IMPACT COMPLIANCE & TESTING

AIR EMISSION TEST REPORT

Title:	AIR EMISSION TEST REPORT FOR THE VERIFICATION OF SULFUR DIOXIDE EMISSIONS FROM LANDFILL GAS FUELED INTERNAL COMBUSTION ENGINES
Report Date:	January 29, 2020
Test Date:	January 9, 2020

Facility Information	
Name:	Pine Tree Acres, Inc. and Sumpter Energy Associates, LLC
Street Address:	36450 29 Mile Road
City, County:	Lenox Township, Macomb
SRN:	N5984

Facility Permit Information	
Renewable Operating Permit No.:	MI-ROP-N5984-2019
Emission Unit ID:	EU-ICENGINE8 & EU-ICENGINE9

Testing Contractor	
Company:	Impact Compliance & Testing, Inc.
Mailing Address:	37660 Hills Tech Drive Farmington Hills, MI 48331
Phone:	(734) 464-3880
Project No.:	1900231

TABLE OF CONTENTS

		Page
1.0	**INTRODUCTION**	3
2.0	**SOURCE AND SAMPLING LOCATION DESCRIPTION**	6
	2.1 General Process Description	6
	2.2 Rated Capacities and Air Emission Controls	6
	2.3 Sampling Locations	6
3.0	**SUMMARY OF TEST RESULTS AND OPERATING CONDITIONS**	7
	3.1 Purpose and Objective of the Tests	7
	3.2 Operating Conditions During the Compliance Tests	7
	3.3 Summary of Air Pollutant Sampling Results	8
4.0	**SAMPLING AND ANALYTICAL PROCEDURES**	9
	4.1 Summary of Sampling Methods	9
	4.2 Exhaust Gas Velocity Determination (USEPA Method 2)	9
	4.3 Exhaust Gas Molecular Weight Determination (USEPA Methods 3A)	9
	4.4 Exhaust Gas Moisture Content (USEPA Method 4)	10
	4.5 SO_2 Concentration Measurements (USEPA Method 6C)	10
5.0	**QA/QC ACTIVITIES**	11
	5.1 Sampling System Response Time Determination	11
	5.2 Gas Divider Certification (USEPA Method 205)	11
	5.3 Instrumental Analyzer Interference Check	11
	5.4 Instrument Calibration and System Bias Checks	11
	5.5 Determination of Exhaust Gas Stratification	12
	5.6 Meter Box Calibrations	12
6.0	**RESULTS**	12
	6.1 Test Results and Allowable Emission Limits	12
	6.2 Variations from Normal Sampling Procedures or Operating Conditions	13

LIST OF TABLES

Table — Page

3.1 Average operating conditions during the test periods 8

3.2 Average measured emission rates for each tested SEA-PTA Landfill RICE (three-test average) 8

6.1 Measured exhaust gas conditions and SO_2 air pollutant emission rates SEA-PTA Landfill Engine No. 9 (EU-ICENGINE9) 14

6.2 Measured exhaust gas conditions and SO_2 air pollutant emission rates SEA-PTA Landfill Engine No. 8 (EU-ICENGINE8) 15

LIST OF APPENDICES

APPENDIX A	SAMPLING DIAGRAMS
APPENDIX B	OPERATING RECORDS
APPENDIX C	FLOWRATE CALCULATIONS AND DATA SHEETS
APPENDIX D	CO2, O2, AND SO_2 CALCULATIONS
APPENDIX E	INSTRUMENTAL ANALYZER RAW DATA
APPENDIX F	QA/QC RECORDS

IMPACT COMPLIANCE & TESTING

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

PINE TREE ACRES, INC. AND SUMPTER ENERGY ASSOCIATES, LLC

1.0 INTRODUCTION

Sumpter Energy Associates (SEA) operates two landfill gas (LFG) to energy facilities at the Pine Tree Acres (PTA) Landfill in Lenox Township, Macomb County, Michigan. The two (2) Sumpter Energy facilities, referred to as SEA Phase I and SEA Phase II, have been issued Renewable Operating Permit (ROP) No. MI-ROP-N5984-2019 by the Michigan Department of Environment, Great Lakes, and Energy – Air Quality Division (EGLE-AQD).

