

FINAL REPORT



WASHINGTON 10 STORAGE CORPORATION

WASHINGTON TOWNSHIP, MICHIGAN

**WASHINGTON 10 COMPRESSOR STATION:
2024 FGENGINE1-3 EMISSIONS REPORT**

RWDI #2403298

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EXECUTIVE SUMMARY

RWDI USA LLC (RWDI) was retained by Washington 10 Storage Corporation (Washington 10) to complete the emission sampling program at the Washington 10 Compressor Station located at 12700 30 Mile Rd, Washington Township, Michigan. The facility operates under the State of Michigan Department of Environment, Great Lakes and Energy (EGLE) Renewable Operating Permit (ROP) MI-ROP-N3391-2023. Under the ROP, the facility operates three (3) 4,000 HP natural gas fired reciprocating engines used to drive natural gas compressors for transport between storage field and pipeline system under Flexible Group FG-ENGINES1. There are three (3) 4-stroke lean-burn, 4,735 HP Caterpillar natural gas fired reciprocating engines under Flexible Group FG-ENGINES2. The engines generate line pressure assisting the transmission of natural gas into and out of the gas storage field as well as to and from the pipeline transmission system in Southeast Michigan.

This report covers the scenarios under Flexible Group FG-ENGINES1 at 60% torque for Engines 1 & 2 and the testing at 100% torque for Engines 1, 2, or 3. This report completes the program. Testing for EUENGINE4 to 6 and EUENGINE3 at 60% torque was provided to EGLE dated July 24th, 2024.

Testing program included the following:

- Testing at the outlet of EU-ENGINE1 under Flexible Group FG-ENGINES1 at 60% Torque for Non-Methane Organic Compounds (NMOC) and Carbon Monoxide (CO).
- Testing at the outlet of EU-ENGINE1 under Flexible Group FG-ENGINES1 at 100% Torque for Non-Methane Organic Compounds (NMOC), Oxides of Nitrogen (NOx) and Carbon Monoxide (CO).
- Testing at the outlet of EU-ENGINE2 under Flexible Group FG-ENGINES1 at 60% Torque for Non-Methane Organic Compounds (NMOC) and Carbon Monoxide (CO).
- Testing at the outlet of EU-ENGINE2 under Flexible Group FG-ENGINES1 at 100% Torque for Non-Methane Organic Compounds (NMOC), Oxides of Nitrogen (NOx) and Carbon Monoxide (CO).
- Testing at the outlet of EU-ENGINE3 under Flexible Group FG-ENGINES1 at 100% Torque for Non-Methane Organic Compounds (NMOC), Oxides of Nitrogen (NOx) and Carbon Monoxide (CO).

Executive Table i: EUENGINE1 and 2 CO & NMOC Emission Rates at 60% Torque and 100% Power

Unit	Carbon Monoxide	NMOC
	g/hp-hr	g/hp-hr
EUENGINE1	1.25	0.09
EUENGINE2	1.16	0.04
Permit Limit	No Limit for Scenario of 60% Torque and 100% Power	

Executive Table ii: EUENGINE1, 2 & 3 NOx, CO & NMOC Emission Rates at 100% Torque and 100% Power

Unit	Oxides of Nitrogen	Carbon Monoxide	NMOC
	g/hp-hr	g/hp-hr	g/hp-hr
EUENGINE1	0.90	1.62	0.12
EUENGINE2	0.98	1.55	0.29
EUENGINE3	0.67	1.58	0.12
Permit Limit	1.3 g/hp-hr	2.0 g/hp-hr	0.9 g/hp-hr



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1 INTRODUCTION

RWDI USA LLC (RWDI) was retained by Washington 10 Storage Corporation (Washington 10) to complete the emission sampling program at the Washington 10 Compressor Station located at 12700 30 Mile Rd, Washington Township, Michigan. The facility operates under the State of Michigan Department of Environment, Great Lakes and Energy (EGLE) Renewable Operating Permit (ROP) MI-ROP-N3391-2023. Under the ROP, the facility operates three (3) 4,000 HP natural gas fired reciprocating engines used to drive natural gas compressors for transport between storage field and pipeline system under Flexible Group FG-ENGINES1. There are three (3) 4-stroke lean-burn, 4,735 HP Caterpillar natural gas fired reciprocating engines under Flexible Group FG-ENGINES2. The engines generate line pressure assisting the transmission of natural gas into and out of the gas storage field as well as to and from the pipeline transmission system in Southeast Michigan.

This report covers the scenarios under Flexible Group FG-ENGINES1 at 60% torque for Engines 1 & 2 and the testing at 100% torque for Engines 1, 2, or 3. This report completes the program. Testing for EUENGINE4 to 6 and EUENGINE3 at 60% torque was provided to EGLE dated July 24th, 2024.

