.2]

FEDERALLY ENFORCEABLE REQUIREMENTS - GENERAL

8. Any Title V application form, report, or compliance certification submitted pursuant to a federally enforceable requirement in this permit shall contain certification by a responsible official. The certification shall state that, based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate and complete.
[SMAQMD Rule No. 207 Section 304]

9. This Title V permit shall have a 5-year fixed term from the date of issuance. The Title V permit shall have a new 5-year fixed term from the date of final action on reopening if the responsible official chooses to submit to the SMAQMD a complete Title V application for renewal upon reopening of the Title V permit pursuant to SMAQMD Rule No. 207 Sections 411 or 412, and the Title V permit is renewed according to the administrative procedures listed in SMAQMD Rule No. 207 Sections 401 through 408.
[SMAQMD Rule No. 207 Section 306]

COMPLIANCE

10. The permittee shall comply with all conditions of the Title V permit.
[SMAQMD Rule No. 207 Section 305.1(k)(1)]

11. It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of the Title V permit.
[SMAQMD Rule No. 207 Section 305.1(k)(2)]

12. This Title V permit may be modified, revoked, reopened, and reissued, or terminated for cause.
[SMAQMD Rule No. 207 Section 305.1(k)(3)]

13. The permittee shall furnish to the SMAQMD Air Pollution Control Officer, within a reasonable time, any information that the SMAQMD Air Pollution Control Officer may request in writing to determine whether cause exists for modifying, revoking and reissuing, or terminating the permit pursuant to SMAQMD Rule No. 207 Section 411, or to determine compliance with this Title V permit. Upon request, the permittee shall also furnish to the SMAQMD Air Pollution Control Officer copies of records required to be kept by conditions of this permit or, for information claimed to be confidential, the permittee may furnish such records directly to the U.S. EPA along with a claim of confidentiality.
[SMAQMD Rule No. 207 Section 305.1(k)(4)]

14. Noncompliance with any federally enforceable requirement in this Title V permit is grounds for Title V permit termination, revocation and reissuance, modification, enforcement action or denial of the Title V permit renewal application. Any violation of the Title V permit shall also be a violation of SMAQMD Rule No. 207.
[SMAQMD Rule No. 207 Section 305.1(k)(5)]

15. A pending Title V permit action (e.g. a proposed permit revision) or notification of anticipated noncompliance does not stay any permit condition.
[SMAQMD Rule No. 207 Section 305.1(k)(6)]

FEDERALLY ENFORCEABLE REQUIREMENTS - GENERAL

16. This Title V permit does not convey any property rights of any sort or any exclusive privilege. **[SMAQMD Rule No. 207 Section 305.1(k)(7)]**

17. Upon presentation of credentials and other documents as may be required by law, the permittee shall allow the SMAQMD Air Pollution Control Officer or an authorized representative to perform all of the following:

    A. Enter upon the stationary source's premises where this source is located or emissions related activity is conducted, or where records must be kept under the conditions of this permit;

    B. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this Title V permit;

    C. Inspect at reasonable times, the stationary source, equipment (including monitoring and air pollution control equipment), practices and operations regulated or required under this Title V permit, and;

    D. As authorized by the Federal Clean Air Act, sample or monitor at reasonable times substances or parameters for the purpose of assuring compliance with the Title V permit conditions or applicable federal requirements.

    [SMAQMD Rule No. 207 Section 413.1]

REPORTS AND RECORDKEEPING

18. **Monitoring Reports**

    A. The permittee shall submit to the SMAQMD Air Pollution Control Officer at least once every six months, unless required more frequently by an applicable requirement, reports of all required monitoring.

        i. All instances of deviations from Title V permit monitoring conditions must be clearly identified in such reports.

    B. The reporting periods for this permit shall be January 01 through June 30 and July 01 through December 31. The reports shall be submitted by July 30 and January 30 following each reporting period respectively.

    C. All required reports must be certified by the responsible official and shall state that, based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate and complete.

    [SMAQMD Rule No. 207 Section 501.1]

FEDERALLY ENFORCEABLE REQUIREMENTS - GENERAL

19. **Compliance Reports**

A. The permittee shall submit to the SMAQMD Air Pollution Control Officer and U.S. EPA (Air-3, U.S. EPA, Region IX) on an annual basis, unless required more frequently by additional applicable federal requirements such as Section 114(a)(3) and 504(b) (42 U.S.C. Sections 7414(a)(3) and 7661c(b)) of the Federal Clean Air Act, a certification of compliance by the responsible official with all terms and conditions contained in the Title V permit, including emission limitations, standards and work practices.

B. The reporting period for this permit shall be January 01 through December 31. The report shall be submitted by January 30 following the reporting period.

C. All required reports must be certified by the responsible official and shall state that, based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate and complete.

D. The Compliance Certification Report shall include the following:

i. The identification of each term or condition of the Title V permit that is the basis of the certification.

ii. The method(s) used for determining the compliance status of the source, currently and over the reporting period, and whether such method(s) provides continuous or intermittent data.

iii. The status of compliance with the terms and conditions of the Title V permit for the period covered by the certification, based on the method designated in Section D.ii of this condition.

iv. Such other facts as the SMAQMD Air Pollution Control Officer may require to determine the compliance status of the source.

v. In accordance with SMAQMD Rule No. 207 Section 305, a method for monitoring the compliance of the stationary source with its emissions limitations, standards and work practices.

[SMAQMD Rule No. 207 Section 413.4]

20. The permittee shall report, within 24 hours of detection, any deviation from a federally enforceable Title V permit condition not attributable to an emergency. In order to fulfill the reporting requirement of this condition, the permittee shall notify the SMAQMD Air Pollution Control Officer by telephone followed by a written statement describing the nature of the deviation from the federally enforceable permit condition.
[SMAQMD Rule No. 207 Section 501.3]

FEDERALLY ENFORCEABLE REQUIREMENTS - GENERAL

21. All monitoring data and support information required by a federally enforceable applicable requirement must be kept by the permittee for a period of 5 years from the date of the monitoring sample, measurement, report or application. Support information includes all calibration and maintenance records and all original strip-chart recordings for continuous monitoring instrumentation, and copies of all reports required by the federally enforceable applicable requirements in the Title V permit.
[SMAQMD Rule No. 207 Section 502.3]

RINGELMANN CHART

22. Except as otherwise provided in SMAQMD Rule No. 401 Section 100, the permittee shall not discharge into the atmosphere from any single source of emission whatsoever any air contaminant, other than uncombined water vapor, for a period or periods aggregating more than three minutes in any one hour which is:

    A. As dark or darker in shade as that designated No. 1 on the Ringelmann Chart, as published by the United States Bureau of Mines, or

    B. Of such opacity as to obscure a human observer's view, or a certified calibrated in-stack opacity monitoring system to a degree equal to or greater than No. 1 on the Ringelmann Chart.
    [SMAQMD Rule No. 401 Section 301]

PARTICULATE MATTER

23. The permittee shall take every reasonable precaution not to cause or allow the emissions of fugitive dust from being airborne beyond the property line from which the emission originates, from any construction, handling or storage activity, or any wrecking, excavation, grading, clearing of land or solid waste disposal operation. Reasonable precautions shall include, but are not limited to:

    A. Use, where possible, of water or chemicals for control of dust in the demolition of existing buildings or structures, construction operations, the construction of roadways or the clearing of land.

    B. Application of asphalt, oil, water, or suitable chemicals on dirt roads, materials stockpiles and other surfaces which can give rise to airborne dusts;

    C. Other means approved by the SMAQMD Air Pollution Control Officer.
    [SMAQMD Rule No. 403 Section 301]

24. Except as otherwise provided in SMAQMD Rule No. 406, the permittee shall not discharge into the atmosphere, from any source, particulate matter in excess of 0.23 grams per dry standard cubic meter (0.1 grains per dry standard cubic foot).
[SMAQMD Rule No. 404 Section 301] [see permit shield for specific equipment - Cooling Tower]

FEDERALLY ENFORCEABLE REQUIREMENTS - GENERAL

25. The permittee shall not discharge into the atmosphere particulate matter from the burning of any kind of material containing carbon in a free or combined state, from any single source of emission whatsoever, combustion contaminants in any state or combination thereof exceeding in concentration at the point of discharge: 0.23 grams per dry standard cubic meter (0.1 grains per dry standard cubic foot) of gas calculated to 12% carbon dioxide (CO2) at standard conditions.
[SMAQMD Rule No. 406 Section 302] [see permit shield for specific equipment - Gas Turbine]

SULFUR COMPOUNDS

26. The permittee shall not discharge into the atmosphere, from any single source of emission whatsoever, sulfur compounds in any state or combination thereof exceeding in concentration at the point of discharge: sulfur compounds, calculated as sulfur dioxide (SO2): 0.2% by volume.
[SMAQMD Rule No. 406 Section 301] [see permit shield for specific equipment - Gas Turbine]

27. Except as otherwise provided in SMAQMD Rule No. 420 Section 110, the permittee shall not burn any gaseous fuel containing sulfur compounds in excess of 1.14 grams per cubic meter (50 grains per 100 cubic feet) of gaseous fuel, calculated as hydrogen sulfide at standard conditions, or any liquid fuel or solid fuel having a sulfur content in excess of 0.5% by weight.
[SMAQMD Rule No. 420 Section 301] [see permit shield for specific equipment - Gas Turbine]

ARCHITECTURAL COATING

28. Any coating applied to stationary structures and their appurtenances, to mobile homes, to pavements, or to curbs, shall meet the requirements of SMAQMD Rule No. 442.
[SMAQMD Rule No. 442 (09-05-1996 version)]

29. All VOC-containing materials shall be stored in closed containers when not in use. In use includes, but is not limited to: being accessed, filled, emptied, maintained or repaired.
[SMAQMD Rule No. 442 Section 304 (09-05-1996 version)]

30. The permittee shall not use volatile organic compounds for the cleanup of spray equipment unless equipment for collection of the cleaning compounds and minimizing its evaporation to the atmosphere is used.
[SMAQMD Rule No. 442 Section 305 (09-05-1996 version)]

31. The permittee shall keep a record of all architectural coatings purchased that are not clearly labeled as complying with the VOC content limits contained in SMAQMD Rule No. 442. Compliance in these cases can be determined by maintaining records of the manufacturer's certifications or by Material Safety Data Sheets (MSDS) that demonstrate compliance with the VOC limits of SMAQMD Rule No. 442.
[SMAQMD Rule No. 442 (09-05-1996 version) and SMAQMD Rule No. 207 Section 305]

FEDERALLY ENFORCEABLE REQUIREMENTS - GENERAL

EQUIPMENT BREAKDOWNS

32. An emergency constitutes an affirmative defense to an action brought for noncompliance with such technology based emission limitations if the following conditions are met:

    A. The affirmative defense of an emergency shall be demonstrated through properly signed, contemporaneous operating logs, or other relevant evidence that:

        i. An emergency occurred and that the permittee can identify the cause(s) of the emergency.

        ii. The permitted facility was at the time being properly operated.

        iii. During the period of the emergency the permittee took all reasonable steps to minimize levels of emissions that exceeded the emission standards, or other requirements in the Title V permit.

        iv The permittee submitted notice of the emergency to the SMAQMD Air Pollution Control Officer within two working days of the time when emissions limitations were exceeded due to the emergency. The notice must contain a description of the emergency and corrective actions taken.