The SEA Phase II facility consists of two (2) Caterpillar (CAT®) Model G3520C LFG-fueled reciprocating internal combustion engines (RICE) and electricity generator sets that are identified in ROP No. MI-ROP-N5984-2019 as Emission Unit ID: EU-ICENGINE8 and EU-ICENGINE9 (Flexible Group ID: FG-ICENGINE2).

Air emission compliance testing was performed pursuant to a condition of ROP No. MI-ROP-N5984-2019, which states:

Within 180 days of permit issuance or five years from the last test date, whichever occurs later, and then every five years thereafter, the permittee shall verify the CO, NOx, SO_2, and VOC emission rates from each engine in FG-ICENGINE2.

EU-ICENGINE8 and EU-ICENGINE9 were tested for CO, NOx, and VOC at a previous test event (December 11, 2019) and test results were presented to EGLE-AQD in the Air Emission Test Report dated December 28, 2020.

The sulfur dioxide (SO_2) air emission compliance testing was performed by Impact Compliance & Testing, Inc. (ICT), a Michigan-based environmental consulting and testing company. ICT representatives Tyler Wilson and Blake Beddow performed the field sampling and measurements January 9, 2020.

The exhaust gas sampling and analysis was performed using procedures specified in the Test Plan that was reviewed and approved by the EGLE-AQD in the January 3, 2020 Test Plan Approval Letter. EGLE-AQD representatives Ms. Regina Angellotti and Mr. Robert Joseph observed portions of the testing project.

Questions regarding this emission test report should be directed to:

Mr. Tyler J. Wilson
Senior Project Manager
Impact Compliance & Testing, Inc.
37660 Hills Tech Drive
Farmington Hills, MI 48331
Ph: (734) 464-3880
Tyler.Wilson@ImpactCandT.com

Ms. Emily Zambuto
Manager of Environmental Programs
Aria Energy
2999 Judge Road
Oakfield, NY 14125-9771
Ph: (585) 948-4616
Emily.Zambuto@ariaenergy.com

Report Certification

This test report was prepared by ICT based on field sampling data collected by ICT. Facility process data were collected and provided by SEA employees or representatives. This test report has been reviewed by SEA representatives and approved for submittal to the State of Michigan EGLE-AQD.

I certify that the testing was conducted in accordance with the approved test plan 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.

I certify that the facility operating conditions were in compliance with permit requirements or were at the maximum routine operating conditions for the facility. Based on information and belief formed after reasonable inquiry, the statements and information in this report are true, accurate and complete.

Responsible Official Certification:

Dennis Plaster
Vice President of Operations
Aria Energy

2.0 SOURCE AND SAMPLING LOCATION DESCRIPTION

2.1 General Process Description

Landfill gas (LFG) containing methane is generated in the Pine Tree Acres Landfill from the anaerobic decomposition of disposed waste materials. The LFG is collected from both active and capped landfill cells using a system of wells (gas collection system). The collected LFG is transferred to the SEA-PTA LFG to energy facility where it is treated and used as fuel for the two (2) RICE. Each RICE is connected to an electricity generator that produces electricity that is transferred to the local utility.

2.2 Rated Capacities and Air Emission Controls

The CAT® Model No. 3520C RICE generator set has a rated output of 2,242 brake-horsepower (bhp) and the connected generator has a rated electricity output of 1,600 kilowatts (kW). The engine is designed to fire low-pressure, lean fuel mixtures (e.g., LFG) and employs lean-burn technology for efficient fuel combustion and to minimize emissions. The engine is also equipped with an air-to-fuel ratio controller that monitors engine performance parameters and automatically adjusts the air-to-fuel ratio and ignition timing to maintain efficient fuel combustion. Exhaust gas is released directly to atmosphere through a noise muffler and vertical exhaust stack.

The engine/generator sets are not equipped with add-on emission control devices. Air pollutant emissions are minimized through the proper operation of the gas treatment system and efficient fuel combustion in the engines.

2.3 Sampling Locations

The RICE exhaust gas is directed through mufflers and is released to the atmosphere through dedicated vertical exhaust stacks with vertical release points. The two (2) CAT® Model 3520C RICE exhaust stacks are identical.