Testing program included the following:

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- Testing at the outlet of EU-ENGINE1 under Flexible Group FG-ENGINES1 at 100% Torque for Non-Methane Organic Compounds (NMOC), Oxides of Nitrogen (NOx) and Carbon Monoxide (CO).
- Testing at the outlet of EU-ENGINE2 under Flexible Group FG-ENGINES1 at 60% Torque for Non-Methane Organic Compounds (NMOC) and Carbon Monoxide (CO).
- Testing at the outlet of EU-ENGINE2 under Flexible Group FG-ENGINES1 at 100% Torque for Non-Methane Organic Compounds (NMOC), Oxides of Nitrogen (NOx) and Carbon Monoxide (CO).
- Testing at the outlet of EU-ENGINE3 under Flexible Group FG-ENGINES1 at 100% Torque for Non-Methane Organic Compounds (NMOC), Oxides of Nitrogen (NOx) and Carbon Monoxide (CO).

1.1 Location and Dates of Testing

The test program took place on July 10 to 11th and 25th, 2024

1.2 Purpose of Testing

This testing was conducted to show compliance with MI-ROP-N3391-2023 and 40 CFR Part 63 Subpart ZZZZ.

1.3 Description of Source

The facility operates three (3) 4,000 HP natural gas fired reciprocating engines used to drive natural gas compressors for transport between storage field and pipeline system under Flexible Group FG-ENGINES1 and three (3) 4-stroke lean-burn, 4,735 HP Caterpillar natural gas fired reciprocating engines under Flexible Group FG-ENGINES2. The engines generate line pressure assisting the transmission of natural gas into and out of the gas storage field as well as to and from the pipeline transmission system in southeast Michigan.



1.4 Personnel Involved in Testing

Table 1.4.1: Testing Personnel

Kimberly Walker Environmental Technical Specialist Kimberly.Walker@dtmidstream.com	DT Midstream, Inc,	(724) 954-5329
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Kate Strang Field Technician Kate.Strang@rwdi.com		248.841.8442
Cade Smith Field Technician Cade.Smith@rwdi.com		

2 SUMMARY OF RESULTS

2.1 Operating Data

Operating parameters used to regulate the compressor engines include speed (RPM) and torque (HP). Additional parameters monitored include fuel flow, inlet & exhaust temperature & pressure, timing, and fuel analysis. Operating parameters for each test can be found in **Appendix A**.

2.2 Applicable Permit Number

MI-ROP-N3391-2023 and 40 CFR Part 63 Subpart ZZZZ.



3 SOURCE DESCRIPTION

3.1 Description of Process and Emission Control Equipment

EUENGINE1-6 are equipped with an oxidation catalyst which controls emissions.

3.2 Process Flow Sheet or Diagram (if applicable)

A process flow diagram is available upon request.

3.3 Type and Quantity of Raw and Finished Materials

EUENGINE1-6 are natural gas-fired reciprocating units.

3.4 Normal Rated Capacity of Process

The engines are rated at 4,000 or 4,735 HP and were ran at maximum achievable load.

4 SAMPLING AND ANALYTICAL PROCEDURES

4.1 Description of Sampling Train and Field Procedures

4.1.1 Carbon Monoxide, Oxides of Nitrogen, and Oxygen

NO_x, CO, and O₂ concentrations were determined utilizing RWDI's continuous emissions monitoring (CEM) system. Prior to testing, a 3-point analyzer calibration error check was conducted using USEPA protocol gases. The calibration error check was performed by introducing zero, mid and high-level calibration gases directly into the analyzer. The calibration error check was performed to confirm that the analyzer response was within $\pm 2\%$ of the certified calibration gas introduced. Prior to each test run, a system-bias test was performed where known concentrations of calibration gases were introduced at the probe tip to measure if the analyzers response was within $\pm 5\%$ of the introduced calibration gas concentrations. At the conclusion of each test run a system-bias check was performed to evaluate the percent drift from pre and post-test system bias checks. The system bias checks were used to confirm that the analyzer did not drift greater than $\pm 3\%$ throughout each test run.

Zero and upscale calibration checks were conducted both before and after each test run to quantify measurement system calibration drift and sampling system bias. Upscale is either the mid- or high-range gas, whichever most closely approximates the flue gas level. During these checks, the calibration gases were introduced into the sampling system at the probe outlet so that the calibration gases were analyzed in the same manner as the flue gas samples.



A gas sample was continuously extracted from the stack and delivered to a series of gas analyzers, which measure the pollutant or diluent concentrations in the gas. The analyzers were calibrated on-site using EPA Protocol No. 1 certified calibration mixtures. The probe tip was equipped with a sintered stainless-steel filter for particulate removal. The end of the probe was connected to a heated Teflon sample line, which delivered the sample gases from the stack to the CEM system. The heated sample line was designed to maintain the gas temperature above 250°F to prevent condensation of stack gas moisture within the line.

Before entering the analyzers, the gas sample passed directly into a refrigerated condenser, which cools the gas to approximately 35°F to remove the stack gas moisture. After passing through the condenser, the dry gas entered a Teflon-head diaphragm pump and a flow control panel, which delivered the gas in series to the NO_x, CO and O₂ analyzers. Each of these analyzers measure the respective gas concentrations on a dry volumetric basis.

4.1.2 Non-Methane Organic Compounds

Non-Methane Organic Compounds (as propane) for VOCs and CH₄ concentrations were recorded simultaneously for each test. The measurements were taken continuously following USEPA Method 25A on each engine (using a non-methane/methane analyzer).