    B. In any enforcement proceedings, the permittee seeking to establish the occurrence of an emergency has the burden of proof.
    [SMAQMD Rule No. 207 Section 414]

33. The permittee shall notify the SMAQMD Air Pollution Control Officer of any occurrence which constitutes an emergency as defined in SMAQMD Rule No. 207 Section 212 as soon as reasonably possible, but no later than one hour after its detection. If the emergency occurs when the SMAQMD Air Pollution Control Officer cannot be contacted, the report of the emergency shall be made at the commencement of the next regular working day. The notification shall identify the time, specific location, equipment involved and, to the extent known, the cause(s) of the occurrence.
    [SMAQMD Rule No. 207 Section 501.2]

PAYMENT OF FEES

34. The fee for (1) the issuance of an initial Title V operating permit, (2) the renewal and/or inspection of a Title V operating permit, (3) the modification of a Title V operating permit or (4) an administrative Title V permit amendment shall be based on the actual hours spent by the SMAQMD staff in evaluating the application and processing the operating permit. The fee shall be assessed in accordance with the hourly rate established in SMAQMD Rule No. 301 Section 308.12.
    [SMAQMD Rule No. 207 Section 305.7 and SMAQMD Rule No. 301 Section 313]

FEDERALLY ENFORCEABLE REQUIREMENTS - GENERAL

35. After the provisions for granting permits as set forth in SMAQMD Rule No. 207 have been complied with, the permittee will be notified by mail of the fee due and payable and the date the fee is due. If the fee is not paid by the specified due date, the fee shall be increased by one half the amount and the applicant/permittee shall be notified by mail of the increased fee. If the increased fee is not paid within 30 days after notice the application/permit will be canceled/revoked and the applicant/permittee will be notified by mail.
[SMAQMD Rule No. 207 Section 305.7]

CLEAN AIR ACT FEES

36. After the U.S. EPA determines that the SMAQMD has failed to demonstrate attainment of the one hour ozone ambient air quality standard by the attainment year, the permittee, operating any major stationary source of ROC or NOx, shall pay the Clean Air Act fees specified by the SMAQMD Air Pollution Control Officer in accordance with SMAQMD Rule No. 307.
[SMAQMD Rule No. 307]

EMISSION STATEMENTS

37. The permittee, when operating any stationary source that emits 25 tons or more per year of ROC or NOx, shall annually provide the SMAQMD Air Pollution Control Officer with a written emission statement showing actual emissions of ROC and NOx from that source.
[SMAQMD Rule No. 105]

ACCIDENTAL RELEASES

38. If the permittee is subject to Section 112(r) of the federal Clean Air Act of 1990 and 40 CFR 68, the permittee shall register and submit to the EPA the required data related to the risk management plan (RMP) for reducing the probability of accidental releases of any regulated substances listed pursuant to Section 112(r)(3) of the CAA as amended in 40 CFR 68.130. The list of substances, threshold quantities and accident prevention regulations promulgated under 40 CFR Part 68 do not limit in any way the general duty provisions under Section 112(r)(1) of the federal Clean Air Act of 1990.
[40 CFR 68]

39. If the permittee is subject to Section 112(r) of the federal Clean Air Act of 1990 and 40 CFR 68, the permittee shall comply with the requirements of 40 CFR Part 68 no later than the latest of the following dates as provided in 68.10(a):

    A. June 21, 1999,

    B. Three years after the date on which a regulated substance is first listed under 68.130, or

    C. The date on which a regulated substance is first present above a threshold quantity in a process.

[40 CFR 68]

FEDERALLY ENFORCEABLE REQUIREMENTS - GENERAL

40. If the permittee is subject to Section 112(r) of the federal Clean Air Act of 1990 and 40 CFR 68, the permittee shall submit any additional relevant information requested by any regulatory agency necessary to ensure compliance with the requirements of 40 CFR Part 68.
[40 CFR 68]

41. If the permittee is subject to Section 112(r) of the federal Clean Air Act of 1990 and 40 CFR 68, the permittee shall annually certify compliance with all applicable requirements of Section 112(r) of the federal Clean Air Act of 1990 as part of the annual compliance certification as required by SMAQMD Rule No. 207 Section 413.4.
[40 CFR 68]

TITLE VI REQUIREMENTS (OZONE DEPLETING SUBSTANCES)

42. The permittee, when opening appliances containing CFCs for maintenance, service, repair, or disposal must comply with the required practices pursuant to 40 CFR 82.156.
[40 CFR 82 Subpart F]

43. Equipment used during the maintenance, service, repair, or disposal of appliances containing CFCs must comply with the standards for recycling and recovery equipment pursuant to 40 CFR 82.158.
[40 CFR 82 Subpart F]

44. The permittee, when performing maintenance, service, repair or disposal of appliances containing CFCs must be certified by an approved technician certification program pursuant to 40 CFR 82.161.
[40 CFR 82 Subpart F]

NON-FEDERALLY ENFORCEABLE REQUIREMENTS - GENERAL

APPLICABILITY

1. The requirements outlined in this section are applicable to the SMAQMD Rule No. 201 Permits to Operate only and are not an enforceable part of the Title V permit.

SMAQMD RULE NO. 201 PERMIT RENEWAL

2. Permits to Operate issued, pursuant to SMAQMD Rule No. 201 (non-Title V Permits to Operate), shall be renewed annually on June 30 and upon payment of the permit renewal fee established pursuant to SMAQMD Rule No. 301.

3. The SMAQMD Air Pollution Control Officer shall review every SMAQMD Rule No. 201 Permit to Operate upon annual renewal, pursuant to California Health and Safety Code Section 42301(c), to determine that permit conditions are adequate to ensure compliance with, and the enforceability of, SMAQMD rules and regulations applicable to the article, machine, equipment or contrivance for which the permit was issued. Applicable SMAQMD rules and regulations shall include those which were in effect at the time the permit was issued or modified, or which have subsequently been adopted and made retroactively applicable to an existing article, machine, equipment or contrivance, by the SMAQMD Board of Directors. The SMAQMD Air Pollution Control Officer shall revise the conditions, if such conditions are not consistent, in accordance with all applicable rules and regulations.

GENERAL

4. The SMAQMD Air Pollution Control Officer and/or authorized representatives, upon the presentation of credentials shall be permitted:

   A. To enter upon the premises where the source is located or in which any records are required to be kept under the terms and conditions of this permit to operate, and

   B. At reasonable times to have access to and copy any records required to be kept under the terms and conditions of this Permit to Operate, and

   C. To inspect any equipment, operation, or method required in this Permit to Operate, and

   D. To sample emissions from the source or require samples to be taken.

5. Legible copies of all SMAQMD Rule No. 201 permits shall be maintained on the premises with the equipment.

EQUIPMENT OPERATION

6. The equipment shall be properly maintained.

7. This permit does not authorize the emission of air contaminants in excess of those allowed by Division 26, Part 4, Chapter 3, of the Health and Safety Codes of the State of California or the Rules and Regulations of the Sacramento Metropolitan Air Quality Management District.

NON-FEDERALLY ENFORCEABLE REQUIREMENTS - GENERAL

EQUIPMENT BREAKDOWNS

8. The permittee shall notify the SMAQMD Air Pollution Control Officer of any occurrence which constitutes a breakdown as defined in SMAQMD Rule No. 602 Section 201 as soon as reasonably possible, but no later than one hour after its detection. If the breakdown occurs when the SMAQMD Air Pollution Control Officer cannot be contacted, the report of breakdown shall be made at the commencement of the next regular working day. The notification shall identify the time, specific location, equipment involved, and to the extent known, the cause(s) of the occurrence.

9. Upon notification of the breakdown condition, the SMAQMD Air Pollution Control Officer shall investigate the breakdown condition in accordance with uniform written procedures and guidelines relating to logging of initial reports on appropriate forms, investigation, and enforcement follow-up. If the occurrence does not constitute a breakdown condition, the SMAQMD Air Pollution Control Officer may take appropriate enforcement action.

10. An occurrence which constitutes a breakdown condition, and which persists only until the end of the production run or 24 hours, whichever is sooner (except for continuous air pollution monitoring equipment, for which the period shall be 96 hours) shall constitute a violation of any applicable emission limitation or restriction prescribed by SMAQMD Rules and Regulations; however, the SMAQMD Air Pollution Control Officer may elect to take no enforcement action if the owner or operator demonstrates to his satisfaction that a breakdown condition exists and the following requirements are met:

    A. The notification required in SMAQMD Rule No. 602 Section 301.1 is made; and

    B. Immediate appropriate corrective measures are undertaken and compliance is achieved, or the process is shutdown for corrective measures before commencement of the next production run or within 24 hours, whichever is sooner (except for continuous air pollution monitoring equipment for which the period shall be 96 hours). If the owner or operator elects to shut down rather than come into immediate compliance, (s)he must nonetheless take whatever steps are possible to minimize the impact of the breakdown within the 24 hour period; and

    C. The breakdown does not interfere with the attainment and maintenance of any national ambient air quality standard.

11. An occurrence which constitutes a breakdown condition shall not persist longer than the end of the production run or 24 hours, whichever is sooner (except for continuous air pollution monitoring equipment, for which the period shall be 96 hours), unless an emergency variance has been obtained.

12. If the breakdown condition will either require more than 24 hours to correct or persists longer than the end of the production run (except for continuous air pollution monitoring equipment, for which the period shall be 96 hours) the owner or operator may, in lieu of shutdown, request the SMAQMD Air Pollution Control Officer to commence the emergency variance procedure set forth in SMAQMD Rule No. 602 Section 304.

NON-FEDERALLY ENFORCEABLE REQUIREMENTS - GENERAL

13. No emergency variance shall be granted unless the chairperson of the SMAQMD Hearing Board or other designated member(s) of the SMAQMD Hearing Board finds that:

    A. The occurrence constitutes a breakdown condition;

    B. Continued operation is not likely to create an immediate threat or hazard to public health or safety; and

    C. The requirements for a variance set forth in California Health & Safety Code Sections 42352 and 42353 have been met;

    D. The continued operation in a breakdown condition will not interfere with the attainment or maintenance of the national ambient air quality standards.

14. At any time after an emergency variance has been granted, the SMAQMD Air Pollution Control Officer may request for good cause that the SMAQMD Hearing Board chairperson or designated member(s) reconsider and revoke, modify or further condition the variance. The procedures set forth in SMAQMD Rule No. 602 Section 304.1 shall govern any further proceedings conducted under this section.

15. An emergency variance shall remain in effect only for as long as necessary to repair or remedy the breakdown condition, but in no event after a properly noticed hearing to consider an interim or 90 day variance has been held, or 15 days from the date of the subject occurrence, whichever is sooner.