The exhaust stack sampling ports for the CAT® Model 3520C engines (EU-ICENGINE8 and EU-ICENGINE9) are located in individual exhaust stacks with an inner diameter of 15.0 inches. Each stack is equipped with two (2) sample ports, opposed 90°, that provide a sampling location 66.0 inches (4.4 duct diameters) upstream and 144.0 inches (9.6 duct diameters) downstream from any flow disturbance and satisfies the USEPA Method 1 criteria for a representative sample location.

Individual traverse points were determined in accordance with USEPA Method 1.

Appendix A provides diagrams of the emission test sampling locations.

3.0 SUMMARY OF TEST RESULTS AND OPERATING CONDITIONS

3.1 Purpose and Objective of the Tests

The conditions of ROP No. MI-ROP-N5984-2019 require SEA to test each RICE (EU-ICENGINE8 and EU-ICENGINE9) for SO_2 emissions within 180 days of permit issuance (the permit was issued July 30, 2019) or five years from the last test date, whichever occurs later, and then every five years thereafter. Measurements were performed for each RICE exhaust to determine SO_2 concentrations, diluent gas content (oxygen and carbon dioxide) and volumetric flowrate.

3.2 Operating Conditions During the Compliance Tests

The testing was performed while the engine/generator sets were operated within at least 10% of maximum rated capacity of 1,600 kW electricity output. SEA representatives provided kW output data at 15-minute intervals for each test period. EU-ICENGINE8 generator kW output ranged between 1,561 and 1,595 kW and EU-ICENGINE9 generator kW output ranged between 1,553 and 1,611 kW during the test periods (97% of maximum capacity or greater).

Fuel flowrate (cubic feet per minute (scfm)), fuel methane content (%), fuel gas pressure (psi), and air/fuel ratio were also recorded by SEA representatives in 15-minute intervals for each test period. EU-ICENGINE8 fuel consumption rate ranged between 532 and 558 scfm and EU-ICENGINE9 fuel consumption rate ranged between 535 and 554 scfm. Fuel methane content ranged between 50.7 and 51.7% during the EU-ICENGINE8 test periods and fuel methane content ranged between 52.4 and 54.1% during the EU-ICENGINE9 test periods. EU-ICENGINE8 fuel gas pressure ranged between 18.0 and 18.9 psi. EU-ICENGINE9 fuel gas pressure ranged between 17.9 and 18.1 psi. EU-ICENGINE8 air/fuel ratio ranged between 8.2 and 8.5. EU-ICENGINE9 air/fuel ratio ranged between 8.2 and 8.4. A lower heating value of 910 Btu/scf was used to calculate the LFG heating value (Btu/scf LHV) based on the methane content.

Appendix B provides operating records provided by SEA representatives for the test periods.

Engine output (bhp) cannot be measured directly and was calculated based on the recorded electricity output, the calculated CAT® Model 3520C generator efficiency (95.7%), and the unit conversion factor for kW to horsepower (0.7457 kW/hp).

$$\text{Engine output (bhp)} = \text{Electricity output (kW)} / (0.957) / (0.7457\ \text{kW/hp})$$

Table 3.1 presents a summary of the average engine operating conditions during the test periods.

3.3 Summary of Air Pollutant Sampling Results

The gases exhausted from EU-ICENGINE8 and EU-ICENGINE9 were each sampled for three (3) one-hour test periods during the compliance testing performed January 9, 2020.

Table 3.2 presents the average measured SO_2 emission rates for the engines (average of the three test periods for each engine) and applicable emission limits.

Results of the engine performance tests demonstrate compliance with emission limits specified in ROP No. MI-ROP-N5984-2019. Test results for each one-hour sampling period are presented in Section 6.0 of this report.

Table 3.1 Average engine operating conditions during the test periods

Emission Unit	Gen. Output (kW)	Engine Output (bHp)	Fuel Use (scfm)	LFG CH_4 Content (%)	LFG Btu Content (Btu/scf)	Exhaust Temp. (^oF)
EU-ICENGINE9	1,573	2,204	547	53.3	485	899
EU-ICENGINE8	1,585	2,221	545	51.3	467	878

Table 3.2 Average measured emission rates for each LFG-fueled RICE generator set (three-test average)

Emission Unit	SO_2 Emission Rates	
	(lb/hr)	(g/bhp-hr)
EU-ICENGINE9	1.72	0.35
EU-ICENGINE8	1.85	0.38
FG-ICENGINE2[1]	3.57	0.73
Emission Limit[2]	*7.5*	-

Notes
1. Total combined SO_2 emissions for EU-ICENGINE9 and EU-ICENGINE8 (FG-ICENGINE2)
2. Limit includes SO_2 emissions for both EU-ICENGINE9 and EU-ICENGINE8 (FG-ICENGINE2)

4.0 SAMPLING AND ANALYTICAL PROCEDURES

A protocol for the air emission testing was reviewed and approved by the 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.
USEPA Method 6C	Exhaust gas SO_2 concentration was determined using a pulsed ultraviolet florescence instrumental analyzer.

