EGLE

MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY
AIR QUALITY DIVISION

RENEWABLE OPERATING PERMIT
REPORT CERTIFICATION

Authorized by 1994 P.A. 451, as amended. Failure to provide this information may result in civil and/or criminal penalties.

Reports submitted pursuant to R 336.1213 (Rule 213), subrules (3)(c) and/or (4)(c), of Michigan's Renewable Operating Permit (ROP) program must be certified by a responsible official. Additional information regarding the reports and documentation listed below must be kept on file for at least 5 years, as specified in Rule 213(3)(b)(ii), and be made available to the Department of Environment, Great Lakes, and Energy, Air Quality Division upon request.

Source Name: Waste Management of Michigan, Inc. (Eagle Valley) County: Oakland

Source Address: 3925 Giddings Road; 600 West Silver Bell Road City: Orion

AQD Source ID (SRN): N3845 ROP No.: MI-ROP-N3845-2015 ROP Section No.: ______

Please check the appropriate box(es):

☐ **Annual Compliance Certification (Pursuant to Rule 213(4)(c))**

Reporting period (provide inclusive dates): From ______ To ______

☐ 1. During the entire reporting period, this source was in compliance with **ALL** terms and conditions contained in the ROP, each term and condition of which is identified and included by this reference. The method(s) used to determine compliance is/are the method(s) specified in the ROP.

☐ 2. During the entire reporting period this source was in compliance with all terms and conditions contained in the ROP, each term and condition of which is identified and included by this reference, **EXCEPT** for the deviations identified on the enclosed deviation report(s). The method used to determine compliance for each term and condition is the method specified in the ROP, unless otherwise indicated and described on the enclosed deviation report(s).

☐ **Semi-Annual (or More Frequent) Report Certification (Pursuant to Rule 213(3)(c))**

Reporting period (provide inclusive dates): From ______ To ______

☐ 1. During the entire reporting period, **ALL** monitoring and associated recordkeeping requirements in the ROP were met and no deviations from these requirements or any other terms or conditions occurred.

☐ 2. During the entire reporting period, all monitoring and associated recordkeeping requirements in the ROP were met and no deviations from these requirements or any other terms or conditions occurred, **EXCEPT** for the deviations identified on the enclosed deviation report(s).

☒ **Other Report Certification**

Reporting period (provide inclusive dates): From 9/29/2020 To 9/29/2020

Additional monitoring reports or other applicable documents required by the ROP are attached as described:

Test Report for the verification of CO, NOx, and VOC emissions from two (2) landfill gas fired RICE (EUICENGINE1-2). Testing was performed according to the approved Stack Test Protocol, and the facility operated at maximum routine operating conditions and in in compliance with the conditions specified in MI-ROP-N3845-2015.

I certify that, based on information and belief formed after reasonable inquiry, the statements and information in this report and the supporting enclosures are true, accurate and complete

Scott Rowe	District Manager	(248) 388-8193
Name of Responsible Official (print or type)	Title	Phone Number

[signature] 11-5-2020

Signature of Responsible Official Date

* Photocopy this form as needed. EQP 5736 (Rev 04/30/2019)

AIR EMISSION TEST REPORT

Title:	AIR EMISSION TEST REPORT FOR THE VERIFICATION OF AIR POLLUTANT EMISSIONS FROM A LANDFILL GAS FUELED INTERNAL COMBUSTION ENGINE
Report Date:	November 4, 2020
Test Date:	September 29, 2020

Facility Information	
Name:	Waste Management of Michigan, Inc. Eagle Valley Recycle and Disposal Facility
Street Address:	3925 Giddings Road (Engine Plant) 600 West Silver Bell Road (Landfill)
City, County:	Orion, Oakland
Facility SRN:	N3845

Facility Permit Information	
Renewable Operating Permit No.:	MI-ROP-N3845-2015

Emission Unit ID	Description	Serial #
EUICENGINE1	CAT® G3520C IC Engine	GZJ00418
EUICENGINE2	CAT® G3520C IC Engine	GZJ00443

Testing Contractor	
Company:	Impact Compliance & Testing, Inc.
Mailing Address:	37660 Hills Tech Drive Farmington Hills, MI 48331
Phone:	(734) 464-3880
Project No.:	2000147

AIR EMISSION TEST REPORT
FOR THE
VERIFICATION OF AIR POLLUTANT EMISSIONS
FROM
LANDFILL GAS FUELED INTERNAL COMBUSTION ENGINES

