AIR EMISSION TEST REPORT
FOR THE
VERIFICATION OF AIR POLLUTANT EMISSIONS
FROM
BIOGAS FIRED ENGINE – GENERATOR SETS

Prepared for:

Generate Capital
Generate Fremont Digester, LLC
SRN N8210

ICT Project No.: 2100145
February 11, 2022

IMPACT COMPLIANCE & TESTING

Report Certification

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Generate Capital
Generate Fremont Digester, LLC
Fremont, MI

The material and data in this document were prepared and reviewed under the supervision of the undersigned.

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1.0 Introduction

Generate Capital (Generate) operates biogas-fired reciprocating internal combustion engine (RICE) and electricity generator sets at the Generate Fremont Digester, LLC (GFD) facility located in Fremont, Newaygo County, Michigan. The RICE gensets are fired exclusively with biogas containing methane that is recovered from the anaerobic digester at the GFD facility.

The State of Michigan Department of Environment, Great Lakes, and Energy-Air Quality Division (EGLE-AQD) has issued to GFD Permit to Install (PTI) No. 378-08B for the operation of the renewable energy generation facility, which consists of:

- Two (2) General Electric (GE) Jenbacher Model J420 GS B82 RICE gensets identified as emission units EUICENGINE1 and EUICENGINE2 (Flexible Group ID FGICENGINES).

Air emission compliance testing was performed pursuant to PTI No. 378-08B. Conditions of PTI No. 378-08B specify that:

1. *The permittee shall verify NOx and CO emission rates from each engine in FGICENGINES by testing at the owner's expense, in accordance with Department requirements. The testing frequency shall coincide with the testing required under 40 CFR Part 60 Subpart A and JJJJ (FGRICENSPS, SC V.1).*

2. *Within 180 days after issuance of the permit, the permittee shall verify SO2 emission rates from each engine in FGICENGINES, by testing at owner's expense, in accordance with Department requirements.*

The compliance testing presented in this report was performed by Impact Compliance & Testing, Inc. (ICT), a Michigan-based environmental consulting and testing company. ICT representatives Clay Gaffey and Andrew Eisenberg performed the field sampling and measurements January 25, 2022.

The engine emission performance tests consisted of triplicate, one-hour sampling periods for nitrogen oxides (NOx), carbon monoxide (CO), volatile organic compounds (VOC, as non-methane hydrocarbons (NMHC or NMOC)), and sulfur dioxide (SO_2). Exhaust gas velocity, moisture, oxygen (O_2) content, and carbon dioxide (CO_2) content were determined for each test period to calculate pollutant mass emission rates.

RICE maintenance and scheduling issues delayed testing from the original planned test date of August 17, 2021.

The exhaust gas sampling and analysis was performed using procedures specified in the Stack Test Protocol dated July 15, 2021, that was reviewed and approved by EGLE-AQD. Mr. Trevor Drost and Ms. Kaitlyn DeVries of EGLE-AQD observed portions of the compliance testing.

Questions regarding this air emission test report should be directed to:

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2.0 Summary of Test Results and Operating Conditions

2.1 Purpose and Objective of the Tests

The conditions of Permit to Install (PTI) No. 378-08B and 40 CFR Part 60, Subpart JJJJ, Standards of Performance for New Stationary Sources for Stationary Spark Ignition Internal Combustion Engines require GFD to test each engine in FGICENGINES for CO, NOx, and VOC emissions.

Additionally, conditions of PTI No. 378-08B require GFD to test each engine for SO_2 emissions.

Engine Nos. 1 and 2 (Emission Units EUICENGINE1 and EUICENGINE2, respectively) were tested during this compliance test event.

2.2 Operating Conditions During the Compliance Tests

The testing was performed while the GFD RICE gensets were operated at maximum operating conditions (within 10% of 1,426 kilowatt (kW) electricity output). GFD representatives provided the kW output in 15-minute increments for each test period.

Fuel use (standard cubic feet per minute, scfm), fuel methane content (%), and fuel H_2S content (ppm) were also recorded by GFD representatives in 15-minute increments for each test period.

In addition, the engine serial number and operating hours at the beginning of test No. 1, for each RICE genset, were recorded by GFD representatives.

Appendix 2 provides operating records provided by GFD representatives for the test periods.

Average generator output, fuel consumption, fuel methane content, and fuel hydrogen sulfide (H_2S) content for each RICE are presented in Table 2.1 and Tables 6.1-6.2.