4.2 Exhaust Gas Velocity Determination (USEPA Methods 1 & 2)

The RICE exhaust stack gas velocity and volumetric flow rate was determined using USEPA Method 2 once for each test. 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 onsite, prior to the test event, to verify the integrity of the measurement system.

The absence of significant cyclonic flow for the exhaust configuration 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 C 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 exhaust gas CO_2 content was monitored using a Servomex 1440D single beam single wavelength (SBSW) infrared gas analyzer. The exhaust gas O_2 content was monitored using a paramagnetic sensor within the Servomex 1440D gas analyzer.

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 D provides O_2 and CO_2 calculation sheets. Raw instrument response data are provided in Appendix E.

4.4 Exhaust Gas Moisture Content (USEPA Method 4)

Moisture content of the RICE exhaust gas was determined in accordance with USEPA Method 4 using a chilled impinger sampling train. The moisture sampling was performed concurrently with the instrumental analyzer sampling. During each sampling period a gas sample was extracted at a constant rate from the source where moisture was removed from the sampled gas stream using impingers that were submersed in an ice bath. 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.

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 SO_2 concentration.

Throughout each test period, a continuous sample of the engine exhaust gas was extracted from the stack using the heated sample line and gas conditioning system described previously in this section. Prior to, and at the conclusion of each test, the instrument was calibrated using upscale calibration and zero gas to determine analyzer calibration error and system bias.

Appendix D provides SO_2 calculation sheets. Raw instrument response data are provided in Appendix E.

5.0 QA/QC ACTIVITIES

5.1 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.

Results of the response time determinations were recorded on field data sheets. For each test period, test data were collected once the sample probe was in position for at least twice the maximum system response time.

5.2 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 (once before each test day). The field evaluation yielded no errors greater than 2% of the triplicate measured average and no errors greater than 2% from the expected values for both of the field evaluations.

5.3 Instrumental Analyzer Interference Check

The instrumental analyzer used to measure SO_2 has had an interference response test preformed prior to its 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 the analyzer, separately and as a mixture with the analyte that the analyzer is designed to measure. The analyzer exhibited a composite deviation of less than 2.5% of the span for all measured interferent gases. No major analytical components of the analyzer have been replaced since performing the original interference test.

5.4 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 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.

The instruments were calibrated with USEPA Protocol 1 certified concentrations of CO_2, O_2, and SO_2 in nitrogen or air and zeroed using hydrocarbon free nitrogen or air. A STEC

Model SGD-710C ten-step gas divider was used to obtain intermediate calibration gas concentrations as needed.

5.5 Determination of Exhaust Gas Stratification

A stratification test was performed for each of the two (2) identical RICE exhaust stacks. 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 both RICE exhaust stacks indicate 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.

5.6 Meter Box Calibrations

The Nutech Model 2010 sampling console, which was used for exhaust gas moisture content sampling, 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 Nutech metering consoles were calibrated using a NIST traceable Omega® Model CL 23A temperature calibrator.

Appendix F presents test equipment quality assurance data (Instrument calibration and system bias check records, calibration gas and gas divider certifications, interference test results, meter box calibration records, stratification checks, cyclonic flow determinations sheets, and Pitot tube, scale, and barometer calibration records).

6.0 <u>RESULTS</u>

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 through 6.2. The serial number (SN) for each RICE is presented at the top of each table.

The measured average SO_2 air pollutant emission rates for Engine Nos. 8 through 9 (EU-ICENGINE8 and EU-ICENGINE9) are less than the allowable limit specified in ROP No. MI-ROP-N5984-2019 for the engines (7.5 pounds per hour (lb/hr) for the combination of SO_2 emissions from both EU-ICENGINE8 and EU-ICENGINE9).