16. Within one week after a breakdown condition has been corrected, the owner or operator shall submit a written report to the SMAQMD Air Pollution Control Officer on forms supplied by the SMAQMD Air Pollution Control Officer describing the causes of the breakdown, corrective measures taken, estimated emissions during the breakdown and a statement that the condition has been corrected, together with the date of correction and proof of compliance. The SMAQMD Air Pollution Control Officer may, at the request of the owner or operator for good cause, extend up to 30 days the deadline for submittal of the report described in this subsection.

17. The burden of proof shall be on the owner or operator of the source to provide sufficient information to demonstrate that a breakdown condition did occur. If the owner or operator fails to provide sufficient information, the SMAQMD Air Pollution Control Officer shall undertake appropriate enforcement action.

18. Any failure to comply, or comply in a timely manner, with the reporting requirements established in SMAQMD Rule No. 602 Sections 301.1 and 401 shall constitute a separate violation of SMAQMD Rule No. 602.

19. It shall constitute a separate violation of SMAQMD Rule No. 602 for any person to file with the SMAQMD Air Pollution Control Officer a report which falsely, or without probable cause, claims that an occurrence is a breakdown condition.

NON-FEDERALLY ENFORCEABLE REQUIREMENTS - GENERAL

ARCHITECTURAL COATINGS

20. The permittee shall comply with the requirements of SMAQMD Rule No. 466 Solvent Cleaning when using volatile organic compounds for the cleanup of architectural coating application equipment.
[SMAQMD Rule No. 466 Sections 301 and 302 (09-25-2008 version)]

FEDERALLY ENFORCEABLE REQUIREMENTS - EQUIPMENT SPECIFIC
GAS TURBINE
DUCT BURNER
APC NOx SCR SYSTEM
APC ROC AND CO OXIDATION CATALYST SYSTEM

A. EQUIPMENT DESCRIPTION

The information specified under this section is enforceable by the SMAQMD, U.S. EPA and the public.

The requirements specified under the following sections apply to the following equipment:

COMBINED CYCLE POWER BLOCK

Gas Turbine

SMAQMD Rule 201 Permit to Operate No. 21738 (permit number is for reference purposes only - not federally enforceable)

Manufacturer:	Siemens
Model No.:	V84.2
Type:	Combined Cycle
Nominal Rating:	103 MW
Heat Input Rating:	1410 MMBTU/hour
Fuel:	Natural Gas

Duct Burner for Heat Recovery Steam Generator

SMAQMD Rule 201 Permit to Operate No. 14071 (permit number is for reference purposes only - not federally enforceable)

Heat Input Rating:	200 MMBTU/hour
Fuel:	Natural Gas

Air Pollution Control System - NOx

SMAQMD Rule 201 Permit to Operate No. 11458 (permit number is for reference purposes only - not federally enforceable)

Control Device:	Selective Catalytic Reduction
Manufacturer:	Nooter/Eriksen
Venting:	Gas Turbine and Duct Burner

Air Pollution Control System - ROC and CO

SMAQMD Rule 201 Permit to Operate No. 11459 (permit number is for reference purposes only - not federally enforceable)

Control Device:	Oxidation Catalyst
Manufacturer:	Nooter/Eriksen
Venting:	Gas Turbine and Duct Burner

FEDERALLY ENFORCEABLE REQUIREMENTS - EQUIPMENT SPECIFIC
GAS TURBINE
DUCT BURNER
APC NOx SCR SYSTEM
APC ROC AND CO OXIDATION CATALYST SYSTEM

B. APPLICABLE FEDERALLY ENFORCEABLE REQUIREMENTS - EQUIPMENT SPECIFIC:
The requirements specified under this section are enforceable by the SMAQMD, U.S. EPA and the public.

RECOMMISSIONING PERIOD REQUIREMENTS

CM1. The recommissioning period is defined as follows:

"The recommissioning period shall commence when all mechanical, electrical and control systems associated with the Siemens T-3000 control system are installed and the gas turbine is first fired. The recommissioning period shall terminate 30 operating days after commencement, or when the SPA facility has successfully completed performance testing, tuning and shakedown operations and compliance is demonstrated by continuous emissions monitoring equipment, whichever occurs first. For purposes of this condition, "operating day" is defined as any calendar day during which fuel is combusted in the turbine or duct burner."
[SMAQMD Rule Nos. 201 and 202]

CM2. The facility shall record the date that the recommissioning period terminates and submit written notification of this date to the SMAQMD Air Pollution Control Officer within 3 weekdays (Monday through Friday) of such termination.
[SMAQMD Rule Nos. 201 and 202]

CM3. During the recommissioning period at the earliest feasible opportunity, in accordance with recommendations of the equipment manufacturers and the construction contractor, the gas turbine combustors shall be tuned to minimize emissions of CO and NOx.
[SMAQMD Rule Nos. 201 and 202]

CM4. During the recommissioning period, at the earliest feasible opportunity, in accordance with recommendations of the equipment manufacturers and the construction contractor, the gas turbine and duct burner shall operate with the Selective Catalytic Reduction (SCR) system. The SCR system shall be adjusted and operated to minimize emissions of NOx.
[SMAQMD Rule Nos. 201 and 202]

CM5. During the recommissioning period, compliance with NOx and CO emission limits for the gas turbine and duct burner shall be demonstrated through the use of properly operated and maintained continuous emission monitoring systems and continuous parameter monitoring systems for the following:

A. Firing hours of the gas turbine and duct burner

B. Fuel flow rates to the gas turbine and duct burner

FEDERALLY ENFORCEABLE REQUIREMENTS - EQUIPMENT SPECIFIC
GAS TURBINE
DUCT BURNER
APC NOx SCR SYSTEM
APC ROC AND CO OXIDATION CATALYST SYSTEM

C. Stack gas NOx emission concentrations

D. Stack gas CO emission concentrations

E. Stack gas O2 concentrations
[SMAQMD Rule Nos. 201 and 202]

CM6. During the recommissioning period the monitored parameters shall be recorded at least once every 15 minutes (excluding normal calibration periods or when the monitored source is not in operation) for the gas turbine and duct burner. Previously approved methods shall be used to calculate heat input rates, NOx and CO mass emission rates, and NOx and CO emission concentrations, summarized for each clock hour and each calendar day. All records shall be retained on site for at least 5 years from the date of entry and made available to SMAQMD personnel upon request.
[SMAQMD Rule Nos. 201 and 202]

CM7. During the recommissioning period the continuous emission and parameter monitors shall be installed, calibrated and operational prior to firing of the gas turbine and duct burner with the new master control system. After initial firing of the gas turbine and duct burner, the detection range of these continuous emission monitors shall be adjusted as necessary to accurately measure the resulting range of NOx and CO emission concentrations.
[SMAQMD Rule Nos. 201 and 202]

CM8. During the recommissioning period the total number of firing hours of the gas turbine and duct burner without control of NOx emissions by the SCR system shall not exceed 100 hours. Such operation of the gas turbine and duct burner shall be limited to discrete recommissioning activities that can only be properly executed without the SCR system fully operational.

A. The number of firing hours of the gas turbine and duct burner without control of NOx emissions by the SCR system shall be recorded on an hourly basis during the recommissioning period.
[SMAQMD Rule Nos. 201 and 202]

CM9. During the recommissioning period the total mass emissions of ROC, NOx, SOx, PMI0 and CO that are emitted by the gas turbine and duct burner shall accrue towards the quarterly mass emission limits in Condition No. 4.
[SMAQMD Rule Nos. 201 and 202]

FEDERALLY ENFORCEABLE REQUIREMENTS - EQUIPMENT SPECIFIC
GAS TURBINE
DUCT BURNER
APC NOx SCR SYSTEM
APC ROC AND CO OXIDATION CATALYST SYSTEM

CM10. During the recommissioning period the NOx concentration from the gas turbine and duct burner shall not exceed the following limit:
[SMAQMD Rule Nos. 201 and 202]

Pollutant	Maximum Allowable NOx Concentration Gas Turbine and Duct Burner ppmv at 15% O2, averaged over any consecutive 3 hour period	
	Current Permit Limit	Permit Limit Applicable During the Recommissioning Period
NOx	3	No limit

CM11. During the recommissioning period hourly mass emissions from the gas turbine and duct burner shall not exceed the following limits:
[SMAQMD Rule Nos. 201 and 202]

Pollutant	Maximum Allowable Hourly Emissions Gas Turbine and Duct Burner lb/hour, averaged over any consecutive 3 hour period	
	Current Permit Limits	Permit Limits During the Recommissioning Period
ROC	9.01	9.01 (no change)
NOx	17.76	360
SO2	0.97	0.97 (no change)
PM10	7.00	7.00 (no change)
CO	10.81	500

FEDERALLY ENFORCEABLE REQUIREMENTS - EQUIPMENT SPECIFIC
GAS TURBINE
DUCT BURNER
APC NOx SCR SYSTEM
APC ROC AND CO OXIDATION CATALYST SYSTEM

CM12. During the recommissioning period daily mass emissions from the gas turbine and duct burner shall not exceed the following limits:
[SMAQMD Rule Nos. 201 and 202]

Pollutant	Maximum Allowable Daily Emissions Gas Turbine and Duct Burner lb/day	
	Current Permit Limits	Permit Limits During the Recommissioning Period
ROC	146.7	146.7 (no change)
NOx	384.5	1500
SO2	21.8	21.8 (no change)
PM10	142.1	142.1 (no change)
CO	326.9	1875

FEDERALLY ENFORCEABLE REQUIREMENTS - EQUIPMENT SPECIFIC
GAS TURBINE
DUCT BURNER
APC NOx SCR SYSTEM
APC ROC AND CO OXIDATION CATALYST SYSTEM

EMISSION LIMITATION REQUIREMENTS

1. The NOx concentration from the gas turbine and duct burner shall not exceed the following limit:
   [SMAQMD Rule Nos. 201 and 202]

Pollutant	Maximum Allowable NOx Concentration (A) Gas Turbine and Duct Burner ppmv at 15% O2 averaged over any consecutive 3 hour period
NOx	3

(A) Excluding start-ups, shutdowns and short term excursions as defined in Condition Nos. B.8, B.9 and B.10.

2. Mass emissions from the gas turbine and duct burner shall not exceed the following limits:
   [SMAQMD Rule Nos. 201 and 202]

Pollutant	Maximum Allowable Emissions (A) Gas Turbine and Duct Burner lb/hour averaged over any consecutive 3 hour period
ROC	9.01 (B)
NOx	17.76 (C)
SO2	0.97 (D)
PM10	7.00 (E)
CO	10.81 (F)

(A) Excluding start-ups, shutdowns and short term excursions as defined in Condition Nos. B.8, B.9 and B.10.
(B) Based on a turbine ROC emission factor of 0.00228 lb/MMBTU, duct burner ROC emission factor of 0.029 lb/MMBTU and firing at full capacity.
(C) Based on data submitted in the permit application and is monitored by the turbine's NOx CEM system.
(D) Based on a turbine and duct burner SO2 emission factor of 0.0006 lb/MMBTU and firing at full capacity.