Prior to testing, a 4-point analyzer calibration error check was conducted using USEPA protocol gases. The calibration error check was performed by introducing zero, low, mid, and high-level calibration gases up the heated line to the probe tip. The calibration error check was performed to confirm that the analyzer response is within ±5% of the certified calibration gas introduced. At the conclusion of each test run a system-bias check was performed to evaluate the percent drift from pre- and post-test system bias checks. The system bias check was used to confirm that the analyzer did not drift greater than ±3% throughout a test run.

Zero and mid gas calibration checks were conducted both before and after each test run to quantify measurement system calibration drift and sampling system bias. During these checks, the calibration gases were introduced into the sampling system at the probe tip so that the calibration gases were analyzed in the same manner as the flue gas samples.

A gas sample was continuously extracted from the stack and delivered to the gas analyzer, which measures the pollutant or diluent concentrations in the gas. The end of the probe was connected to a heated Teflon sample line, which delivered the sample gases from the stack to the CEM system. The heated sample line is designed to maintain the gas temperature above 250°F to prevent condensation of stack gas moisture within the line.

To subtract methane from THC, the methane must be converted from methane as methane to methane as propane and then subtracted from the THC number. The methane response factor (RF) is used in the conversion and is determined each test by introducing a known methane concentration to the analyzer and dividing the methane channel response by the THC channel response. Dividing methane by the RF gives methane as propane and is then subtracted from the THC concentration.

Moisture tests were completed on VOC test runs as per USEPA Method 4.



4.1.3 Verification of Gas Dilution Systems for Field Instrument Calibration

Calibration gas was mixed using an Environics 4040 Gas Dilution System. The mass flow controllers are factory calibrated using a primary flow standard traceable to the United States National Institute of Standards and Technology (NIST). Each flow controller utilizes an 11-point calibration table with linear interpolation, to increase accuracy and reduce flow controller nonlinearity. The calibration is done yearly, and the records are included in the Source Testing Report. A multi-point EPA Method 205 check was executed in the field prior to testing to ensure accurate gas mixtures. The gas dilution system consists of calibrated orifices for mass flow controllers and dilutes a high-level calibration gas to within $\pm 2\%$ of predicted values. The gas divider is capable of diluting gases at set increments and was evaluated for accuracy in the field in accordance with US EPA Method 205 "Verification of Gas Dilution Systems for Field Instrument Calibrations". The gas divider dilutions were measured to evaluate that the responses are within $\pm 2\%$ of predicted values. In addition, a certified mid-level calibration gas within $\pm 10\%$ of one of the tested dilution gases was introduced into an analyzer to ensure the response of the gas calibration was within $\pm 2\%$ of gas divider dilution concentration.

4.2 Description of Recovery and Analytical Procedures

There were no samples to recover during this test program. All testing used real time data from the analyzers.

4.3 Sampling Port Description

A figure of the testing sites is provided in the **Figures** section.

5 TEST RESULTS AND DISCUSSION

5.1 Detailed Results

The following tables give the averages for each permit requirement. The **Tables** section and **Appendix B** provide a detailed breakdown of each test.

Table 5.1.1: EUENGINE1 and 2 CO & NMOC Emission Rates at 60% Torque and 100% Power

Unit	Carbon Monoxide	NMOC
	g/hp-hr	g/hp-hr
EUENGINE1	1.25	0.09
EUENGINE2	1.16	0.04
Permit Limit	No Limit for Scenario of 60% Torque and 100% Power	



Table 5.1.2: EUENGINE1, 2 & 3 NO_x, CO & NMOC Emission Rates at 100% Torque and 100% Power

Unit	Oxides of Nitrogen	Carbon Monoxide	NMOC
	g/hp-hr	g/hp-hr	g/hp-hr
EUENGINE1	0.90	1.62	0.12
EUENGINE2	0.98	1.55	0.29
EUENGINE3	0.67	1.58	0.12
Permit Limit	1.3 g/hp-hr	2.0 g/hp-hr	0.9 g/hp-hr

5.2 Discussion of Results

For EUENGINES1 & 2 under 60% torque scenario, CO/NMOC emission limits (g/hp-hr) were verified.

For EUENGINES1, 2 & 3 under 100% torque scenario, NO_x/CO/NMOC emission limits (g/hp-hr) were verified and confirmed to be lower than the ROP defined limits.

5.3 Variations in Testing Procedures

For any test that concluded with a negative NMOC result, 0.1 ppm was used as an MDL for all calculations.

5.4 Process Upset Conditions During Testing

There were normal process breaks during production.

5.5 Maintenance Performed in Last Three Months

Only normal routine maintenance was completed in EUENGINES1, 2 & 3 during the three (3) months prior to testing. In July of 2024, EUENGINE3 had maintenance performed on it by Eagle Compression as follows:

- Installed new waste gate controller
- Adjusted waste gate
- Fixed tubing leaks
- Changed 3 coils and plugs

5.6 Re-Test

This was not a retest.

5.7 Audit Samples

This test did not require any audit samples.

5.8 Field Data Sheets

Field data sheets can be found in **Appendix C**.



5.9 Calibration Data

Calibration data can be found in **Appendix D**.

5.10 Example Calculations

Example calculations can be found in **Appendix E**.