EAGLE VALLEY RECYCLE AND DISPOSAL FACILITY

1.0 INTRODUCTION

Waste Management of Michigan, Inc. (WMI) operates two (2) Caterpillar (CAT®) Model No. G3520C gas-fired reciprocating internal combustion engine (RICE) electricity generator sets at the Eagle Valley Recycling and Disposal Facility (Eagle Valley (RDF) in Orion, Oakland County, Michigan. The treated landfill gas (LFG) fueled RICE generator sets (Serial Nos. GZJ00418 and GZJ00443) are identified as emission unit EUICENGINE1 and EUICENGINE2 (Flexible Group ID: FGICENGINES) in the Renewable Operating Permit (ROP) MI-ROP-N3845-2015, issued by the State of Michigan Department of Environment, Great Lakes, and Energy-Air Quality Division (EGLE-AQD).

Pursuant to the current permit and requirements of 40 CFR §60.4243(b)(2)(ii) of the *Standards of Performance for Stationary Spark Ignition Internal Combustion Engines* (SI RICE NSPS, 40 CFR Part 60 Subpart JJJJ), WMI is required to perform testing for specific regulated air pollutant emissions exhausted from the RICE-generator sets within 180 days of startup and every 8,760 operating hours or three years, whichever comes first.

This test report presents the results of emissions testing for EUICENGINE1 and EUICENGINE2. The testing was conducted on September 29, 2020, within 8,760 hours of engine operation from the previous tests completed on September 26, 2019. The testing was performed by Impact Compliance & Testing, Inc. (ICT) representatives Tyler Wilson and Andrew Eisenberg. WMI representatives provided process coordination and operating parameter data acquisition. EGLE-AQD representative Mr. Robert Joseph was onsite to witness portions of the test event.

The compliance demonstration consisted of triplicate, one-hour, test periods for the determination of nitrogen oxides (NOx), carbon monoxide (CO), and volatile organic compounds (VOC, as non-methane hydrocarbons) mass emission rates. The exhaust gas sampling and analysis was performed using procedures specified in the Test Protocol dated August 14, 2020, and the EGLE-AQD Test Plan Approval Letter dated September 8, 2020.

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

Tyler J. Wilson
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Report Certification

This test report was prepared by ICT based on field sampling data collected by ICT. Facility process data was collected and provided by WMI employees or representatives.

I certify that the testing was conducted in accordance with the approved stack test protocol unless otherwise specified in this report. I believe the information provided in this report and its attachments are true, accurate, and complete.

Report Prepared By:

Tyler J. Wilson
Senior Project Manager
Impact Compliance & Testing, Inc.

2.0 SUMMARY OF RESULTS

The exhaust from two (2) LFG-fueled RICE-generator sets (identified as EUICENGINE1 and EUICENGINE2) were sampled on September 29, 2020 to determine the concentrations of NOx, CO, and VOC. Exhaust gas velocity, moisture, oxygen (O_2) content, and carbon dioxide (CO_2) content were measured for each test period to calculate pollutant mass emission rates.

The testing was performed while each RICE operated at normal base load conditions (i.e., 1,600 kW peak electricity output +/- 10%). Test results and applicable emission limits are provided in the following table. The test results demonstrate compliance with emission limits specified in the SI RICE NSPS and MI-ROP-N3845-2015.

Pollutant	Results for EUICENGINE1 (g/bhp-hr)	Results for EUICENGINE2 (g/bhp-hr)	Emission Limits (g/bhp-hr)
NOx	0.63	0.55	0.9 g/bhp (MI-ROP-N3845-2015) 2.0 g/bhp-hr (NSPS JJJJ)
CO	2.98	2.77	4.13 g/bhp (MI-ROP-N3845-2015) 5.0 g/bhp-hr (NSPS JJJJ)
VOC	0.10	0.10	1.0 g/bhp (MI-ROP-N3845-2015) 1.0 g/bhp-hr (NSPS JJJJ)

3.0 SOURCE AND SAMPLING LOCATION DESCRIPTION

3.1 General Process Description

Landfill gas (LFG) is produced in the Eagle Valley Landfill from the anaerobic decomposition of disposed waste materials. The LFG is collected from landfill cells using a system of wells that are connected to a central header (gas collection system). The collected LFG is treated and used as fuel for the two (2) CAT® Model No. G3520C RICE-generator sets that produce electricity for transfer to the local utility.