2.3 Summary of Air Pollutant Sampling Results

The gases exhausted from each RICE (Engine Nos. 1 and 2 / EUICENGINE1 and EUICENGINE2) were each sampled for three (3) one-hour test periods during the compliance testing performed January 25, 2022.

Table 2.2 presents the average measured CO, NO_X, VOC, and SO_2 emission rates for each engine (average of the three test periods).

Test results for each one-hour sampling period and comparison to the permitted emission rates are presented in Section 6.0 of this report.

Table 2.1 Average engine operating conditions during the test periods

Engine Parameter	EUICENGINE1	EUICENGINE2
Generator output (kW)	1,429	1,427
Engine output (bhp)	1,970	1,967
Engine LFG fuel use (scfm)	345	358
LFG Methane content (%)	60.4	60.0
LFG H_2S content (ppm)	219	407
Exhaust temperature (°F)	538	757

Table 2.2 Average measured emission rates for each engine (three-test average)

	CO Emissions		NOx Emissions		VOC Emissions	SO_2 Emissions
Emission Unit	(lb/hr)	(g/bhp-hr)	(lb/hr)	(g/bhp-hr)	(g/bhp-hr)	(lb/hr)
EUICENGINE1	9.53	2.19	5.03	1.16	0.09	0.53
EUICENGINE2	9.33	2.15	4.97	1.15	0.12	1.16
Permit Limit	***11.27***	***5.0***	***6.39***	***2.0***	***1.0***	***6.11***

3.0 Source and Sampling Location Description

3.1 General Process Description

GFD is permitted to operate two (2) RICE gensets (GE Jenbacher Model J420 GS B82) at its facility. The units are fired exclusively with biogas containing methane that is recovered from the anaerobic digester at the GFD facility.

3.2 Rated Capacities and Air Emission Controls

The GE Jenbacher Model J420 GS B82 RICE gensets each have a rated design capacity of:

- Engine Power: 1,966 brake horsepower (bhp)
- Electricity Generation: 1,426 kW

The biogas fueled RICE gensets are not equipped with add-on emission control equipment. The electronic air-to-fuel ratio controller automatically adjusts the air-to-fuel ratio and ignition timing to maintain efficient fuel combustion, which minimizes air pollutant emissions. Exhaust gas is exhausted directly to atmosphere through noise mufflers and vertical exhaust stacks.

The methane content in the biogas from anaerobic digesters is not always consistent, and it can vary based on the feedstock and other digester operating conditions.

3.3 Sampling Locations

Each RICE exhaust gas is directed through a muffler and is released to the atmosphere through a dedicated vertical exhaust stack with a vertical release point.

The exhaust stacks for Engine Nos. 1 and 2 / EUICENGINE1 and EUICENGINE2 are identical. The exhaust stack sampling ports are located after the muffler in the vertical exhaust stacks, each with an inner diameter of 19.625 inches. Each stack is equipped with two (2) sample ports, opposed 90°, that provide a sampling location at 120 inches (6.1 duct diameters) upstream and 48 inches (2.4 duct diameters) downstream from any flow disturbance.

All sample port locations satisfy the USEPA Method 1 criteria for a representative sample location. Individual traverse points were determined in accordance with USEPA Method 1.

Appendix 1 provides a diagram of the emission test sampling locations with actual stack dimension measurements.

4.0 Sampling and Analytical Procedures

A Stack Test Protocol for the air emission testing was reviewed and approved by EGLE-AQD. This section provides a summary of the sampling and analytical procedures that were used during the testing periods.

4.1 Summary of Sampling Methods

USEPA Method 1	Exhaust gas velocity measurement locations were determined based on the physical stack arrangement and requirements in USEPA Method 1.
USEPA Method 2	Exhaust gas velocity pressure was determined using a Type-S Pitot tube connected to a red oil incline manometer; temperature was measured using a K-type thermocouple connected to the Pitot tube.
USEPA Method 3A	Exhaust gas O_2 and CO_2 content was determined using paramagnetic and infrared instrumental analyzers, respectively.
USEPA Method 4	Exhaust gas moisture was determined based on the water weight gain in chilled impingers.
USPEA Method 6C	Exhaust gas sulfur dioxide content was determined using a pulsed ultraviolet fluorescence instrumental analyzer.
USEPA Method 7E	Exhaust gas NOx concentration was determined using chemiluminescence instrumental analyzers.
USEPA Method 10	Exhaust gas CO concentration was measured using an infrared instrumental analyzer.
USEPA Method 25A / ALT-096	Exhaust gas VOC (as NMHC) concentration was determined using a flame ionization analyzer equipped with methane separation column.