5.11 Laboratory Data

There was no laboratory data from this testing program.

5.12 Test Plan and EGLE Correspondence

The submitted test plan and all EGLE correspondence is located in **Appendix F**.

TABLES



Table 1: Summary of Sampling Parameters and Methodology

Source Location	No. of Tests per Stack	Sampling Parameter	Sampling Method
EUENGINE1 60% Torque	3	Oxygen	U.S. EPA ^[1] Method 3A
	3	Carbon Monoxide	U.S. EPA ^[1] Method 10
	3	Moisture	U.S. EPA ^[1] Method 4
	3	Non-Methane Organic Compounds	U.S. EPA ^[1] Method 25A
EUENGINE1 100% Torque	3	Oxygen	U.S. EPA ^[1] Method 3A
	3	Carbon Monoxide	U.S. EPA ^[1] Method 10
	3	Moisture	U.S. EPA ^[1] Method 4
	3	Non-Methane Organic Compounds	U.S. EPA ^[1] Method 25A
EUENGINE2 60% Torque	3	Oxygen	U.S. EPA ^[1] Method 3A
	3	Carbon Monoxide	U.S. EPA ^[1] Method 10
	3	Moisture	U.S. EPA ^[1] Method 4
	3	Non-Methane Organic Compounds	U.S. EPA ^[1] Method 25A
EUENGINE2 100% Torque	3	Oxygen	U.S. EPA ^[1] Method 3A
	3	Carbon Monoxide	U.S. EPA ^[1] Method 10
	3	Moisture	U.S. EPA ^[1] Method 4
	3	Non-Methane Organic Compounds	U.S. EPA ^[1] Method 25A
EUENGINE3 100% Torque	3	Oxygen	U.S. EPA ^[1] Method 3A
	3	Carbon Monoxide	U.S. EPA ^[1] Method 10
	3	Moisture	U.S. EPA ^[1] Method 4
	3	Non-Methane Organic Compounds	U.S. EPA ^[1] Method 25A

Notes:

[1] U.S. EPA - United States Environmental Protection Agency

Table 2: Sampling Time Summary

Source and Test #	Sampling Date	Start Time	End Time
EUENGINE1 - 60% Torque			
Test #1	11-Jul-24	8:54 AM	9:53 AM
Test #2	11-Jul-24	10:20 AM	11:19 AM
Test #3	11-Jul-24	11:35 AM	12:34 PM
EUENGINE1 - 100% Torque			
Test #1	11-Jul-24	1:27 PM	2:26 PM
Test #2	11-Jul-24	2:43 PM	3:42 PM
Test #3	11-Jul-24	4:00 PM	4:59 PM
EUENGINE2 - 60% Torque			
Test #1	10-Jul-24	12:18 PM	1:17 PM
Test #2	10-Jul-24	1:50 PM	2:49 PM
Test #3	10-Jul-24	3:17 PM	4:16 PM
EUENGINE2 - 100% Torque			
Test #1	10-Jul-24	4:43 PM	5:42 PM
Test #2	11-Jul-24	5:23 AM	6:22 AM
Test #3	11-Jul-24	6:53 AM	7:52 AM
EUENGINE3 - 100% Torque			
Test #1	25-Jul-24	7:24 AM	8:23 AM
Test #2	25-Jul-24	9:17 AM	10:16 AM
Test #3	25-Jul-24	10:37 AM	11:36 AM

Table 3: EUENGINE1 60% Torque / 100% Power CO Testing Summary

RWDI Project #2403298

Test ID	Date	Start	End	O ₂	CO	CO Emission Rate			Natural Gas Usage	
				%	ppm	lbs/mmBTU	lbs/hr	g/hp-hr	MMBTU/hr	ft ³ /hr
				Outlet	Outlet	Outlet	Outlet	Outlet		
1	2024-07-11	8:53	9:52	15.2	207.6	0.4790	7.57	1.299	15.8	15,000
2	2024-07-11	10:20	11:19	14.9	207.7	0.4550	7.19	1.224	15.8	15,000
3	2024-07-11	11:35	12:34	15.2	197.8	0.4626	7.31	1.235	15.8	15,000
Average				15.1	204.4	0.4655	7.35	1.253	15.8	15,000
										2.0 g/hp-hr

lb/MMBTU =CO ppm x 0.0000000726 x 8710 x (20.9/20.9-Actual O2)

MMBTU = 1052.9265 BTU/sft3 natural gas x ft3 of natural gas x 1 MMBTU/1,000,000 BTU

Table 4: EUENGINE1 60% Torque and 100% Power NMOC Testing Summary

RWDI Project #2403298

Test ID	Date	Start	End	O ₂	THC (as propane)	CH ₄ (as Propane)	NMOC (as Propane)	NMOC Emission Rate		
				%	ppm	ppm	ppm	lbs/mmBTU	lbs/hr	g/hp-hr
				Outlet	Outlet	Outlet	Outlet	Outlet	Outlet	Outlet
1	2024-07-11	8:53	9:52	15.2	336.3	331.8	4.5	0.01625	0.2566	0.0441
2	2024-07-11	10:20	11:19	14.9	339.4	328.9	10.5	0.03612	0.5705	0.0972
3	2024-07-11	11:35	12:34	15.2	349.4	340.5	8.9	0.03258	0.5146	0.0870
Average				15.1	344.4	334.7	9.7	0.03435	0.5425	0.0921
										0.9 g/hp-hr