3.2 Rated Capacities, Type and Quantity of Raw Materials Used

Each CAT® Model No. G3520C RICE-genet consists of a spark ignition, lean-burn, RICE fueled by treated LFG and a connected electricity generator. The RICE has a rated mechanical output of 2,233 bhp and the connected generator produces 1,600 kW of electricity. Fuel consumption is regulated to maintain the required heat input rate to support engine operations and is dependent on the fuel heat value (methane content). Emissions testing was performed while each unit operated within 10% of the design capacity electricity generation rate of 1,600 kW.

3.3 Emission Control System Description

The CAT® Model No. G3520C RICE do not have add-on emission control equipment. The electronic air-to-fuel ratio controllers automatically adjust the air-to-fuel ratio to maintain efficient fuel combustion, which minimizes air pollutant emissions. Exhaust gas is exhausted directly to the atmosphere through noise mufflers and vertical exhaust stacks.

3.4 Sampling Locations (USEPA Method 1)

The exhaust stack sampling ports for each CAT® Model No. G3520C RICE satisfied the USEPA Method 1 criteria for representative sample locations. The inner diameter of each engine exhaust stack is 16 inches at the sampling location. Each stack is equipped with two (2) sample ports, opposed 90°, that provide a sampling location 54 inches (3.4 duct diameters) downstream and 60 inches (3.8 duct diameters) upstream from any flow disturbance.

Velocity pressure traverse locations for the sampling points were determined in accordance with USEPA Method 1 for the engine exhaust.

Figure 1 presents the emission test sampling and measurement locations.

4.0 SAMPLING AND ANALYTICAL PROCEDURES

A stack test protocol for the compliance testing was prepared by ICT and reviewed by EGLE-AQD. This section provides a summary of the sampling and analytical procedures that were used during the test event and presented in the stack test protocol.

Attachment A provides a copy of the EGLE-AQD Test Plan Approval Letter.

4.1 Exhaust Gas Velocity and Flowrate Determination (USEPA Method 2)

RICE exhaust stack gas velocity and volumetric flow rates were determined using USEPA Method 2 once for each 60-minute test period. An S-type Pitot tube connected to a red-oil manometer was used to determine gas velocity pressure. Gas temperature was measured using a K-type thermocouple mounted to the Pitot tube. Exhaust gas velocity pressure and temperature were measured before and after each one-hour sampling period. The Pitot tube and connective tubing were leak-checked to verify the integrity of the measurement system.

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

CO_2 and O_2 content in each RICE exhaust were measured continuously throughout each one-hour test period in accordance with USEPA Method 3A. The CO_2 content of the exhaust was monitored using a Servomex Model 4900 single beam single wavelength (SBSW) infrared gas analyzer. The O_2 content of the exhaust was monitored using a Servomex Model 4900 gas analyzer that utilizes a paramagnetic sensor.

During each one-hour 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 analyzer. Therefore, measurement of O_2 and CO_2 content correspond to standard dry gas conditions. The instrument was calibrated using appropriate calibration gases to determine accuracy and system bias (described in Section 5.6 of this document).

Figure 2 presents a diagram of the instrumental analyzer sampling train.

4.3 Exhaust Gas Moisture Content Determinations (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.

Figure 3 presents a schematic of the moisture sampling train.

4.4 NOx and CO Concentration Measurements (USEPA Methods 7E and 10)

NOx and CO pollutant concentrations in each RICE exhaust were determined using a Thermo Environmental Instruments, Inc. (TEI) Model 42C chemiluminescence NO-NO_2-NO_X analyzer and a California Analytics / Fuji Model ZRF non-dispersive infrared (NDIR) CO analyzer.

Three (3) one-hour sampling periods were performed for each RICE exhaust during the test event. Throughout each one-hour 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 described in Section 4.2 of this document, and delivered to the instrumental analyzers. Instrument response for each analyzer was recorded on a data logging 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 appropriate upscale calibration and zero gas to determine analyzer calibration error and system bias.

4.5 VOC Concentration Measurements (USEPA Method 25A / ALT-096)

VOC emission rate was determined by measuring the nonmethane hydrocarbon (NMHC) concentration in each RICE exhaust gas. NMHC pollutant concentration was determined using a Thermo Environmental Instruments (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 TEI 55-series analyzer has been approved by the USEPA for measuring VOC relative to 40 CFR

Part 60 Subpart JJJJ compliance test demonstrations (Alternative Test Method 096 or 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).

The instrumental analyzer was calibrated using certified propane concentrations in hydrocarbon-free air to demonstrate detector linearity and determine calibration drift and zero drift error.