4.2 Exhaust Gas Velocity Determination (USEPA Method 2)

The RICE exhaust stack gas velocities and volumetric flow rates were determined using USEPA Method 2 once during each test period. An S-type Pitot tube connected to a red-oil manometer was used to determine velocity pressure at each traverse point across the stack cross section. Gas temperature was measured using a K-type thermocouple mounted to the Pitot tube. The Pitot tube and connective tubing were leak-checked periodically throughout the test periods to verify the integrity of the measurement system.

The absence of significant cyclonic flow at the sampling location was verified using an S-type Pitot tube and oil manometer. The Pitot tube was positioned at each velocity traverse point with the planes of the face openings of the Pitot tube perpendicular to the stack cross-sectional plane. The Pitot tube was then rotated to determine the null angle (rotational angle as measured from the perpendicular, or reference, position at which the differential pressure is equal to zero).

Appendix 3 provides exhaust gas flowrate calculations and field data sheets.

4.3 Exhaust Gas Molecular Weight Determination (USEPA Method 3A)

CO_2 and O_2 content in the RICE exhaust gas stream was measured continuously throughout each test period in accordance with USEPA Method 3A. The CO_2 content of the exhaust was monitored using a Servomex 4900 infrared gas analyzer. The O_2 content of the exhaust was monitored using a Servomex 4900 gas analyzer that uses a paramagnetic sensor.

During each sampling period, a continuous sample of the RICE exhaust gas stream was extracted from the stack using a stainless-steel probe connected to a Teflon® heated sample line. The sampled gas was conditioned by removing moisture prior to being introduced to the analyzers; therefore, measurement of O_2 and CO_2 concentrations correspond to standard dry gas conditions. Instrument response data were recorded using an ESC Model 8816 data acquisition system that monitored the analog output of the instrumental analyzers continuously and logged data as one-minute averages.

Prior to, and at the conclusion of each test, the instruments were calibrated using upscale calibration and zero gas to determine analyzer calibration error and system bias (described in Section 5.0 of this document). Sampling times were recorded on field data sheets.

Appendix 4 provides O_2 and CO_2 calculation sheets. Raw instrument response data are provided in Appendix 5.

4.4 Exhaust Gas Moisture Content (USEPA Method 4)

Moisture content of each RICE exhaust gas was determined in accordance with USEPA Method 4 using a chilled impinger sampling train. Exhaust gas moisture content measurements were performed concurrently with the instrumental analyzer sampling periods. At the conclusion of each sampling period the moisture gain in the impingers was determined gravimetrically by weighing each impinger to determine net weight gain.

Appendix 3 provides moisture calculations and data sheets.

4.5 SO_2 Concentration Measurements (USEPA Method 6C)

RICE exhaust gas SO_2 concentration measurements was performed using a Thermo Environmental Instruments, Inc. (TEI) Model 43i that uses pulsed ultraviolet fluorescence technology in accordance with USEPA Method 6C for the measurement of SO2 concentration.

Appendix 4 provides SO_2 calculation sheets. Raw instrument response data are provided in Appendix 5.

4.6 NO_x and CO Concentration Measurements (USEPA Methods 7E and 10)

NO_X and CO pollutant concentrations in the RICE exhaust gas streams were determined using a Thermo Environmental Instruments, Inc. (TEI) Model 42i High Level chemiluminescence NO_X analyzer and a California Analytical Instruments (CAI) Fuji ZRF infrared CO analyzer.

Throughout each test period, a continuous sample of the engine exhaust gas was extracted from the stack using the Teflon® heated sample line and gas conditioning system and delivered to the instrumental analyzers. Instrument response for each analyzer was recorded on an ESC Model 8816 data acquisition system that logged data as one-minute averages. Prior to, and at the conclusion of each test, the instruments were calibrated using upscale calibration and zero gas to determine analyzer calibration error and system bias.

Appendix 4 provides CO and NO_X calculation sheets. Raw instrument response data are provided in Appendix 5.

4.7 Measurement of VOC (USEPA Method 25A/ALT-096)

The VOC emission rate was determined by measuring the nonmethane hydrocarbon (NMHC or NMOC) concentration in the engine exhaust gas. NMHC pollutant concentration was determined using a TEI Model 55i Methane / Nonmethane hydrocarbon analyzer. The TEI 55i analyzer contains an internal gas chromatograph column that separates methane from non-methane components. The concentration of NMHC in the sampled gas stream, after separation from methane, is determined relative to a propane standard using a flame ionization detector in accordance with USEPA Method 25A.