MMBTU = 1052.9265 BTU/sft3 natural gas x ft3 of natural gas x 1 MMBTU/1,000,000 BTU

lb/MMBTU = NOx ppm x 0.0000001194 x 8710 x (20.9/20.9-Actual O2)

lb/MMBTU = THC (propane) ppm x 0.000000114 x 8710 x (20.9/20.9-Actual O2)

NMOC Results: After methane subtraction, if the NMOC concentration resulted in a negative value a MDL of 0.1 ppm would be used for the results

Table 5: EUENGINE1 100% Torque and Power CO Testing Summary

RWDI Project #2403298

Test ID	Date	Start	End	O ₂	CO	CO Emission Rate			Natural Gas Usage	
				%	ppm	lbs/mmBTU	lbs/hr	g/hp-hr	MMBTU/hr	ft ³ /hr
				Outlet	Outlet	Outlet	Outlet	Outlet		
1	2024-07-11	13:27	14:26	16.2	162.1	0.4523	14.29	1.611	31.6	30,000
2	2024-07-11	14:43	15:42	16.3	159.8	0.4606	14.55	1.622	31.6	30,000
0	2024-07-11	16:00	16:59	16.1	166.1	0.4539	14.34	1.612	31.6	30,000
Average				16.2	162.7	0.4556	14.39	1.615	31.6	30,000
										2.0 g/hp-hr

lb/MMBTU =CO ppm x 0.0000000726 x 8710 x (20.9/20.9-Actual O2)
MMBTU = 1052.9265 BTU/sft3 natural gas x ft3 of natural gas x 1 MMBTU/1,000,000 BTU

Table 6: EUENGINE1 100% Torque / Power NOx and NMOC Testing Summary

RWDI Project #2403298

Test ID	Date	Start	End	O ₂	NOx	NOx Emission Rate			Natural Gas Usage	
				%	ppm	lbs/mmBTU	lbs/hr	g/hp-hr	MMBTU/hr	ft ³ /hr
				Outlet	Outlet	Outlet	Outlet	Outlet		
1	2024-07-11	13:27	14:26	16.2	80.3	0.3683	11.63	1.312	31.6	30,000
2	2024-07-11	14:43	15:42	16.3	52.0	0.2464	7.78	0.872	31.6	30,000
3	2024-07-11	16:00	16:59	16.1	58.2	0.2615	8.26	0.929	31.6	30,000
Average				16.2	55.1	0.2539	8.02	0.900	31.6	30,000
										1.3 g/hp-hr

Test ID	Date	Start	End	O ₂	THC (as propane)	CH ₄ (as Propane)	NMOC (as Propane)	NMOC Emission Rate		
				%	ppm	ppm	ppm	lbs/mmBTU	lbs/hr	g/hp-hr
				Outlet	Outlet	Outlet	Outlet	Outlet	Outlet	Outlet
1	2024-07-11	13:27	14:26	16.2	397.3	419.0	0.1	0.00044	0.0138	0.0016
2	2024-07-11	14:43	15:42	16.3	395.3	405.6	0.1	0.00045	0.0143	0.0016
3	2024-07-11	16:00	16:59	16.1	387.8	371.7	16.1	0.06898	2.1791	0.2450
Average				16.2	391.5	388.7	8.1	0.03472	1.0967	0.1233
										0.9 g/hp-hr

MMBTU = 1052.9265 BTU/sft3 natural gas x ft3 of natural gas x 1 MMBTU/1,000,000 BTU

lb/MMBTU = NOx ppm x 0.0000001194 x 8710 x (20.9/20.9-Actual O2)

lb/MMBTU = THC (propane) ppm x 0.000000114 x 8710 x (20.9/20.9-Actual O2)

NMOC Results: After methane subtraction, if NMOC concentration is a negative value a MDL of 0.1 ppm was used for the results

Table 7: EUENGINE2 60% Torque / 100% Power CO Testing Summary

RWDI Project #2403298

Test ID	Date	Start	End	O ₂	CO	CO Emission Rate			Natural Gas Usage	
				%	ppm	lbs/mmBTU	lbs/hr	g/hp-hr	MMBTU/hr	ft ³ /hr
				Outlet	Outlet	Outlet	Outlet	Outlet		
1	2024-07-10	12:18	13:17	14.7	224.9	0.4790	7.57	1.418	15.8	15,000
2	2024-07-10	13:50	14:49	14.7	177.1	0.3799	6.00	1.040	15.8	15,000
3	2024-07-10	15:17	16:16	14.7	176.4	0.3776	5.96	1.017	15.8	15,000
Average				14.7	192.8	0.4122	6.51	1.159	15.8	15,000
										2.0 g/hp-hr

lb/MMBTU =CO ppm x 0.0000000726 x 8710 x (20.9/20.9-Actual O2)
MMBTU = 1052.965 BTU/sft3 natural gas x ft3 of natural gas x 1 MMBTU/1,000,000 BTU