5.0 QA/QC ACTIVITIES

5.1 Exhaust Gas Flow Measurement

Prior to arriving onsite, the instruments used during the source test to measure exhaust gas properties and velocity (barometer, pyrometer, scale, and Pitot tube) 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 NOx Converter Efficiency Test

The NO_2 – NO conversion efficiency of the TEI Model 42C instrumental analyzer was verified prior to the commencement of the performance tests. The instrument analyzer NO_2 – NO converter uses a catalyst at high temperatures to convert the NO_2 to NO for measurement. A USEPA Protocol 1 certified NO_2 calibration gas was used to verify the efficiency of the NO_2 – NO converter.

The NO_2 – NO conversion efficiency test satisfied the USEPA Method 7E criteria (the calculated NO_2 – NO conversion efficiency is greater than 90%).

5.3 Calibration Gas Divider Field Validation

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 Sampling System Response Time Determination

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 system response time.

5.5 Instrumental Analyzer Interference Check

The instrumental analyzers used to measure NOx, CO, O_2, and CO_2 have had an interference response test performed 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 the 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.

5.6 Instrument Calibration and System Bias Checks

At the beginning of each field test day, initial three-point instrument calibrations were performed for the NOx, CO, 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, NOx, and CO 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.

5.7 Determination of Exhaust Gas Stratification

A stratification test for the RICE exhaust stack gas was performed as part of the first test period. 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 data for the RICE exhaust stack gas indicate that the measured CO, NOx, CO_2, and O_2 concentrations did not vary by more than 5% of the mean across the stack diameter. Therefore, the stack gas was considered to be unstratified and the compliance test sampling was performed at a single sampling location within the engine exhaust stack.

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.

Appendix E 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 <u>TEST RESULTS AND DISCUSSION</u>

6.1 Purpose and Objectives of the Tests

MI-ROP-N3845-2015 and 40 CFR 60.4243(b)(2)(ii) of the SI RICE NSPS specify that owners and operators of new stationary spark-ignited RICE with a power rating greater than 500 horsepower must conduct an initial performance test and conduct subsequent performance testing every 8,760 hours of engine operation or 3 years, whichever comes first, thereafter to demonstrate compliance.

6.2 Operating Conditions During the Compliance Test

Each LFG-fueled RICE was operated at base load conditions (100% rated capacity +/- 10%) during the compliance test event. The following process data were monitored and recorded for each test run and presented in Attachment B.

- Treated LFG fuel use (scfm)
- LFG methane (%)
- RICE Generator output (kW)
- LFG heat input (Btu/scf)

Engine output (bhp) cannot be measured directly. Therefore, it is calculated based on the recorded electricity output, the generator efficiency (96.1%), and the unit conversion factor for kW to horsepower (0.7457 kW/hp). The following equation was used to calculate average engine horsepower for each test period based on a linear relationship between engine output and electricity generator output:

Engine output (bhp) = Electricity output (kW) / (0.961) / (0.7457 kW/hp)

Average operating parameters for each one-hour test run are presented in Tables 6.1 and 6.2.

6.3 Air Pollutant Sampling Results

The exhaust gas for each LFG-fueled RICE were monitored for three (3) one-hour test periods, during which the NOx, CO, VOC, O_2, and CO_2 concentrations were measured using instrumental analyzers. The measured pollutant concentrations were adjusted based on instrument calibrations performed prior to and following each test period (drift and bias corrected pursuant to equations in specified in the USEPA reference test methods).

Exhaust gas moisture content was determined by gravimetric analysis of the weight gain in chilled impingers in accordance with USEPA Method 4. Exhaust gas velocity was measured once for each one-hour test period. The calculated exhaust gas volumetric flowrate was used to calculate NOx, CO, and VOC mass emission rates based on the measured pollutant concentrations (parts per million by volume (ppmv)).

For each engine (EUICENGINE1 and EUICENGINE2) the average measured:

- NOx emission rate is less than the allowable limit of 0.9 g/bhp-hr.
- CO emission rate is less than the allowable limit of 4.13 g/bhp-hr.
- VOC emission rate is less than the allowable limit of 1.0 g/bhp-hr.

Tables 6.1 and 6.2 present measured exhaust gas conditions and calculated air pollutant emission rates for LFG-fueled RICE EUICENGINE1 and EUICENGINE2, respectively.

Attachment C provides air pollutant emissions calculations, computer generated flowrate data, and field sampling data sheets for the RICE test periods.

Attachment D provides raw instrumental analyzer response data for each test period.