FEDERALLY ENFORCEABLE REQUIREMENTS - EQUIPMENT SPECIFIC
GAS TURBINE
DUCT BURNER
APC NOx SCR SYSTEM
APC ROC AND CO OXIDATION CATALYST SYSTEM

(E) Based on a turbine PM10 emission factor of 0.003546 lb/MMBTU, duct burner PM10 emission factor of 0.01 lb/MMBTU and firing at full capacity.
(F) Based on data submitted in the permit application and is monitored by the turbine's CO CEM system.

3. Mass emissions from the following equipment at the facility shall not exceed the following limits:
[SMAQMD Rule Nos. 201 and 202]

Pollutant	Maximum Allowable Emissions (A) lb/day		
	Gas Turbine and Duct Burner	Cooling Tower	Total
ROC	146.7	NA	146.7
NOx	384.5	NA	384.5
SO2	21.8	NA	21.8
PM10	142.1	9.7	151.8
CO	326.9	NA	326.9

(A) Including start-ups, shutdowns and short term excursions as defined in Condition Nos. B.8, B.9 and B.10.

4. Combined mass emissions from the following equipment at the facility shall not exceed the following limits:
[SMAQMD Rule Nos. 201 and 202]

Pollutant	Maximum Allowable Emissions (A) Combined Emissions from: Gas Turbine and Duct Burner and Cooling Tower				
	Quarter 1 lb/quarter	Quarter 2 lb/quarter	Quarter 3 lb/quarter	Quarter 4 lb/quarter	Total lb/year
ROC	8,792	8,898	13,264	8,968	39,922
NOx	24,209	24,545	26,321	24,725	99,800
SOx	1,814	1,836	1,944	1,853	7,447

FEDERALLY ENFORCEABLE REQUIREMENTS - EQUIPMENT SPECIFIC
GAS TURBINE
DUCT BURNER
APC NOx SCR SYSTEM
APC ROC AND CO OXIDATION CATALYST SYSTEM

Pollutant	Maximum Allowable Emissions (A) Combined Emissions from: Gas Turbine and Duct Burner and Cooling Tower				
	Quarter 1 lb/quarter	Quarter 2 lb/quarter	Quarter 3 lb/quarter	Quarter 4 lb/quarter	Total lb/year
PM10	11,015	10,160	12,294	11,619	45,088
CO	21,265	21,601	22,803	21,708	87,377

(A) Including start-ups, shutdowns and short term excursions as defined in Condition Nos. B.8, B.9 and B.10.

5. HAP mass emissions from the facility shall not exceed the following limits:
[SMAQMD Rule Nos. 201 and 202]

Equipment	Maximum Allowable HAP Emissions (A) tons/year	
	Single HAP	Combination of HAPs
Total facility	9.4	24.4

(A) The purpose of this limitation is to qualify the gas turbines for the non-applicability of 40 CFR 63 Subpart YYYY - National Emission Standards for Hazardous Air Pollutants for Stationary Gas Turbines.

EQUIPMENT OPERATION REQUIREMENTS

6. The duct burner shall not be operated unless the gas turbine is operating.
[SMAQMD Rule Nos. 201 and 202]

7. The turbine and/or the duct burner shall not be operated without fully functioning selective catalytic reduction and oxidizing catalyst air pollution control systems, excluding periods of start-ups and shutdowns.
[SMAQMD Rule Nos. 201 and 202]

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8. The duration of the gas turbine's start-up period shall not exceed 60 minutes.

   A. Gas turbine start-ups are defined as the time periods commencing with the introduction of fuel to the gas turbine and ending at the time that 15-minute average NOx concentrations do not exceed 3 ppmvd at 15% O2, but in no case exceeding 60 consecutive minutes.

   [SMAQMD Rule Nos. 201 and 202]

9. Gas turbine shutdowns are defined as the 30-minute time period immediately preceding the termination of fuel to the gas turbine.
   [SMAQMD Rule Nos. 201 and 202]

10. Gas turbine short-term excursions are defined as 15-minute periods designated by the applicant that are a direct result of a diffusion mode switchover, not to exceed four consecutive 15-minute periods, when the 15-minute average NOx concentration exceeds 3 ppmvd at 15% O2.

    A. Maximum 3-hour average NOx concentration for periods that include short-term excursions shall not exceed 30 ppmvd at 15% O2.

    B. Short-term excursion periods that total in excess of 10 hours per rolling 12-month period shall not be excluded from evaluations for compliance with emission limits in Condition Nos. B.1 and B.2.

    [SMAQMD Rule Nos. 201 and 202]

11. The gas turbine and duct burner shall only combust natural gas fuel.
    [SMAQMD Rule Nos. 201 and 202]

MONITORING REQUIREMENTS

12. The permittee shall operate a continuous emission monitoring system that has been approved by the SMAQMD Air Pollution Control Officer for the gas turbine and duct burner.

    A. The continuous emission monitoring (CEM) system shall monitor and record nitrogen oxides, carbon monoxide and oxygen.

    B. For NOx and O2, the CEM system shall comply with U.S. EPA Performance Specifications in 40 CFR 75 Appendix A.

    C. For CO, the CEM system shall comply with U.S. EPA Performance Specifications in 40 CFR 60 Appendix B Performance Specification 4.

    [SMAQMD Rule Nos. 201 and 202]

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13. The permittee shall operate a continuous parameter monitoring system that has been approved by the SMAQMD Air Pollution Control Officer that either measures or calculates and records the following:
[SMAQMD Rule Nos. 201 and 202]

Parameter to be Monitored	Units
A. Fuel consumption of the combined cycle gas turbine	MMBTU/hour of natural gas
B. Fuel consumption of the duct burner	MMBTU/hour of natural gas
C. Exhaust gas flow rate of the combined cycle gas turbine and the duct burner.	kscfh or lb/hr

RECORDKEEPING AND REPORTING REQUIREMENTS

14. The following records shall be continuously maintained on site for the most recent five-year period and shall be made available to the SMAQMD Air Pollution Control Officer upon request. Quarterly records as specified in the table below shall be made available for inspection within 30 days of the end of the quarter.
[SMAQMD Rule Nos. 201 and 202 and 40 CFR 60.7]

Frequency	Information to be Recorded
Upon occurrence	A. Record of the occurrence and duration of any start-up, shutdown or short term excursion. i. The number of consecutive 15-minute periods when the 15-minute average NOx concentration exceeded the limits of Condition No. B.1 during each short-term excursion. ii. The qualified condition(s) under which each short-term excursion occurred, pursuant to SMAQMD Rule No. 413 Section 114. iii. The maximum 6-hour average NOx concentration during the period that includes each short-term excursion. iv. The cumulative total, per calendar year, of all 15-minute periods when the 15-minute average NOx concentration exceeded the limits of Condition No. B.1.

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Frequency	Information to be Recorded
	B. Malfunction in operation of the gas turbine. C. Measurements from the continuous emission and parameter monitoring systems. D. Monitoring device and performance testing measurements. E. All continuous monitoring system performance evaluations. F. All continuous monitoring system or monitoring device calibration checks. G. All continuous monitoring system adjustments and maintenance.
Hourly	H. Gas turbine natural gas fuel consumption (MMBTU/hr). I. Duct burner natural gas fuel consumption (MMBTU/hr). J. Indicate when each gas turbine start-up occurred. K. NOx emission concentration from the gas turbine and duct burner (ppmvd at 15% O2). L. ROC, NOx, SOx, PM10 and CO hourly emissions (lb/hour) from the gas turbine and duct burner (combined emissions). i. For those pollutants directly monitored (NOx and CO), the hourly emissions will be from the CEM system required pursuant to Condition No. B.12. ii. For those pollutants that are not directly monitored (ROC, SOx and PM10), the hourly emissions shall be calculated based on SMAQMD approved emission factors contained in the footnotes to Condition No. B.2.
Daily	M. ROC, NOx, SOx, PM10 and CO daily mass emissions from all equipment <u>separately</u> and <u>combined</u> at the facility (lb/day): i. gas turbine and duct burner (for separate reporting the gas turbine and duct burner emission are combined).

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Frequency	Information to be Recorded
	ii. cooling tower.
Quarterly	N. ROC, NOx, SOx, PM10 and CO quarterly mass emissions from all equipment combined at the facility (lb/quarter). i. gas turbine and duct burner. ii. cooling tower.

15. Submit to the SMAQMD Air Pollution Control Officer a written report which contains the following information.
[SMAQMD Rule Nos. 201 and 202 and 40 CFR 60.7]

Frequency	Information to be Reported
Quarterly Submitted by: Jan 30 Apr 30 Jul 30 Oct 30 for the previous calendar quarter	A. Whenever the continuous emissions monitoring system is inoperative except for zero and span checks: i. Date and time of non-operation of the continuous emission monitoring system. ii. Nature of the continuous emission monitoring system repairs or adjustments. B. Whenever an emission occurs as measured by the required continuous emissions monitoring system that is in excess of any emission limitation: i. Magnitude of the emission which has been determined to be in excess. ii. Date and time of the commencement and completion of each period of excess emissions. iii. Periods of excess emissions due to startup, shutdown and malfunction shall be specifically identified. iv. The nature and cause of any malfunction (if known). v. The corrective action taken or preventive measures adopted.

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GAS TURBINE
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Frequency	Information to be Reported
	C. If there are no excess emissions or the continuous monitoring system has not been inoperative, repaired or adjusted for a calendar quarter, a report shall be submitted stating such information.

EMISSION REDUCTION CREDIT (ERC) REQUIREMENTS

16. The permittee shall surrender (and has surrendered - See Condition Nos. 17, 18 and 19) ERCs to the SMAQMD Air Pollution Control Officer to offset the following amount of emissions:
[SMAQMD Rule No. 202]

Equipment - Gas Turbine Duct Burner Cooling Tower	Amount of Emission Offsets for which ERCs are to be Surrendered lb/quarter			
	Quarter 1	Quarter 2	Quarter 3	Quarter 4
ROC	1,292	1,398	5,764	1,468
NOx	24,209	24,545	26,321	24,725
PM10	11,015	10,160	12,294	11,619

17. The following ERCs have been surrendered to the SMAQMD Air Pollution Control Officer to comply with the ROC emission offset requirements as stated in Condition No. 16:
[SMAQMD Rule No. 202]

ERC Certificate No.	Face Value of Emission Reduction Credit Certificates lb/quarter				IPTR (A)	Offset Ratio	Value Applied to ROC Emission Liability lb/quarter			
	Qtr 1	Qtr 2	Qtr 3	Qtr 4			Qtr 1	Qtr 2	Qtr 3	Qtr 4
SMAQMD 00-00652 Swansons	1,550	1,678	6,917	1,762	NA	1.2	1,292	1,398	5,764	1,468
Total ROC Emission Offsets							1,292	1,398	5,764	1,468

(A) IPTR = interpollutant trading ratio

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18. The following ERCs have been surrendered to the SMAQMD Air Pollution Control Officer to comply with the NOx emission offset requirements as stated in Condition No. 16: **[SMAQMD Rule No. 202]**

ERC Certificate No.	Face Value of Emission Reduction Credit Certificates lb/quarter				IPTR (A)	Offset Ratio	Value Applied to NOx Emission Liability lb/quarter			
	Qtr 1	Qtr 2	Qtr 3	Qtr 4			Qtr 1	Qtr 2	Qtr 3	Qtr 4
SMAQMD 97-00437 Campbell	23,622	13,491	31,585	20,983	NA	1.2:1	19,685	11,243	26,321	17,486
PCAQMD 98-00002 Formica (ROC)	18,096	53,208	0	28,956	2:1	2:1	4,524	13,302	0	7,239
Total NOx Emission Offsets							24,209	24,545	26,321	24,725

(A) IPTR = interpollutant trading ratio

19. The following ERCs have been surrendered to the SMAQMD Air Pollution Control Officer to comply with the PM10 emission offset requirements as stated in Condition No. 16: **[SMAQMD Rule No. 202]**

Offset Source	Face Value of Emission Reduction credit Certificates lb/quarter				IPTR (A)	Offset Ratio	Value Applied to PM10 Emission Liability lb/quarter			
	Qtr 1	Qtr 2	Qtr 3	Qtr 4			Qtr 1	Qtr 2	Qtr 3	Qtr 4
PCAPCD 99-00003 Sierra Pine	16,523	15,240	18,441	17,429	NA	1.5	11,015	10,160	12,294	11,619
Total PM10 Emission Offsets							11,015	10,160	12,294	11,619

(A) IPTR = interpollutant trading ratio

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EMISSION TESTING REQUIREMENTS

20. The permittee shall perform an ROC, NOx, PM10 and CO source test and CEM accuracy (RATA) test of the gas turbine and duct burner once each calendar year.