Table 8: EUENGINE2 60% Torque and 100% Power NMOC Testing Summary

RWDI Project #2403298

Test ID	Date	Start	End	O ₂	THC (as propane)	CH ₄ (as Propane)	NMOC (as Propane)	NMOC Emission Rate		
				%	ppm	ppm	ppm	lbs/mmBTU	lbs/hr	g/hp-hr
				Outlet	Outlet	Outlet	Outlet	Outlet	Outlet	Outlet
1	2024-07-10	12:18	13:17	14.7	391.6	365.4	26.1	0.08741	1.3806	0.2588
2	2024-07-10	13:50	14:49	14.7	369.0	422.7	0.1	0.00034	0.0053	0.0009
3	2024-07-10	15:17	16:16	14.7	300.8	292.1	8.7	0.02917	0.4608	0.0786
Average				14.7	334.9	357.4	11.6	0.01475	0.2330	0.0398
										0.9 g/hp-hr

MMBTU = 1052.965 BTU/sft3 natural gas x ft3 of natural gas x 1 MMBTU/1,000,000 BTU

lb/MMBTU = NOx ppm x 0.0000001194 x 8710 x (20.9/20.9-Actual O2)

lb/MMBTU = THC (propane) ppm x 0.000000114 x 8710 x (20.9/20.9-Actual O2)

NMOC Results: After methane subtraction, If NMOC cocentration was a negative value a MDL of 0.1 ppm was used for the results.

Table 9: EUENGINE2 100% Torque and Power CO Testing Summary

RWDI Project #2403298

Test ID	Date	Start	End	O ₂	CO	CO Emission Rate			Natural Gas Usage	
				%	ppm	lbs/mmBTU	lbs/hr	g/hp-hr	MMBTU/hr	ft ³ /hr
				Outlet	Outlet	Outlet	Outlet	Outlet		
1	2024-07-10	16:43	17:42	17.1	135.6	0.4682	11.34	1.519	24.2	23,000
2	2024-07-11	5:23	6:22	16.8	152.3	0.4869	11.79	1.587	24.2	23,000
3	2024-07-11	6:53	7:52	16.7	148.4	0.4666	11.30	1.528	24.2	23,000
Average				16.8	145.4	0.4739	11.48	1.545	24.2	23,000
										2.0 g/hp-hr

lb/MMBTU = CO ppm x 0.0000000726 x 8710 x (20.9/20.9-Actual O₂)

MMBTU = 1052.965 BTU/sft³ natural gas x ft³ of natural gas x 1 MMBTU/1,000,000 BTU

Table 10: EUENGINE2 100% Torque / Power NOx and NMOC Testing Summary

RWDI Project #2403298

Test ID	Date	Start	End	O ₂	NO _x	NO _x Emission Rate			Natural Gas Usage	
				%	ppm	lbs/mmBTU	lbs/hr	g/hp-hr	MMBTU/hr	ft ³ /hr
				Outlet	Outlet	Outlet	Outlet	Outlet		
1	2024-07-10	16:43	17:42	17.1	54.9	0.3119	7.55	1.012	24.2	23,000
2	2024-07-11	5:23	6:22	16.8	55.4	0.2916	7.06	0.958	24.2	23,000
3	2024-07-11	6:53	7:52	16.7	59.6	0.3084	7.47	1.010	24.2	23,000
Average				16.7	57.5	0.3000	7.27	0.984	24.2	23,000
										1.3 g/hp-hr

Test ID	Date	Start	End	O ₂	THC (as propane)	CH ₄ (as Propane)	NMOC (as Propane)	NMOC Emission Rate		
				%	ppm	ppm	ppm	lbs/mmBTU	lbs/hr	g/hp-hr
				Outlet	Outlet	Outlet	Outlet	Outlet	Outlet	Outlet
1	2024-07-10	16:43	17:42	17.1	329.7	313.0	16.6	0.09023	2.1853	0.2928
2	2024-07-11	5:23	6:22	16.8	328.7	311.9	16.8	0.08449	2.0461	0.2776
3	2024-07-11	6:53	7:52	16.7	321.3	302.8	18.5	0.09125	2.2098	0.2988
Average				16.7	325.0	307.4	17.7	0.08787	2.1280	0.2882
										0.9 g/hp-hr

MMBTU = 1052.965 BTU/sft3 natural gas x ft3 of natural gas x 1 MMBTU/1,000,000 BTU

lb/MMBTU = NO_x ppm x 0.0000001194 x 8710 x (20.9/20.9-Actual O₂)

lb/MMBTU = THC (propane) ppm x 0.000000114 x 8710 x (20.9/20.9-Actual O₂)

NMOC Results: After methane subtraction, if NMOC concentration was negative value a MDL of 0.1 ppm was used

Table 11: EUENGINE3 100% Torque and Power CO Testing Summary

RWDI Project #2403864

Test ID	Date	Start	End	O ₂	CO	CO Emission Rate			Natural Gas Usage	
				%	ppm	lbs/mmBTU	lbs/hr	g/hp-hr	MMBTU/hr	ft ³ /hr
				Outlet	Outlet	Outlet	Outlet	Outlet		
1	2024-07-25	7:24	8:23	16.1	158.1	0.4350	13.68	1.416	31.5	30,000
2	2024-07-25	9:17	10:16	16.2	164.0	0.4661	14.66	1.534	31.5	30,000
3	2024-07-25	10:37	11:36	16.3	183.3	0.5290	16.64	1.796	31.5	30,000
Average				16.2	168.5	0.4767	14.99	1.582	31.5	30,000
										2.0 g/hp-hr

lb/MMBTU = CO ppm x 0.000000726 x 8710 x (20.9/20.9-Actual O₂)