6.4 Variations from Normal Sampling Procedures or Operating Conditions

The compliance tests for all pollutants were performed in accordance with the stack test protocol dated August 14, 2020, the EGLE-AQD Test Plan Approval Letter dated September 8, 2020, and the specified USEPA test methods.

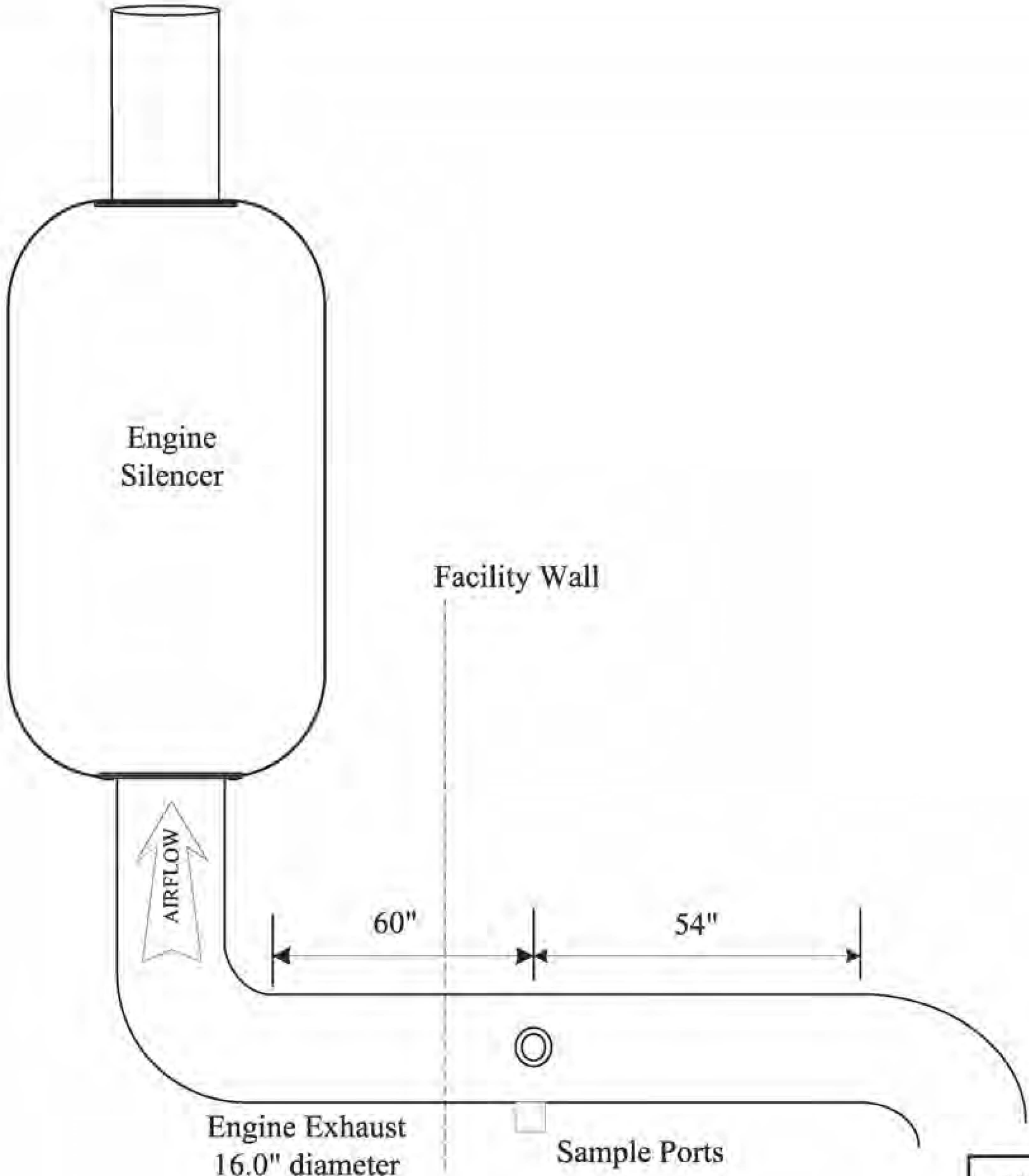
Instrument calibrations and sampling period results satisfy the quality assurance verifications required by USEPA Methods 3A, 7E, 10, and ALT-096. No variations from the normal operating conditions of each RICE occurred during the testing program.