6.2 Variations from Normal Sampling Procedures or Operating Conditions

The testing for all pollutants was performed in accordance with the approved test protocol. The engine-generator sets operated within 10% of maximum output and no variations from the normal operating conditions of the RICE occurred during the engine test periods.

Table 6.1 Measured exhaust gas conditions and SO_2 air pollutant emission rates SEA-PTA Landfill Engine No. 9 (EU-ICENGINE9), SN: GZJ00199

Test No. Test date Test period (24-hr clock)	1 1/9/2020 0720-0820	2 1/9/2020 0842-0942	3 1/9/2020 1000-1100	Three Test Average
Fuel flowrate (scfm)	552	545	543	547
Generator output (kW)	1,568	1,565	1,587	1,573
Engine output (bhp)	2,197	2,193	2,223	2,204
LFG methane content (%)	52.7	53.5	53.9	53.3
LFG LHV heat content (Btu/scf)	480	487	490	485
Fuel gas pressure (psi)	18.1	18.1	18.1	18.1
Air / Fuel ratio	8.3	8.3	8.4	8.3
Exhaust Gas Composition				
CO_2 content (% vol)	11.5	11.4	11.5	11.5
O_2 content (% vol)	8.61	8.66	8.67	8.64
Moisture (% vol)	11.7	11.0	11.5	11.4
Exhaust gas temperature (^{o}F)	905	900	890	899
Exhaust gas flowrate (dscfm)	4,122	4,104	4,051	4,092
Exhaust gas flowrate (scfm)	4,667	4,613	4,579	4,620
Sulfur Dioxide				
SO_2 conc. (ppmvd)	42.5	43.0	41.2	42.2
SO_2 emissions (g/bhp*hr)	0.36	0.36	0.34	0.35
SO_2 emissions (lb/hr)	1.75	1.76	1.67	1.72

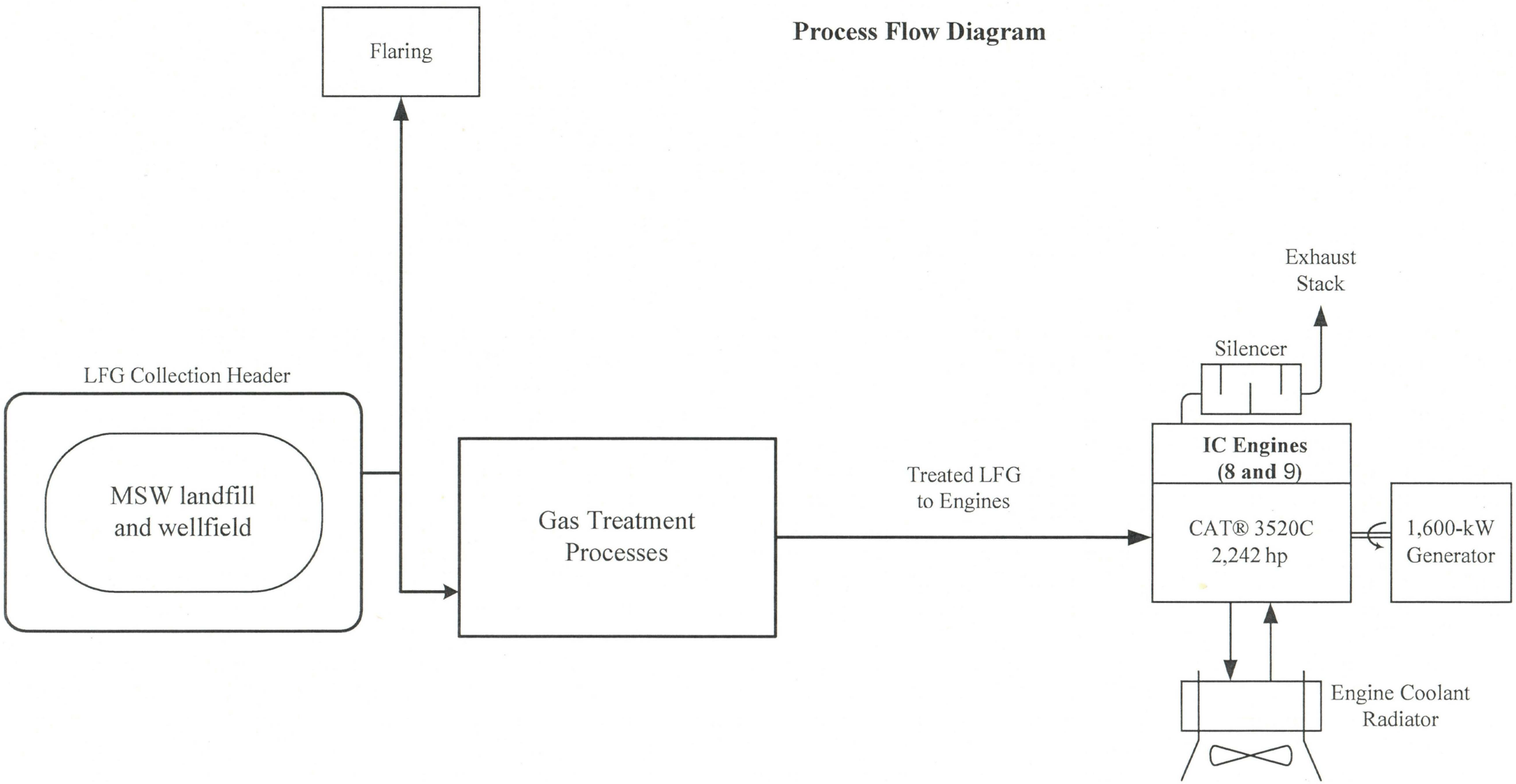
Table 6.2 Measured exhaust gas conditions and SO_2 air pollutant emission rates SEA-PTA Landfill Engine No. 8 (EU-ICENGINE8), SN: GZJ00189