The USEPA Office of Air Quality Planning and Standards (OAQPS) has issued an alternate test method approving the use of the TEI 55i-series analyzer as an effective instrument for measuring NMOC from gas-fueled RICE (ALT-096).

Samples of the exhaust gas were delivered directly to the instrumental analyzer using the Teflon® heated sample line to prevent condensation. The sample to the NHMC analyzer was not conditioned to remove moisture. Therefore, VOC measurements correspond to standard conditions with no moisture correction (wet basis).

Prior to, and at the conclusion of each test, the instrument was calibrated using mid-range calibration (propane) and zero gas to determine analyzer calibration error and system bias (described in Section 5.0 of this document).

Appendix 4 provides VOC calculation sheets. Raw instrument response data for the NMHC analyzer is provided in Appendix 5.

5.0 QA/QC Activities

5.1 Flow Measurement Equipment

Prior to arriving onsite (or onsite prior to the compliance test event), the instruments used during the source test to measure exhaust gas properties and velocity (Pitot tube and scale) were calibrated to specifications in the sampling methods.

The absence of cyclonic flow for each sampling location was verified using an S-type Pitot tube and oil manometer. The Pitot tube was positioned at each of the velocity traverse points with the planes of the face openings of the Pitot tube perpendicular to the stack cross-sectional plane. The Pitot tube was then rotated to determine the null angle (rotational angle as measured from the perpendicular, or reference, position at which the differential pressure is equal to zero).

5.2 NO_x Converter Efficiency Test

The NO_2 – NO conversion efficiency of the Model 42c analyzer was verified prior to the testing program. A USEPA Protocol 1 certified concentration of NO_2 was injected directly into the analyzer, following the initial three-point calibration, to verify the analyzer's conversion efficiency. The analyzer's NO_2 – NO converter uses a catalyst at high temperatures to convert the NO_2 to NO for measurement. The conversion efficiency of the analyzer is deemed acceptable if the measured NO_x concentration is within 90% of the expected value.

The NO_2 – NO conversion efficiency test satisfied the USEPA Method 7E criteria (measured NO_x concentration was 95.0% of the expected value).

5.3 Gas Divider Certification (USEPA Method 205)

A STEC Model SGD-710C 10-step gas divider was used to obtain appropriate calibration span gases. The ten-step STEC gas divider was NIST certified (within the last 12 months) with a primary flow standard in accordance with Method 205. When cut with an appropriate zero gas, the ten-step STEC gas divider delivered calibration gas values ranging from 0% to 100% (in 10% step increments) of the USEPA Protocol 1 calibration gas that was introduced into the system. The field evaluation procedures presented in Section 3.2 of Method 205 were followed prior to use of gas divider. The field evaluation yielded no errors greater than 2% of the triplicate measured average and no errors greater than 2% from the expected values.

5.4 Instrumental Analyzer Interference Check

The instrumental analyzers used to measure NO_X, CO, SO2, O2, and CO_2 have had an interference response test preformed prior to their use in the field, pursuant to the interference response test procedures specified in USEPA Method 7E. The appropriate interference test gases (i.e., gases that would be encountered in the exhaust gas stream) were introduced into each analyzer, separately and as a mixture with the analyte that each analyzer is designed to measure. All of analyzers exhibited a composite deviation of less than 2.5% of the span for all measured interferent gases. No major analytical components of the analyzers have been replaced since performing the original interference tests.

5.5 Instrument Calibration and System Bias Checks

At the beginning of each day of the testing program, initial three-point instrument calibrations were performed for the NO_x, CO, SO_2, CO_2, and O_2 analyzers by injecting calibration gas directly into the inlet sample port for each instrument. System bias checks were performed prior to and at the conclusion of each sampling period by introducing the upscale calibration gas and zero gas into the sampling system (at the base of the stainless-steel sampling probe prior to the particulate filter and Teflon® heated sample line) and determining the instrument response against the initial instrument calibration readings.

At the beginning of each test day, appropriate high-range, mid-range, and low-range span gases followed by a zero gas were introduced to the NMHC analyzer, in series at a tee connection, which is installed between the sample probe and the particulate filter, through a poppet check valve. After each one-hour test period, mid-range and zero gases were re-introduced in series at the tee connection in the sampling system to check against the method's performance specifications for calibration drift and zero drift error.