Table 6.1 Measured exhaust gas conditions and air pollutant emission rates for EUICENGINE1 / CAT® Model No. G3520C (Serial No. GZJ00418)

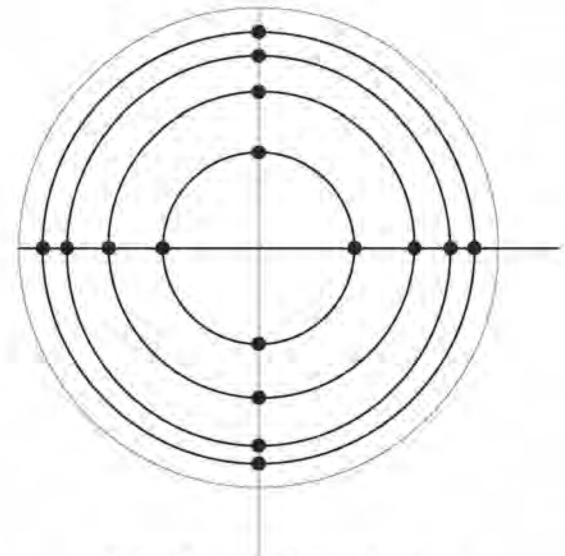
Test No. Test date Test period (24-hr clock)	1 09/29/2020 0756-0856	2 09/29/2020 0919-1019	3 09/29/2020 1041-1141	Test Avg.
Generator output (kW)	1,626	1,629	1,628	1,628
Engine Horsepower (Hp)	2,269	2,273	2,272	2,271
Exhaust gas composition				
CO_2 content (% vol)	12.7	12.6	12.5	12.6
O_2 content (% vol)	7.28	7.42	7.41	7.37
Moisture (% vol)	12.2	13.2	12.7	12.7
Engine Fuel Use (scfm)	586	587	587	587
LFG Methane Content (%)	51.5	51.5	51.6	51.5
LFG LHV heat content (Btu/scf)	469	468	470	469
Exhaust gas flowrate				
Standard conditions (scfm)	5,293	5,594	5,491	5,459
Dry basis (dscfm)	4,645	4,857	4,794	4,766
Nitrogen oxides emission rates				
NO_X conc. (ppmvd)	95.3	92.4	88.1	91.9
NO_X emissions (lb/hr NO_2)	3.17	3.22	3.03	3.14
NO_X emissions (g/bhp-hr)	0.63	0.64	0.60	0.63
NO_X permit limit (g/bhp-hr)	-	-	-	*0.9*
Carbon monoxide emission rates				
CO conc. (ppmvd)	716	719	719	718
CO emissions (lb/hr)	14.5	15.2	15.0	14.9
CO emissions (g/bhp-hr)	2.90	3.04	3.00	2.98
CO permit limit (g/bhp-hr)	-	-	-	*4.13*
VOC/NMHC emission rates				
VOC conc. (ppmv C_3)	13.0	12.9	13.1	13.0
VOC emissions (lb/hr)	0.47	0.50	0.49	0.49
VOC emissions (g/bhp-hr)	0.09	0.10	0.10	0.10
VOC permit limit (g/bhp-hr)	-	-	-	*1.0*

Table 6.2 Measured exhaust gas conditions and air pollutant emission rates for EUICENGINE2 / CAT® Model No. G3520C (Serial No. GZJ00443)

Test No.	1	2	3	
Test date	09/29/2020	09/29/2020	09/29/2020	Test
Test period (24-hr clock)	1202-1302	1321-1421	1440-1540	Avg.
Generator output (kW)	1,634	1,614	1,625	1,624
Engine Horsepower (Hp)	2,280	2,252	2,267	2,266
Exhaust gas composition				
CO_2 content (% vol)	12.5	12.4	12.4	12.4
O_2 content (% vol)	7.57	7.61	7.62	7.60
Moisture (% vol)	12.5	13.0	12.9	12.8
Engine Fuel Use (scfm)	561	555	558	558
LFG Methane Content (%)	51.8	51.8	51.9	51.8
LFG LHV heat content (Btu/scf)	471	471	472	471
Exhaust gas flowrate				
Standard conditions (scfm)	5,066	5,326	5,163	5,185
Dry basis (dscfm)	4,431	4,635	4,497	4,521
Nitrogen oxides emission rates				
NO_X conc. (ppmvd)	87.2	85.1	82.9	85.1
NO_X emissions (lb/hr NO_2)	2.77	2.83	2.67	2.76
NO_X emissions (g/bhp-hr)	0.55	0.57	0.53	0.55
NO_X permit limit (g/bhp-hr)	-	-	-	*0.9*
Carbon monoxide emission rates				
CO conc. (ppmvd)	710	697	696	701
CO emissions (lb/hr)	13.7	14.1	13.7	13.8
CO emissions (g/bhp-hr)	2.73	2.84	2.73	2.77
CO permit limit (g/bhp-hr)	-	-	-	*4.13*
VOC/NMHC emission rates				
VOC conc. (ppmv C_3)	13.4	13.7	13.6	13.6
VOC emissions (lb/hr)	0.47	0.50	0.48	0.48
VOC emissions (g/bhp-hr)	0.09	0.10	0.10	0.10
VOC permit limit (g/bhp-hr)	-	-	-	*1.0*