Test No. Test date Test period (24-hr clock)	1 1/9/2020 1117-1217	2 1/9/2020 1235-1335	3 1/9/2020 1355-1455	Three Test Average
Fuel flowrate (scfm)	554	537	543	545
Generator output (kW)	1,582	1,582	1,590	1,585
Engine output (bhp)	2,216	2,217	2,228	2,221
LFG methane content (%)	51.1	51.6	51.4	51.3
LFG LHV heat content (Btu/scf)	465	470	468	467
Fuel gas pressure (psi)	18.5	18.2	18.0	18.3
Air / Fuel ratio	8.3	8.4	8.4	8.4
Exhaust Gas Composition				
CO_2 content (% vol)	11.4	11.4	11.4	11.4
O_2 content (% vol)	8.70	8.72	8.71	8.71
Moisture (% vol)	10.7	11.5	11.2	11.1
Exhaust gas temperature (^oF)	877	879	877	878
Exhaust gas flowrate (dscfm)	4,339	4,187	4,198	4,241
Exhaust gas flowrate (scfm)	4,861	4,732	4,727	4,773
Sulfur Dioxide				
SO_2 conc. (ppmvd)	43.3	44.3	43.5	43.7
SO_2 emissions (g/bhp*hr)	0.38	0.38	0.37	0.38
SO_2 emissions (lb/hr)	1.87	1.85	1.82	1.85