The instruments were calibrated with USEPA Protocol 1 certified concentrations of CO_2, O_2, NO_x, CO, and SO_2 in nitrogen and zeroed using hydrocarbon free nitrogen. The NMHC (VOC) instrument was calibrated with USEPA Protocol 1 certified concentrations of propane in air and zeroed using hydrocarbon-free air. A STEC Model SGD-710C ten-step gas divider was used to obtain intermediate calibration gas concentrations as needed.

5.6 Determination of Exhaust Gas Stratification

A stratification test was performed for each RICE exhaust stack. The stainless-steel sample probe was positioned at sample points correlating to 16.7, 50.0 (centroid), and 83.3% of the stack diameter. Pollutant concentration data were recorded at each sample point for a minimum of twice the maximum system response time.

The recorded concentration data for the RICE exhaust stacks indicated that the measured O_2 and CO_2 concentrations did not vary by more than 5% of the mean across the stack diameter. Therefore, the RICE exhaust gas was considered to be unstratified and the compliance test sampling was performed at a single sampling location within each RICE exhaust stack.

5.7 System Response Time

The response time of the sampling system was determined prior to the compliance test program by introducing upscale gas and zero gas, in series, into the sampling system using a tee connection at the base of the sample probe. The elapsed time for the analyzer to display a reading of 95% of the expected concentration was determined using a stopwatch.

Sampling periods did not commence until the sampling probe had been in place for at least twice the greatest system response time.

5.8 Meter Box Calibrations

The dry gas meter sampling console used for moisture testing was calibrated prior to and after the testing program. This calibration uses the critical orifice calibration technique presented in USEPA Method 5. The metering console calibration exhibited no data outside the acceptable ranges presented in USEPA Method 5.

The digital pyrometer in the metering console was calibrated using a NIST traceable Omega® Model CL 23A temperature calibrator.

5.9 Cyclonic Flow Check

The absence of cyclonic flow for each sampling location was verified using an S-type Pitot tube and oil manometer. The Pitot tube was positioned at multiple velocity traverse points with the planes of the face openings of the Pitot tube perpendicular to the stack cross-sectional plane. The Pitot tube was then rotated to determine the null angle (rotational angle as measured from the perpendicular, or reference, position at which the differential pressure is equal to zero).

Appendix 6 presents test equipment quality assurance data (NO_2 – NO conversion efficiency test data, instrument calibration and system bias check records, calibration gas certifications, interference test results, meter box calibration records, and field equipment calibration records).

6.0 Results

6.1 Test Results and Allowable Emission Limits

Engine operating data and air pollutant emission measurement results for each one-hour test period are presented in Tables 6.1 and 6.2.

EUICENGINE1 and EUICENGINE2 each have the following allowable emission limits specified in PTI No. 378-08B and 40 CFR Part 60 Subpart JJJJ:

- 11.27 pounds per hour (lb/hr) and 5.0 grams per brake horsepower hour (g/bhp-hr) for CO;
- 6.39 lb/hr and 2.0 g/bhp-hr for NO_X;
- 1.0 g/bhp-hr for VOC; and
- 6.11 lb/hr SO_2

The measured air pollutant emission rates for EUICENGINE1 and EUICENGINE2 are less than the allowable limits specified in PTI No. 378-08B and 40 CFR Part 60 Subpart JJJJ.

6.2 Variations from Normal Sampling Procedures or Operating Conditions

The testing for all pollutants was performed in accordance with USEPA methods and the approved Stack Test Protocol. The engine-generator sets were operated within 10% of maximum output (1,426 kW generator output) during the engine test periods.

Compliance emission testing was originally scheduled to be performed for Engine Nos. 1 and 2 / EUICENGINE1 and EUICENGINE2 on August 17, 2021. RICE maintenance and scheduling issues delayed testing from the original planned test date. This was communicated with EGLE-AQD representatives Mr. Trevor Drost and Ms. Kaitlyn DeVries for each delay incurred.

Test Nos. 1 and 3 for Engine No. 2 were paused due to engine shutdowns. Following each engine shutdown, ICT collected test data for at least twice the maximum system response time before resuming the test. Each test was performed for a total of at least 60 1-minute average data points.