MMBTU = 1048.5419 BTU/sft³ natural gas x ft³ of natural gas x 1 MMBTU/1,000,000 BTU

Table 12: EUENGINE3 100% Torque / Power NOx and NMOC Testing Summary

RWDI Project #2403864

Test ID	Date	Start	End	O ₂	NOx	NOx Emission Rate			Natural Gas Usage	
				%	ppm	lbs/mmBTU	lbs/hr	g/hp-hr	MMBTU/hr	ft ³ /hr
				Outlet	Outlet	Outlet	Outlet	Outlet		
1	2024-07-25	7:24	8:23	16.1	48.1	0.2178	6.85	0.709	31.5	30,000
2	2024-07-25	9:17	10:16	16.2	43.9	0.2053	6.46	0.678	31.5	30,000
3	2024-07-25	10:37	11:36	16.3	40.9	0.1941	6.10	0.659	31.5	30,000
Average				16.3	42.4	0.1997	6.28	0.668	31.5	30,000
										1.3 g/hp-hr

Test ID	Date	Start	End	O ₂	THC (as propane)	CH ₄ (as Propane)	NMOC (as Propane)	NMOC Emission Rate		
				%	ppm	ppm	ppm	lbs/mmBTU	lbs/hr	g/hp-hr
				Outlet	Outlet	Outlet	Outlet	Outlet	Outlet	Outlet
1	2024-07-25	7:24	8:23	16.1	281.7	263.0	18.8	0.08116	2.55	0.26
2	2024-07-25	9:17	10:16	16.2	293.5	290.1	3.4	0.01515	0.48	0.050
3	2024-07-25	10:37	11:36	16.3	323.3	311.0	12.3	0.05576	1.7541	0.1893
Average				16.3	308.4	300.6	7.8	0.03546	1.1153	0.1197
										0.9 g/hp-hr

MMBTU = 1048.5419 BTU/sft3 natural gas x ft3 of natural gas x 1 MMBTU/1,000,000 BTU

lb/MMBTU = NOx ppm x 0.0000001194 x 8710 x (20.9/20.9-Actual O2)

lb/MMBTU = THC (propane) ppm x 0.000000114 x 8710 x (20.9/20.9-Actual O2)

NMOC Results: After methane subtraction, if the NMOC showed a negative value a MDL of 0.1 ppm was used for the results.