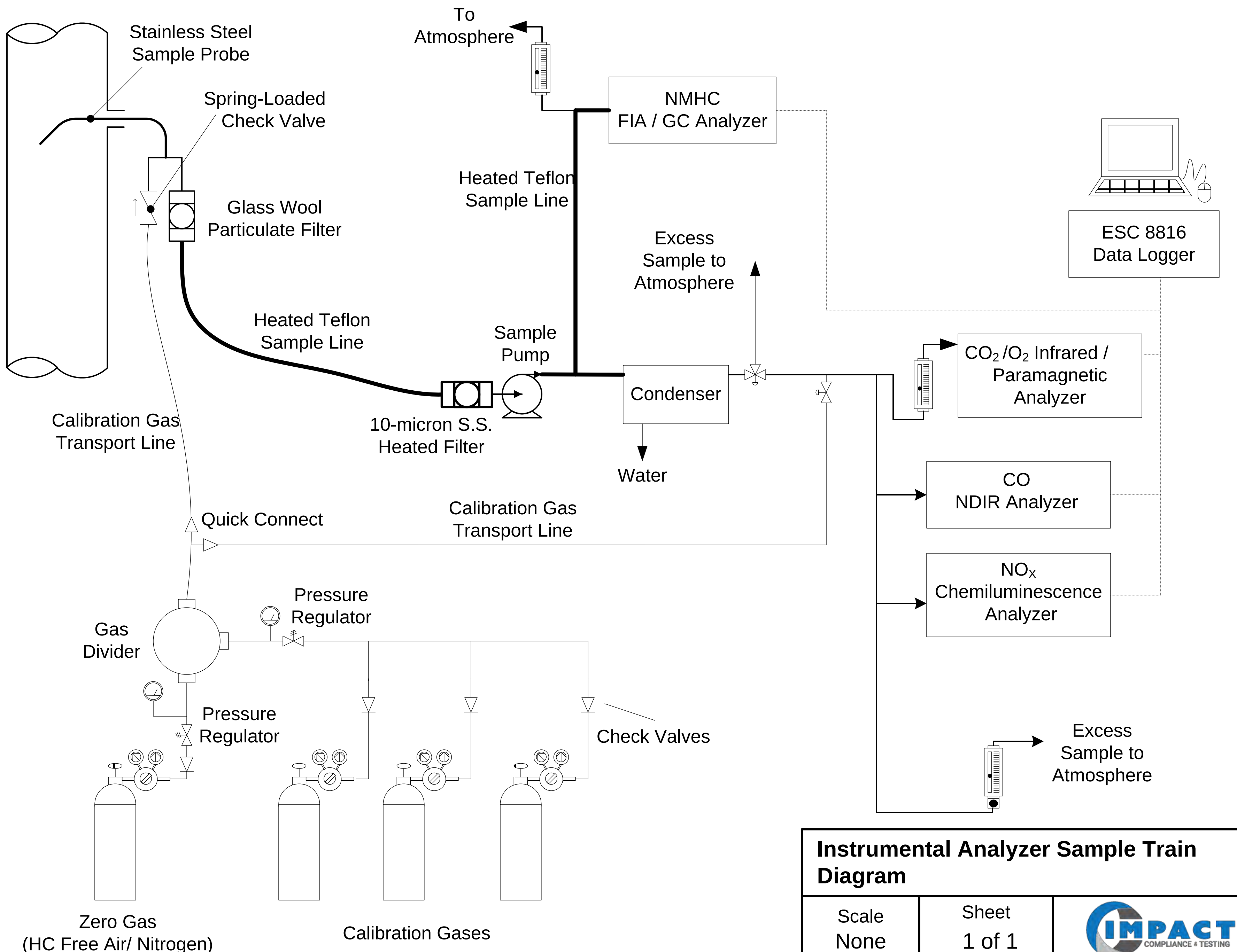
Stack Cross Section



Velocity sample locations
(as measured from stack wall)