APPENDIX A

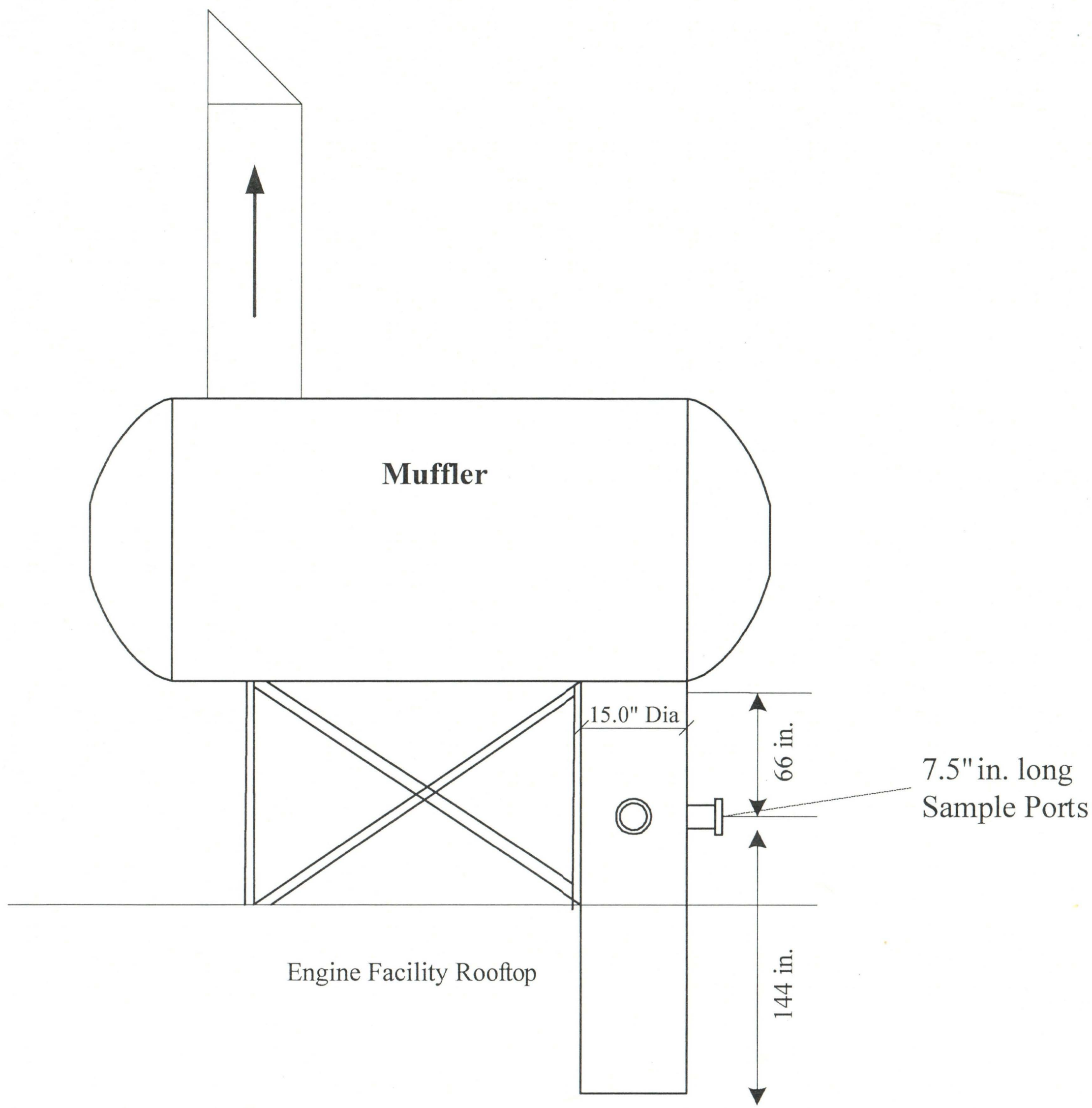
- Figure A-1 – Process Flow Diagram
- Figure A-2 – IC Engines Sample Port Diagram

Process Flow Diagram

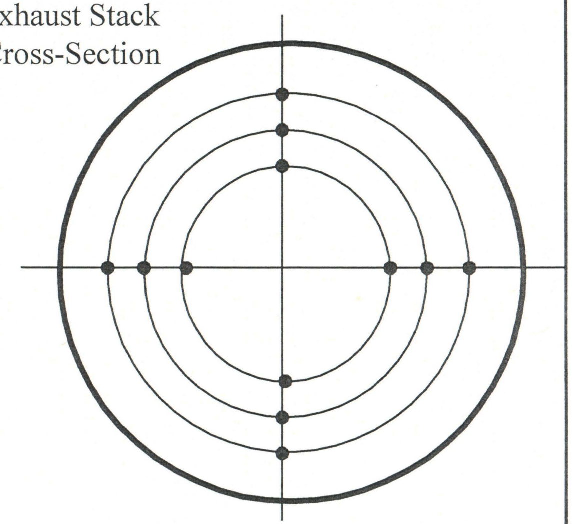


12/8/2014	**Figure A-1. SEA Facility Process Flow Diagram**		
	Scale None	Sheet 1 of 1	

Engine Exhausts



Exhaust Stack
Cross-Section



Velocity Sample Location as Measured from Stack Wall

Sample Port	
Pt. #	in.
1	0.66
2	2.19
3	4.44
4	10.56
5	12.81
6	14.34

Attachment A-2

Pine Tree Acres Facility
Exhaust Sample Locations

Scale	Sheet	
None	1 of 1	IMPACT COMPLIANCE & TESTING