    A. Submit a source test plan to the SMAQMD Air Pollution Control Officer for approval at least 30 days before the source test is to be performed. The source test plan shall indicate that U.S. EPA approved test methods are used for NOx and CO.

    B. Notify the SMAQMD Air Pollution Control Officer at least 7 days prior to the source testing date.

    C. During the source test the gas turbine and duct burner shall be operated at the maximum firing capacity, defined as ≥ 90% of the heat input capacity that is achievable based on ambient conditions at the time of the source test.

    D. Submit the source test results to the SMAQMD Air Pollution Control Officer within 60 days after the completion of the source test(s).

    E. The SMAQMD Air Pollution Control Officer may waive the ROC and PM10 annual source test requirement every other year if the prior annual source test result indicates that the respective hourly emissions are less than or equal to 75% of the respective hourly emission limit.

    [SMAQMD Rule Nos. 201 and 202]

PERMIT SHIELD

21. Compliance with the specified conditions of the Title V permit shall be deemed compliance with the following subsumed requirements.
    [U.S. EPA Title V White Paper Number 2 for Improved Implementation of the Part 70 Operating Permits Program]

Title V Permit Condition No.	Subsumed requirement
B.2	SMAQMD Rule No. 406 - Combustion Contaminants (adopted 12-06-1978)
B.1, B.2, B.8, B.9, B.10, B.11, B.12, B.13, B.14,	SMAQMD Rule No. 413 - Stationary Gas Turbines (adopted 03-24-2005)

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Title V Permit Condition No.	Subsumed requirement
B.2, B.11	SMAQMD Rule No. 420 - Sulfur Content of Fuels (adopted 08-13-1981)
B.1, B.2, B.14, B.15	40 CFR 60 Subpart Db - NSPS for Small Industrial - Commercial - Institutional Steam Generating Units (amended 06-13-2007)
B.1, B.2, B.14, B.15	40 CFR 60 Subpart GG - Standards of Performance for Stationary Gas Turbines (amended 02-24-2006)

NON-FEDERALLY ENFORCEABLE REQUIREMENTS - EQUIPMENT SPECIFIC
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DUCT BURNER
APC NOx SCR SYSTEM
APC ROC AND CO OXIDATION CATALYST SYSTEM

C. *NON*-FEDERALLY ENFORCEABLE REQUIREMENTS - EQUIPMENT SPECIFIC

The requirements specified under this section are enforceable by the SMAQMD only.

EMISSION LIMITATION REQUIREMENTS

22. Concentrations of ammonia (NH3) emissions from the gas turbine and duct burner shall not exceed the following limit.
[SMAQMD Rule No. 402]

Pollutant	Maximum Allowable Ammonia Concentration ppmv at 15% O2 (measured as NH3) averaged over any consecutive 3 hour
Ammonia (NH3)	10

(A) Excluding start-ups, shutdowns and short term excursions as defined in Condition Nos. B.8, B.9 and B.10.

EMISSION TESTING REQUIREMENTS

23. The permittee shall perform an ammonia (NH3) source test of the gas turbine and duct burner once each calendar year.

A. Submit a source test plan to the SMAQMD Air Pollution Control Officer for approval at least 30 days before the source test is to be performed.

B. Notify the SMAQMD Air Pollution Control Officer at least 7 days prior to the source testing date.

C. During the source test the gas turbine and duct burner shall be operated at the maximum firing capacity, defined as ≥ 90% of the heat input capacity that is achievable based on ambient conditions at the time of the source test.

D. Submit the source test results to the SMAQMD Air Pollution Control Officer within 60 days after the completion of the source test(s).
[SMAQMD Rule No. 201]

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D. ACID RAIN PERMIT

The requirements specified under this subsection are issued in accordance with SMAQMD Rule No. 207 - Title V Federal Operating Permit Program and Title IV and Title V of the federal Clean Air Act, and are enforceable by the SMAQMD, the U.S. EPA and the public.

PERMIT REQUIREMENTS

24. The designated representative of each affected source and each affected unit at the source shall:

    A. Submit a complete Acid Rain permit application (including a compliance plan) under 40 CFR Part 72 in accordance with the deadlines specified in 40 CFR 72.30; and

    B. Submit in a timely manner any supplemental information that the permitting authority determines is necessary in order to review an Acid Rain permit application and issue or deny an Acid Rain permit.
    [40 CFR 72.9(a)(1)]

25. The owners and operators of each affected source and each affected unit at the source shall:

    A. Operate the unit in compliance with a complete Acid Rain permit application or a superseding Acid Rain permit issued by the permitting authority; and

    B. Have an Acid Rain Permit.
    [40 CFR 72.9(a)(2)]

MONITORING REQUIREMENTS

26. The owners and operators and, to the extent applicable, designated representative of each affected source and each affected unit at the source, shall comply with the monitoring requirements as provided in 40 CFR Parts 74, 75 and 76.

    A. Sampling and analysis for fuel gas total sulfur content shall comply with the requirements of 40 CFR Part 75 Appendix D.

        i. Sampling for fuel gas total sulfur content is not required if a valid contract or tariff sheet is used to qualify the gas as pipeline natural gas, as defined in 40 CFR 72.2.

        ii. If fuel gas sampling is used to qualify the fuel gas as pipeline natural gas, a sample shall be collected and analyzed:

            a. at least once annually for fuel gas total sulfur content, and

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b. whenever the fuel gas supply source changes.

iii. Provided that the analysis results do not exceed 0.5 grains total sulfur per 100 scf of fuel gas, the default emission rate of 0.0006 lb SO2/MMBTU shall be used to determine SO2 mass emissions for the purposes of the Acid Rain Program.

iv. If the results of the fuel gas sampling show that the fuel gas does not meet the definition of pipeline natural gas in 40 CFR 72.2, but those results are believed to be anomalous, the owner or operator may document the reasons for believing this in the monitoring plan for the unit, and may immediately perform additional sampling in accordance with of 40 CFR 75 Appendix D Section 2.3.1.4(b). In such cases, a minimum of three additional samples must be obtained and analyzed, and the results of each sample analysis must meet the definition of pipeline natural gas.

v. If the results of the annual and additional samples show that the fuel gas does not meet the definition of pipeline quality gas, the owner or operator shall reclassify the fuel as appropriate and determine the SO2 emission rate to be used in the Acid Rain Program calculations in accordance with the following:

(a) If the fuel still qualifies as natural gas under 40 CFR 75 Appendix D Section 2.3.2.4, reclassify the fuel as natural gas and determine the appropriate default SO2 emission rate for the fuel, according to 40 CFR 75 Appendix D Section 2.3.2.1.1.

[40 CFR 72.9(b)(1) and 40 CFR 75 Appendix D]

27. The emissions measurements recorded and reported in accordance with 40 CFR Part 75 shall be used to determine compliance by the source or unit, as appropriate, with the Acid Rain emissions limitations and emissions reduction requirements for sulfur dioxide and nitrogen oxides under the Acid Rain Program.
[40 CFR 72.9(b)(2)]

28. The requirements of 40 CFR Parts 74 and 75 shall not affect the responsibility of the owners and operators to monitor emissions of other pollutants or other emissions characteristics at the unit under other applicable requirements of the federal Clean Air Act and other provisions of the operating permit for the source.
[40 CFR 72.9(b)(3)]

SULFUR DIOXIDE REQUIREMENTS

29. The owners and operators of each source and each affected unit at the source shall:

A. Hold allowances, as of the allowance transfer deadline, in the source's compliance account (after deductions under 40 CFR 73.34(c)) not less than the total annual

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emissions of sulfur dioxide for the previous calendar year from the affected units at the source; and

B. Comply with the applicable Acid Rain emissions limitations for sulfur dioxide.
[40 CFR 72.9(c)(1)]

30 Each ton of sulfur dioxide emitted in excess of the Acid Rain emissions limitations for sulfur dioxide shall constitute a separate violation of the federal Clean Air Act.
[40 CFR 72.9(c)(2)]

31. An affected unit shall be subject to the requirements under 40 CFR 72.9(c)(1) as follows:

A. Starting January 1, 2000, an affected unit under 40 CFR 72.6(a)(2); or

B. Starting on or after January 1, 1995 in accordance with 40 CFR 72.41 and 72.43, an affected unit under 40 CFR 72.6(a)(2) or (3) that is a substitution or compensating unit;

C. Starting January 1, 2000, an affected unit under 40 CFR 72.6(a)(2) that is not a substitution or compensating unit; or

D. Starting on the later of January 1, 2000 or the deadline for monitor certification under 40 CFR Part 75, an affected unit under 40 CFR 72.6(a)(3) that is not a substitution or compensating unit.
[40 CFR 72.9(c)(3)]

32. Allowances shall be held in, deducted from or transferred among Allowance Tracking System accounts in accordance with the Acid Rain Program.
[40 CFR 72.9(c)(4)]

33. An allowance shall not be deducted in order to comply with the requirements of 40 CFR 72.9(c)(1)(i) prior to the calendar year for which the allowance was allocated.
[40 CFR 72.9(c)(5)]

34. An allowance allocated by the U.S. EPA Administrator under the Acid Rain Program is a limited authorization to emit sulfur dioxide in accordance with the Acid Rain Program. No provision of the Acid Rain Program, the Acid Rain permit application, the Acid Rain permit, or an exemption under 40 CFR 72.7 and 72.8 and no provision of law shall be construed to limit the authority of the United States to terminate or limit such authorization.
[40 CFR 72.9(c)(6)]

35. An allowance allocated by the U.S. EPA Administrator under the Acid Rain Program does not constitute a property right.
[40 CFR 72.9(c)(7)]

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NITROGEN OXIDES REQUIREMENTS

36. The owners and operators of the source and each affected unit at the source shall comply with the applicable Acid Rain emissions limitation for nitrogen oxides.