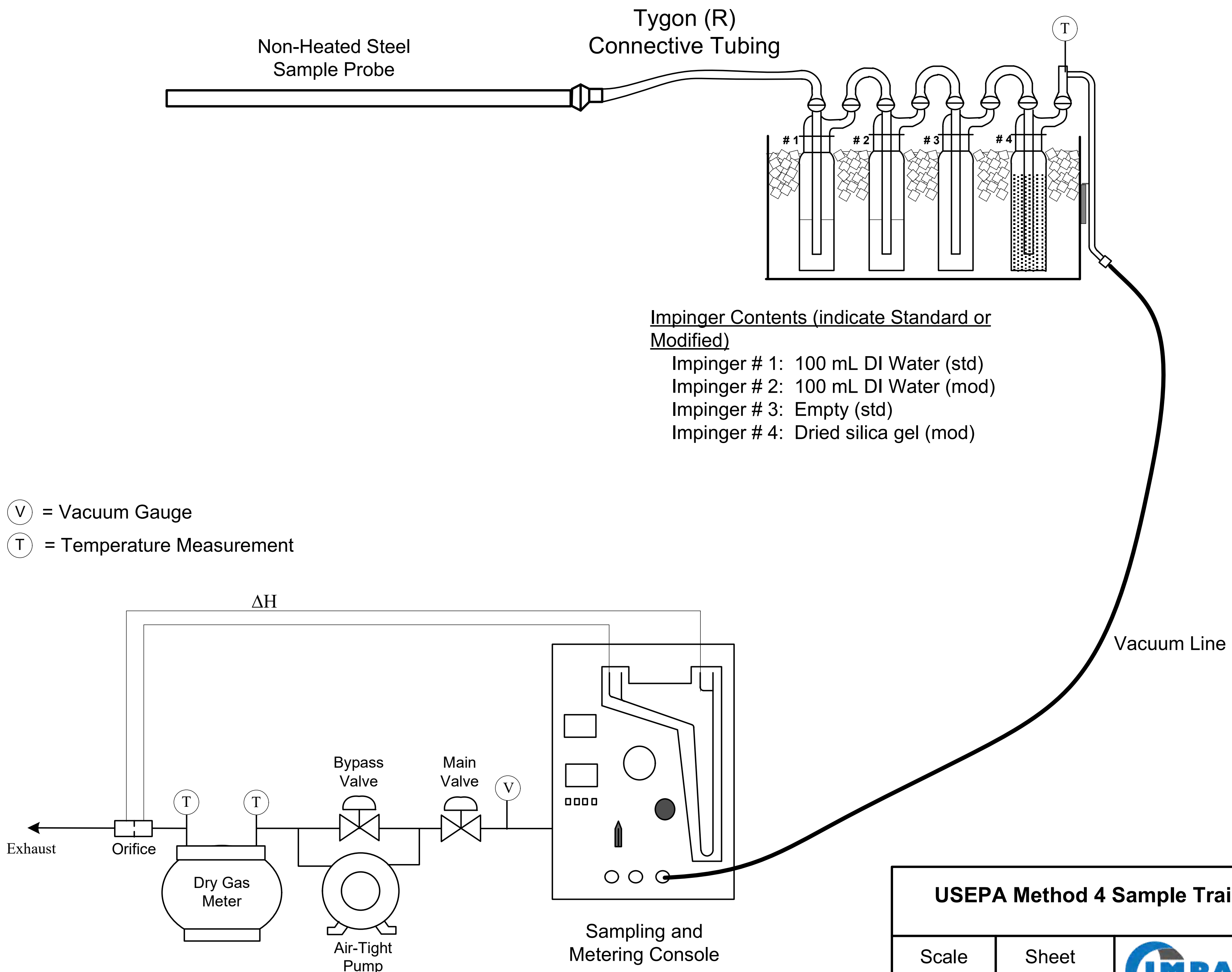
1	0.5"
2	1.7"
3	3.1"
4	5.2"
5	10.8"
6	12.9"
7	14.3"
8	15.5"

11/4/2015	**Eagle Valley Landfill Gas Fueled Engine Exhaust Sample Locations** **[Figure 1]**		
	Scale None	Sheet 1 of 1	IMPACT



Instrumental Analyzer Sample Train Diagram

Scale	Sheet	
None	1 of 1	IMPACT COMPLIANCE & TESTING



USEPA Method 4 Sample Train

Scale	Sheet
None	1 of 1

IMPACT COMPLIANCE & TESTING