Table 6.1 Measured exhaust gas conditions and NOx, CO, VOC, and SO_2 air pollutant emission rates for Engine No. 1 (EUICENGINE1)

Test No. Test date Test period (24-hr clock)	1 1/25/2022 1350-1450	2 1/25/2022 1521-1621	3 1/25/2022 1644-1744	Three Test Average
Fuel flowrate (scfm)	347	345	344	345
Generator output (kW)	1,429	1,429	1,429	1,429
Engine output (bhp)	1,969	1,970	1,969	1,970
Fuel methane content (%)	60.3	60.4	60.5	60.4
Fuel H_2S content (ppm)	229	214	215	219
Exhaust Gas Composition				
CO_2 content (% vol)	11.2	11.2	11.2	11.2
O_2 content (% vol)	8.52	8.43	8.49	8.48
Moisture (% vol)	12.4	12.0	12.0	12.2
Exhaust gas temperature (°F)	528	542	544	538
Exhaust gas flowrate (dscfm)	4,059	4,054	4,026	4,047
Exhaust gas flowrate (scfm)	4,636	4,609	4,578	4,608
Nitrogen Oxides				
NO_X conc. (ppmvd)	173	174	172	173
NO_X emissions (lb/hr)	5.05	5.07	4.97	5.03
Permit limit (lb/hr)	-	-	-	*6.93*
NOx emissions (g/bhp*hr)	1.16	1.17	1.14	1.16
*Permit limit (g/bhp*hr)*	-	-	-	*2.0*
Carbon Monoxide				
CO conc. (ppmvd)	540	540	539	540
CO emissions (lb/hr)	9.57	9.56	9.47	9.53
Permit limit (lb/hr)	-	-	-	*11.27*
CO emissions (g/bhp*hr)	2.20	2.20	2.18	2.19
*Permit limit (g/bhp*hr)*	-	-	-	*5.0*
Volatile Organic Compounds				
VOC conc. (ppmv C_3)	11.9	11.9	12.0	11.9
VOC emissions (lb/hr)	0.38	0.38	0.38	0.38
VOC emissions (g/bhp*hr)	0.09	0.09	0.09	0.09
*Permit limit (g/bhp*hr)*	-	-	-	*1.0*
Sulfur Dioxide				
SO_2 conc. (ppmvd)	14.6	12.8	12.3	13.2
SO_2 emissions (lb/hr)	0.59	0.52	0.49	0.53
Permitted emissions (lb/hr)	-	-	-	*6.11*

Table 6.2 Measured exhaust gas conditions and NOx, CO, VOC, and SO_2 air pollutant emission rates for Engine No. 2 (EUICENGINE2)

Test No. Test date Test period (24-hr clock)	1 1/25/2022 0805-0931	2 1/25/2022 0955-1055	3 1/25/2022 1120-1236	Three Test Average
Fuel flowrate (scfm)	355	364	355	358
Generator output (kW)	1,427	1,428	1,427	1,427
Engine output (bhp)	1,966	1,968	1,967	1,967
Fuel methane content (%)	60.6	59.3	60.0	60.0
Fuel H_2S content (ppm)	545	401	275	407
Exhaust Gas Composition				
CO_2 content (% vol)	10.9	11.3	11.1	11.1
O_2 content (% vol)	8.70	8.70	8.77	8.72
Moisture (% vol)	12.2	11.7	13.3	12.4
Exhaust gas temperature (°F)	750	762	759	757
Exhaust gas flowrate (dscfm)	3,896	3,927	3,803	3,876
Exhaust gas flowrate (scfm)	4,435	4,450	4,387	4,424
Nitrogen Oxides				
NO_X conc. (ppmvd)	182	175	179	179
NO_X emissions (lb/hr)	5.08	4.94	4.89	4.97
Permit limit (lb/hr)	-	-	-	*6.93*
NOx emissions (g/bhp*hr)	1.17	1.14	1.13	1.15
*Permit limit (g/bhp*hr)*	-	-	-	*2.0*
Carbon Monoxide				
CO conc. (ppmvd)	547	554	553	551
CO emissions (lb/hr)	9.31	9.49	9.18	9.33
Permit limit (lb/hr)	-	-	-	*11.27*
CO emissions (g/bhp*hr)	2.15	2.19	2.12	2.15
*Permit limit (g/bhp*hr)*	-	-	-	*5.0*
Volatile Organic Compounds				
VOC conc. (ppmv C_3)	16.7	16.7	17.0	16.8
VOC emissions (lb/hr)	0.51	0.51	0.51	0.51
VOC emissions (g/bhp*hr)	0.12	0.12	0.12	0.12
*Permit limit (g/bhp*hr)*	-	-	-	*1.0*
Sulfur Dioxide				
SO2 conc. (ppmvd)	40.9	28.6	20.2	29.9
SO2 emissions (lb/hr)	1.59	1.12	0.77	1.16
Permitted emissions (lb/hr)	-	-	-	*6.11*