EXCESS EMISSIONS REQUIREMENTS

37. The designated representative of an affected source that has excess emissions in any calendar year shall submit a proposed offset plan, as required under 40 CFR Part 77. **[40 CFR 72.9(e)(1)]**

38. The owners and operators of an affected source that has excess emissions in any calendar year shall:

    A. Pay without demand the penalty required, and pay upon demand the interest on that penalty, as required by 40 CFR Part 77; and

    B. Comply with the terms of an approved offset plan, as required by 40 CFR Part 77. **[40 CFR 72.9(e)(2)]**

RECORDKEEPING AND REPORTING REQUIREMENTS

39. Unless otherwise provided, the owners and operators of the source and each affected unit at the source shall keep on site at the source each of the following documents for a period of 5 years from the date the document is created. This period may be extended for cause, at any time prior to the end of 5 years, in writing by the U.S. EPA Administrator or permitting authority:

    A. The certificate of representation for the designated representative for the source and each affected unit at the source and all documents that demonstrate the truth of the statements in the certificate of representation, in accordance with 40 CFR 72.24; provided that the certificate and documents shall be retained on site at the source beyond such 5-year period until such documents are superseded because of the submission of a new certificate of representation changing the designated representative.

    B. All emissions monitoring information, in accordance with 40 CFR Part 75 provided that to the extent that 40 CFR Part 75 provides for a 3-year period for recordkeeping, the 3-year period shall apply.

    C. Copies of all reports, compliance certifications and other submissions and all records made or required under the Acid Rain Program.

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D. Copies of all documents used to complete an Acid Rain permit application and any other submission under the Acid Rain Program or to demonstrate compliance with the requirements of the Acid Rain Program.

E. The date that any fuel gas supply source change occurs.
(this requirement is not part of 40 CFR 72.9(f)(1))

F. The date when the fuel type changes between pipeline natural gas and natural gas as described in Condition No. D.27.
(this requirement is not part of 40 CFR 72.9(f)(1))
[40 CFR 72.9(f)(1)]

40. The designated representative of an affected source and each affected unit at the source shall submit the reports and compliance certifications required under the Acid Rain Program, including those under 40 CFR Part 72 Subpart I and 40 CFR Part 75.
[40 CFR 72.9(f)(2)]

LIABILITY REQUIREMENTS

41. Any person who knowingly violates any requirement or prohibition of the Acid Rain Program, a complete Acid Rain permit application, an Acid Rain permit or an exemption under 40 CFR 72.7 or 72.8, including any requirement for the payment of any penalty owed to the United States, shall be subject to enforcement pursuant to Section 113(c) of the federal Clean Air Act.
[40 CFR 72.9(g)(1)]

42. Any person who knowingly makes a false material statement in any record, submission or report under the Acid Rain Program shall be subject to criminal enforcement pursuant to Section 113(c) of the federal Clean Air Act and 18 U.S.C. 1001.
[40 CFR 72.9(g)(2)]

43. No permit revision shall excuse any violation of the requirements of the Acid Rain Program that occurs prior to the date that the revision takes effect.
[40 CFR 72.9(g)(3)]

44. Each affected source and each affected unit shall meet the requirements of the Acid Rain Program.
[40 CFR 72.9(g)(4)]

45. Any provision of the Acid Rain Program that applies to an affected source (including a provision applicable to the designated representative of an affected source) shall also apply to the owners and operators of such source and of the affected units at the source.
[40 CFR 72.9(g)(5)]

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46. Any provision of the Acid Rain Program that applies to an affected unit (including a provision applicable to the designated representative of an affected unit) shall also apply to the owners and operators of such unit.
[40 CFR 72.9(g)(6)]

47. Each violation of a provision of 40 CFR Parts 72, 73, 74, 75, 76, 77 and 78 by an affected source or affected unit, or by an owner or operator or designated representative of such source or unit, shall be a separate violation of the federal Clean Air Act.
[40 CFR 72.9(g)(7)]

EFFECT ON OTHER AUTHORITIES

48. No provision of the Acid Rain Program, an Acid Rain permit application, an Acid Rain permit or an exemption under 40 CFR 72.7 or 72.8 shall be construed as:

A. Except as expressly provided in Title IV of the federal Clean Air Act, exempting or excluding the owners and operators and, to the extent applicable, the designated representative of an affected source or affected unit from compliance with any other provision of the federal Clean Air Act, including the provisions of Title I of the federal Clean Air Act relating to applicable National Ambient Air Quality Standards or State Implementation Plans.

B. Limiting the number of allowances a source can hold; provided, that the number of allowances held by the source shall not affect the source's obligation to comply with any other provisions of the federal Clean Air Act.

C. Requiring a change of any kind in any State law regulating electric utility rates and charges, affecting any State law regarding such State regulation, or limiting such State regulation, including any prudence review requirements under such State law.

D. Modifying the Federal Power Act or affecting the authority of the Federal Energy Regulatory Commission under the Federal Power Act.

E. Interfering with or impairing any program for competitive bidding for power supply in a State in which such program is established.
[40 CFR 72.9(h)]

FEDERALLY ENFORCEABLE REQUIREMENTS - EQUIPMENT SPECIFIC
COOLING TOWER

A. EQUIPMENT DESCRIPTION

The information specified under this section is enforceable by the SMAQMD, U.S. EPA and the public.

The requirements specified under the following sections apply to the following equipment:

COOLING TOWER

P/O No. 13316	(permit number is for reference purposes only - not federally enforceable)
Manufacturer:	GEA Thermal-Dynamic Towers
Type:	Mechanical draft, counterflow, with drift eliminator
Size:	3 cell
Capacity:	45,000 gallons water/minute, 4,763,000 cfm air flowrate

B. APPLICABLE FEDERALLY ENFORCEABLE REQUIREMENTS - EQUIPMENT SPECIFIC

The requirements specified under this subsection are enforceable by the SMAQMD, U.S. EPA and the public.

EMISSION LIMITATION REQUIREMENTS

1. Emissions from the cooling tower shall not exceed the following:
   [SMAQMD Rule Nos. 201 and 202]

Pollutant	Maximum Allowable Emissions Cooling Tower lb/hour averaged over any consecutive 3 hour period
PM10	0.41 (A)

(A) Based on a water circulation rate of 45,000 gal/min, cooling tower drift rate of 0.0006%, and a TDS level of 3000 ppmw.

2. Emissions from the following equipment at the facility shall not exceed the following daily emission limits:
   [SMAQMD Rule Nos. 201 and 202]

   See Condition No. B.3 for the Gas Turbine and Duct Burner

3. Emissions from the following equipment at the facility shall not exceed the following quarterly emission limits:
   [SMAQMD Rule Nos. 201 and 202]

   See Condition No. B.4 for the Gas Turbine and Duct Burner

FEDERALLY ENFORCEABLE REQUIREMENTS - EQUIPMENT SPECIFIC
COOLING TOWER

4. The total dissolved solids content of the circulating cooling water shall not exceed 3000 ppmw, averaged over any consecutive three hour period.
[SMAQMD Rule Nos. 201 and 202]

EQUIPMENT OPERATION REQUIREMENTS

None

MONITORING REQUIREMENTS

5. The permittee shall operate a continuous parameter monitoring system, that has been approved by the SMAQMD Air Pollution Control Officer, that either measures or calculates and records the following.
[SMAQMD Rule Nos. 201 and 202]

Parameter to be Monitored	Units
A. Total dissolved solids content of the circulating water in the cooling tower	ppmw

RECORDKEEPING AND REPORTING REQUIREMENTS

6. The following records shall be continuously maintained on site for the most recent five-year period and shall be made available to the SMAQMD Air Pollution Control Officer upon request. Quarterly records shall be made available for inspection within 30 days of the end of the reporting period.
[SMAQMD Rule Nos. 201 and 202]

Frequency	Information to be Recorded
Hourly	A. Total dissolved solids content of the circulating water in the cooling tower. (ppmw) B. Cooling tower hourly PM10 mass emission rate. (lb PM10/hour) i. The hourly emissions shall be calculated based on the cooling water circulation rate multiplied by the cooling tower drift rate, density of water and the measured TDS level.
Daily	C. Cooling tower PM10 daily mass emissions. (lb/day) D. Total facility PM10 daily mass emissions. (lb/day)
Quarterly	E. Total facility PM10 quarterly mass emissions. (lb/quarter)

FEDERALLY ENFORCEABLE REQUIREMENTS - EQUIPMENT SPECIFIC
COOLING TOWER

EMISSION REDUCTION CREDIT (ERC) REQUIREMENTS

7. The permittee shall surrender (and has surrendered - See Condition No. 8) PM10 ERCs to the SMAQMD Air Pollution Control Officer to offset the following amount of PM10 emissions: **[SMAQMD Rule Nos. 201 and 202]**

   See Condition No. B.16 for the Gas Turbine and Duct Burner (PM10 only)

8. The following PM10 ERCs have been surrendered to the SMAQMD Air Pollution Control Officer to comply with the PM10 emission offset requirements as stated in Condition No. 7: **[SMAQMD Rule Nos. 201 and 202]**

   See Condition No. B.19 for the Gas Turbine and Duct Burner

PERMIT SHIELD

9. Compliance with the specified conditions of the Title V permit shall be deemed compliance with the following subsumed requirements.
   [U.S. EPA Title V White Paper Number 2 for Improved Implementation of the Part 70 Operating Permits Program]

Title V Permit Condition No.	Subsumed requirement
B.1	SMAQMD Rule No. No. 404 - Particulate Matter (adopted 11-20-1984)

NON-FEDERALLY ENFORCEABLE REQUIREMENTS - EQUIPMENT SPECIFIC COOLING TOWER

C. *NON*-FEDERALLY ENFORCEABLE REQUIREMENTS - EQUIPMENT SPECIFIC

The requirements specified under this section are enforceable by the SMAQMD only.

10. The cooling tower shall not use any chromium containing water treatment chemicals. **[State of California Air Toxic Control Measure for Chromate Treated Cooling Towers (CCR 93103)]**

INSIGNIFICANT EMISSIONS UNITS

The following systems are considered insignificant emissions units and are not subject to equipment specific requirements. However, these units are required to comply with all applicable general requirements.

Equipment Description	Basis for the Exemption
Vehicles	SMAQMD Rule No. 201 Section 111.1 Vehicles used to transport passengers or freight.
Portable pressure washer, 13 hp Portable welder, 16 hp Water treatment backup electrical generator, 18 hp, natural gas fuel	SMAQMD Rule No. 201 Section 112.1 Internal combustion engines with a manufacturer's maximum continuous rating of 50 hp or less.
Air conditioners	SMAQMD Rule No. 201 Section 115 Air conditioning systems not designed to remove air contaminants.
Aqueous ammonia storage tank Compressed gas cylinders (e.g. CO2, H2, calibration gases)	SMAQMD Rule No. 201 Section 117.1 Tanks used for the storage of liquefied or compressed gases.
Lube oil storage tanks Waste lube oil storage tanks Hydraulic oil storage tanks Water/waste oil separator	SMAQMD Rule No. 201 Section 117.2 Tanks used for the storage of unheated organic materials with a vapor pressure ≤ 5 mm Hg (0.1 psia) or initial boiling point ≥ 150 °C (302 °F).
Maintenance shop painting	SMAQMD Rule No. 201 Section 118 Surface coating operations using a combined total of one gallon per day or less of coating material or solvent.

INSIGNIFICANT EMISSIONS UNITS

Equipment Description	Basis for the Exemption
Parts washer and wipe cleaning Natural gas compressor (electric motor drive) Abrasive blasting cabinet Fugitive emissions associated with plant piping systems for fuel gas, fuel oil, lube oil and anhydrous ammonia Water treatment chemical storage tanks Brazing, soldering, welding and cutting torches for plant maintenance activities Adhesive use for plant maintenance activities	SMAQMD Rule No. 201 Section 122 Other equipment which would emit any pollutant, without the benefit of air pollution control devices, at a rate less than 2 pounds in any 24 hour period.

ACRONYMS, ABBREVIATIONS AND UNITS OF MEASURE

Acronyms, abbreviations and units of measure used in this permit are defined as follows:

ASTM
American Society for Testing and Materials

BACT
Best Available Control Technology.

CAA
The federal Clean Air Act.

CARB
California Air Resources Board.

CFC
Chloro-fluoro-carbons. A class of compounds responsible for destroying ozone in the upper atmosphere.

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.

CO2
Carbon dioxide.

ERC
Emission reduction credit.

Federally Enforceable
All limitations and conditions which are enforceable by the Administrator of the U.S. 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 (HAP) and Part 72 (Permits Regulation, Acid Rain) including limitations and conditions contained in operating permits issued under a U.S. EPA approved program that has been incorporated into the California SIP.

NESHAP
National Emission Standards for Hazardous Air Pollutants (see 40 CFR Parts 61 and 63).

NOx
Nitrogen oxides.

ACRONYMS, ABBREVIATIONS AND UNITS OF MEASURE

NSPS
New Source Performance Standards. U.S. EPA 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 SMAQMD Regulation 8.

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 SMAQMD Rule No. 202. (Note: There are additional NSR requirements mandated by the California Clean Air Act.)

O2
Oxygen.

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 ROC, NOx, SO2 and PM10.

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 SMAQMD is classified "attainment" of the National Air Ambient Quality Standards. Mandated by Title I of the federal Clean Air Act and implemented by 40 CFR Part 52.

ROC
Reactive organic compounds.

SIP
State Implementation Plan. CARB and SMAQMD programs and regulations approved by U.S. EPA and developed in order to attain the National Air Ambient Quality Standards. Mandated by Title I of the federal Clean Air Act.

SMAQMD
Sacramento Metropolitan Air Quality Management District.

SO2
Sulfur dioxide.

ACRONYMS, ABBREVIATIONS AND UNITS OF MEASURE

Title V
Title V of the federal Clean Air Act. Title V requires the SMAQMD to operate a federally enforceable operating permit program for major stationary sources and other specified sources.

TSP
Total suspended particulate.

U.S. EPA
The federal Environmental Protection Agency.

VOC
Volatile Organic Compounds.

UNITS OF MEASURE:

BTU	=	British Thermal Unit
cfm	=	cubic feet per minute
cm	=	centimeter
g	=	grams
gal	=	gallon
gpm	=	gallons per minute
hp	=	horsepower
hr	=	hour
lb	=	pound
in	=	inch
kg	=	kilogram
max	=	maximum
m2	=	square meter
min	=	minute
mm	=	millimeter
MM	=	million
ppmv	=	parts per million by volume
ppmw	=	parts per million by weight
psia	=	pounds per square inch, absolute
psig	=	pounds per square inch, gauge
quarter	=	calendar quarter
RVP	=	Reid vapor pressure
scfm	=	standard cubic feet per minute
yr	=	year

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If you have any questions, please contact one of the following individuals by email or phone.

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Phone:	+1 916 391 2993 x2 (direct SPA)

APPENDIX E

2018 Hazardous Materials List.

Hazardous Materials And Wastes Inventory Matrix Report

CERS Business/Org. **SACTO POWER AUTHORITY COGENERATION**
Facility Name **SACTO POWER AUTHORITY COGENERATION**
3215 47TH AVE , SACRAMENTO 95824

Chemical Location **Boiler Chemical Building**

CERS ID **10222930**
Facility ID **FA0013407**
Status **Submitted** on 12/19/2018 1:22 PM

DOT Code/Fire Haz. Class	Common Name	Unit	Quantities: Max. Daily	Quantities: Largest Cont.	Quantities: Avg. Daily	Annual Waste Amount	Federal Hazard Categories	Hazardous Components (For mixture only): Component Name	% Wt	EHS	CAS No.
	Boiler pH Control boiler water CAS No 100-37-8	**Gallons** State Liquid Type Mixture	**50** Storage Container Aboveground Tank, Tank Inside Building Days on Site: 365	**50**	25 Pressue Ambient Temperature Ambient	0 Waste Code	- Chronic health	2diethylaminoethanol 15 40 % Cyclohexylamine 15 40%	28 % 28 %		100378 108918
	Phosphate for boiler water CAS No 7601-54-9	**Gallons** State Liquid Type Mixture	**100** Storage Container Aboveground Tank, Tank Inside Building Days on Site: 365	**50**	75 Pressue Ambient Temperature Ambient	0 Waste Code	- Chronic health	Sodium phosphate, tribasic 1 5 %	3 %		7601549
	Closed Loop Corrosion Inhibitor CAS No 1310-73-2	**Gallons** State Liquid Type Mixture	**20** Storage Container Aboveground Tank, Tank Inside Building, Plastic/Non-metalic Drum Days on Site: 365	**5**	10 Pressue Ambient Temperature Ambient	0 Waste Code	- Chronic health	Sodium hydroxide 0.5 1.5% Sodium tetraborate pentahydrate 1 5% Sodium molybdate 5 10%	1 % 3 % 8 %		1310732 12179043 7631950

Hazardous Materials And Wastes Inventory Matrix Report

CERS Business/Org. **SACTO POWER AUTHORITY COGENERATION**
Facility Name **SACTO POWER AUTHORITY COGENERATION**
3215 47TH AVE , SACRAMENTO 95824

Chemical Location **CEMS Bottle Rack**

CERS ID **10222930**
Facility ID **FA0013407**
Status **Submitted** on 12/19/2018 1:22 PM

DOT Code/Fire Haz. Class	Common Name	Unit	Quantities: Max. Daily	Quantities: Largest Cont.	Quantities: Avg. Daily	Annual Waste Amount	Federal Hazard Categories	Hazardous Components (For mixture only): Component Name	% Wt	EHS	CAS No.
	Nox Span Gas	**Cu. Feet**	**420**	**140**	280	0	- Chronic health	Nitric Oxide			10102-43-9
	CAS No	State: Gas	Storage Container: Cylinder		Pressue: > Ambient	Waste Code		Carbon Monoxide			630-08-0
		Type: Mixture	Days on Site: 365		Temperature: Ambient			Nitrogen	100 %		7727-37-9

Hazardous Materials And Wastes Inventory Matrix Report

CERS Business/Org. **SACTO POWER AUTHORITY COGENERATION**
Facility Name **SACTO POWER AUTHORITY COGENERATION**
3215 47TH AVE , SACRAMENTO 95824

Chemical Location **CHEMS Bottle Rack**

CERS ID **10222930**
Facility ID **FA0013407**
Status **Submitted** on 12/19/2018 1:22 PM

DOT Code/Fire Haz. Class	Common Name	Unit	Quantities: Max. Daily	Quantities: Largest Cont.	Quantities: Avg. Daily	Annual Waste Amount	Federal Hazard Categories	Hazardous Components (For mixture only): Component Name	% Wt	EHS	CAS No.
	CO Span Gas	**Cu. Feet**	**420**	**140**	280	0	- Chronic health	Carbon Monoxide			630-08-0
	CAS No	State: Gas	Storage Container: Cylinder		Pressue: > Ambient	Waste Code		Nitrogen	100 %		7727-37-9
		Type: Mixture	Days on Site: 365		Temperature: Ambient						

Hazardous Materials And Wastes Inventory Matrix Report

CERS Business/Org. **SACTO POWER AUTHORITY COGENERATION**
Facility Name **SACTO POWER AUTHORITY COGENERATION**
3215 47TH AVE , SACRAMENTO 95824

Chemical Location
Cooling Tower

CERS ID **10222930**
Facility ID **FA0013407**
Status **Submitted** on 12/19/2018 1:22 PM

DOT Code/Fire Haz. Class	Common Name	Unit	Quantities: Max. Daily	Quantities: Largest Cont.	Quantities: Avg. Daily	Annual Waste Amount	Federal Hazard Categories	Hazardous Components (For mixture only): Component Name	% Wt	EHS	CAS No.
	Biocide for cooling tower	**Gallons**	**400**	**400**	300	0	- Chronic health	5chloro2methyl4isothiazolin3one	0 %		26172554
								2methyl4isothiazolin3one			2682204

CAS No
26172-55-4

State
Liquid

Storage Container
Aboveground Tank

Pressue
Ambient

Waste Code

Type
Mixture

Days on Site: 365

Temperature
Ambient

Hazardous Materials And Wastes Inventory Matrix Report

CERS Business/Org. **SACTO POWER AUTHORITY COGENERATION**
Facility Name **SACTO POWER AUTHORITY COGENERATION**
3215 47TH AVE , SACRAMENTO 95824

Chemical Location **Cooling Tower Water Treatment Area**

CERS ID **10222930**
Facility ID **FA0013407**
Status **Submitted** on 12/19/2018 1:22 PM

DOT Code/Fire Haz. Class	Common Name	Unit	Quantities: Max. Daily	Largest Cont.	Avg. Daily	Annual Waste Amount	Federal Hazard Categories	Hazardous Components (For mixture only): Component Name	% Wt	EHS	CAS No.
	Bleach CAS No 7681-52-9	**Gallons** State Liquid Type Mixture	**3000** Storage Container Aboveground Tank Days on Site: 365	**3000**	1500 Pressue Ambient Temperature Ambient	0 Waste Code	- Reactive - Chronic health	Sodium Hypochlorite	13 %		7681-52-9
DOT: 8 - Corrosives (Liquids and Solids)	**Cooling water corrosion inhibitor** CAS No	**Gallons** State Liquid Type Mixture	**200** Storage Container Aboveground Tank Days on Site: 365	**200**	100 Pressue Ambient Temperature Ambient	0 Waste Code	- Health Carcinogenicity - Health Acute Toxicity - Health Skin Corrosion Irritation - Health Serious Eye Damage Eye Irritation	Chlorotolytriazole sodium salt Sodium 4(or 5) -methyl-1H-benzotriazolide Sodium Hydroxide Dichlorotolytriazole	20 % 5 % 5 % 10 %		202420-04-0 64665-57-2 1310-73-2
DOT: 8 - Corrosives (Liquids and Solids) Corrosive	**Chem Treat CT 775 Corrosion Inhibitor** CAS No 7664-38-2	**Gallons** State Liquid Type Pure	**200** Storage Container Aboveground Tank Days on Site: 365	**200**	100 Pressue Temperature	0 Waste Code	- Physical Corrosive To Metal - Health Skin Corrosion Irritation - Health Serious Eye Damage Eye Irritation				
	Chem Treat CL 5428 CAS No	**Gallons** State Liquid Type	**550** Storage Container Aboveground Tank Days on Site: 365	**550**	275 Pressue Ambient Temperature Ambient	Waste Code	- Health Acute Toxicity				

Hazardous Materials And Wastes Inventory Matrix Report

CERS Business/Org. **SACTO POWER AUTHORITY COGENERATION**
Facility Name **SACTO POWER AUTHORITY COGENERATION**
3215 47TH AVE , SACRAMENTO 95824

Chemical Location **I&E shop, Aux. Transformers, Gas Bottle Rack**

CERS ID **10222930**
Facility ID **FA0013407**
Status **Submitted** on 12/19/2018 1:22 PM

DOT Code/Fire Haz. Class	Common Name	Unit	Quantities: Max. Daily	Quantities: Largest Cont.	Quantities: Avg. Daily	Annual Waste Amount	Federal Hazard Categories	Hazardous Components (For mixture only): Component Name	% Wt	EHS	CAS No.
	Compressed Acetylene Gas CAS No 74-86-2	**Cu. Feet** State: Gas Type: Pure	**1500** Storage Container: Cylinder Days on Site: 365	**300**	900 Pressue: > Ambient Temperature: Ambient	0 Waste Code	- Fire - Reactive - Pressure Release - Chronic health				
	COMPRESSED ARGON GAS CAS No 7440-37-1	**Cu. Feet** State: Gas Type: Pure	**900** Storage Container: Cylinder Days on Site: 365	**300**	750 Pressue: > Ambient Temperature: Ambient	0 Waste Code	- Chronic health				
	Compressed Nitrogen Gas CAS No 7727-37-9	**Cu. Feet** State: Gas Type: Pure	**3000** Storage Container: Cylinder Days on Site: 365	**300**	1200 Pressue: > Ambient Temperature: Ambient	0 Waste Code	- Pressure Release				

Hazardous Materials And Wastes Inventory Matrix Report

CERS Business/Org. **SACTO POWER AUTHORITY COGENERATION**
Facility Name **SACTO POWER AUTHORITY COGENERATION**
3215 47TH AVE , SACRAMENTO 95824

Chemical Location **MCC/PCC/Plant Vehicles**

CERS ID **10222930**
Facility ID **FA0013407**
Status **Submitted** on 12/19/2018 1:22 PM

DOT Code/Fire Haz. Class	Common Name	Unit	Quantities: Max. Daily	Largest Cont.	Avg. Daily	Annual Waste Amount	Federal Hazard Categories	Hazardous Components (For mixture only): Component Name	% Wt	EHS	CAS No.
	Batteries, Lead Acid	**Pounds**	**7910**	**180**	7910	0	- Reactive	Lead			7439-92-1
	CAS No	State: Liquid	Storage Container: Plastic Bottle or Jug		Pressue: > Ambient	Waste Code	- Chronic health	Sulfuric Acid			7664-93-9
		Type: Mixture	Days on Site: 365		Temperature: Ambient						

Hazardous Materials And Wastes Inventory Matrix Report

CERS Business/Org. **SACTO POWER AUTHORITY COGENERATION**
Facility Name **SACTO POWER AUTHORITY COGENERATION**
3215 47TH AVE , SACRAMENTO 95824

Chemical Location **Near HRSG Stack**

CERS ID **10222930**
Facility ID **FA0013407**
Status **Submitted** on 12/19/2018 1:22 PM

DOT Code/Fire Haz. Class	Common Name	Unit	Quantities Max. Daily	Largest Cont.	Avg. Daily	Annual Waste Amount	Federal Hazard Categories	Hazardous Components (For mixture only) Component Name	% Wt	EHS	CAS No.
	Aqueous Ammonia	**Pounds**	**30000**	**30000**	22500	0	- Fire	AMMONIA	25 %		1336-21-6
	CAS No 1336-21-6	State Liquid	Storage Container Aboveground Tank		Pressue Ambient	Waste Code	- Chronic health	WATER	75 %		7732-18-5
		Type Mixture	Days on Site: 365		Temperature Ambient						

Hazardous Materials And Wastes Inventory Matrix Report

CERS Business/Org. **SACTO POWER AUTHORITY COGENERATION**
Facility Name **SACTO POWER AUTHORITY COGENERATION**
3215 47TH AVE , SACRAMENTO 95824

Chemical Location **North Side of CTG**

CERS ID **10222930**
Facility ID **FA0013407**
Status **Submitted** on 12/19/2018 1:22 PM

DOT Code/Fire Haz. Class	Common Name	Unit	Quantities: Max. Daily	Largest Cont.	Avg. Daily	Annual Waste Amount	Federal Hazard Categories	Hazardous Components (For mixture only): Component Name	% Wt	EHS	CAS No.
	Liquid Carbon Dioxide	**Pounds**	**35000**	**35000**	28000	0	- Pressure Release - Chronic health				
	CAS No 124-38-9	State Liquid	Storage Container Aboveground Tank		Pressue > Ambient	Waste Code					
		Type Pure	Days on Site: 365		Temperature Cryogenic						

Hazardous Materials And Wastes Inventory Matrix Report

CERS Business/Org. **SACTO POWER AUTHORITY COGENERATION**
Facility Name **SACTO POWER AUTHORITY COGENERATION**
3215 47TH AVE , SACRAMENTO 95824

Chemical Location **T1,T2, and UAT Transformers**

CERS ID **10222930**
Facility ID **FA0013407**
Status **Submitted** on 12/19/2018 1:22 PM

DOT Code/Fire Haz. Class	Common Name	Unit	Quantities: Max. Daily	Largest Cont.	Avg. Daily	Annual Waste Amount	Federal Hazard Categories	Hazardous Components (For mixture only): Component Name	% Wt	EHS	CAS No.
	Transformer Oil	**Gallons**	**20600**	**10980**	20600	0	- Fire	Solvent refined Hydrotreated Middle Distillate	85 %		64742-46-7
	CAS No	State: Liquid	Storage Container: Aboveground Tank		Pressue: Ambient	Waste Code		Severely Hydrotreated Light Naphthenic Distillate	15 %		64742-53-6
		Type: Mixture	Days on Site: 365		Temperature: Ambient			Butylated Hydroxy Toluene	0 %		128-37-0

Hazardous Materials And Wastes Inventory Matrix Report

CERS Business/Org. **SACTO POWER AUTHORITY COGENERATION**
Facility Name **SACTO POWER AUTHORITY COGENERATION**
3215 47TH AVE , SACRAMENTO 95824

Chemical Location **Various**

CERS ID **10222930**
Facility ID **FA0013407**
Status **Submitted** on 12/19/2018 1:22 PM

DOT Code/Fire Haz. Class	Common Name	Unit	Quantities: Max. Daily	Largest Cont.	Avg. Daily	Annual Waste Amount	Federal Hazard Categories	Hazardous Components (For mixture only): Component Name	% Wt	EHS	CAS No.
	Lubricating Oil	**Gallons**	**8600**	**4000**	8540	0	- Fire	Solvent-dexaxed heavy paraffnic pertoleum	35 %		64742-65-0
	CAS No	State: Liquid	Storage Container: Aboveground Tank		Pressue: Ambient	Waste Code		Residual oils, pertoleum, hydrotreated	30 %		64742-57-0
		Type: Mixture	Days on Site: 365		Temperature: Ambient			Hydrotreated heavy paraffinic petroleum	35 %		64742-54-7

Hazardous Materials And Wastes Inventory Matrix Report

CERS Business/Org. **SACTO POWER AUTHORITY COGENERATION**
Facility Name **SACTO POWER AUTHORITY COGENERATION**
3215 47TH AVE , SACRAMENTO 95824

Chemical Location **Water Treatment Building**

CERS ID **10222930**
Facility ID **FA0013407**
Status **Submitted** on 12/19/2018 1:22 PM

DOT Code/Fire Haz. Class	Common Name	Unit	Quantities: Max. Daily	Quantities: Largest Cont.	Quantities: Avg. Daily	Annual Waste Amount	Federal Hazard Categories	Hazardous Components (For mixture only): Component Name	% Wt	EHS	CAS No.
	Caustic or Liquid Caustic Soda CAS No 1310-73-2	**Gallons** State Liquid Type Mixture	**6000** Storage Container Aboveground Tank Days on Site: 365	**6000**	4000 Pressue Ambient Temperature Ambient	0 Waste Code	- Chronic health	Sodium Hydroxide	50 %		1310-73-2
	Sulfuric Acid CAS No 7664-93-0	**Pounds** State Liquid Type Pure	**91800** Storage Container Aboveground Tank Days on Site: 365	**91800**	41310 Pressue Ambient Temperature Ambient	0 Waste Code	- Reactive - Chronic health	Sulfuric Acid	93 %		7664-93-0
	Used Oil CAS No	**Gallons** State Liquid Type Waste	**55** Storage Container Steel Drum Days on Site: 365	**55**	10 Pressue Ambient Temperature Ambient	175 Waste Code	- Fire	Water	5 %		7732-18-5
	Gas Turbine Compressor Cleaner CAS No	**Gallons** State Liquid Type Mixture	**80** Storage Container Carboy Days on Site: 365	**6.6**	40 Pressue Ambient Temperature Ambient	0 Waste Code	- Chronic health	Proprietary Nonionic Surfactant Dipropylene Glycol Monomethyl Ether	99 % 2 %		Trade Secret 34590-94-8

Hazardous Materials And Wastes Inventory Matrix Report

CERS Business/Org. **SACTO POWER AUTHORITY COGENERATION**
Facility Name **SACTO POWER AUTHORITY COGENERATION**
3215 47TH AVE , SACRAMENTO 95824

Chemical Location **Water Treatment Building, Warehouse**

CERS ID **10222930**
Facility ID **FA0013407**
Status **Submitted** on 12/19/2018 1:22 PM

DOT Code/Fire Haz. Class	Common Name	Unit	Quantities: Max. Daily	Quantities: Largest Cont.	Quantities: Avg. Daily	Annual Waste Amount	Federal Hazard Categories	Hazardous Components (For mixture only): Component Name	% Wt	EHS	CAS No.
	Compressed Oxygen Gas	**Cu. Feet**	**2100**	**300**	900	0	- Fire - Pressure Release				
	CAS No 7782-44-7	State Gas	Storage Container Cylinder		Pressue > Ambient	Waste Code					
		Type Pure	Days on Site: 365		Temperature Ambient						