FIGURES

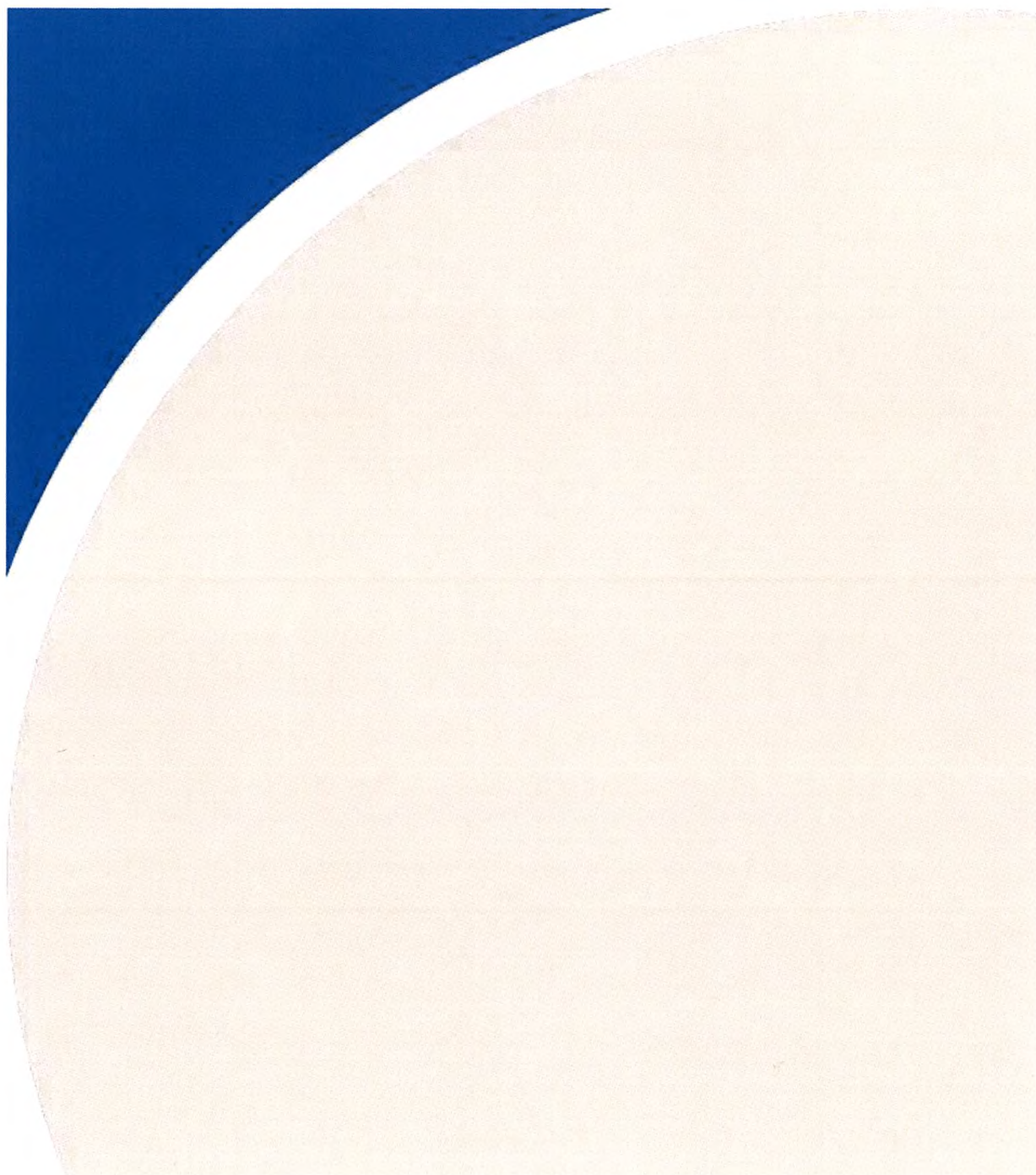
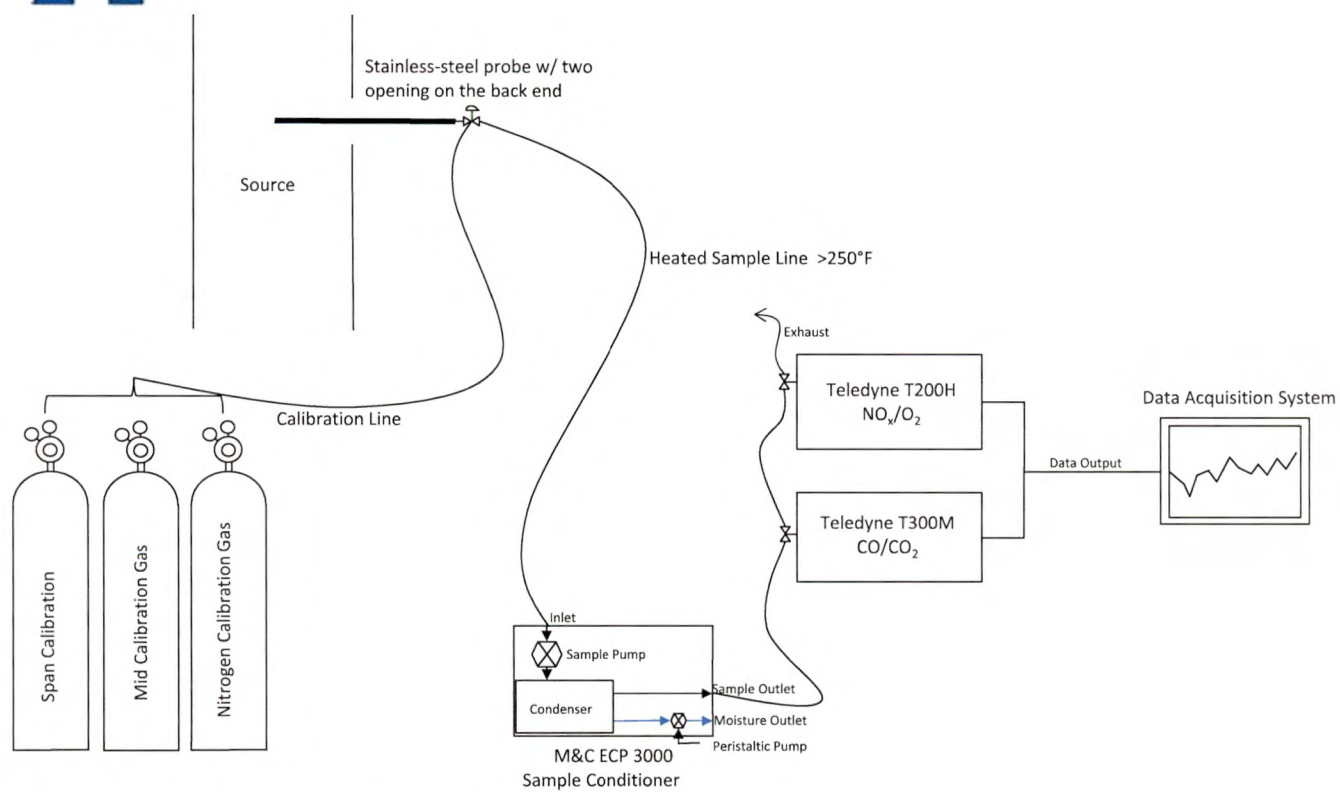




Figure No. 1: USEPA Method 3A,7E,10 Schematic



USEPA Method 3A,7E,10

DT Midstream

Washington 10

EUENGINE1-3

Washington Township, Michigan

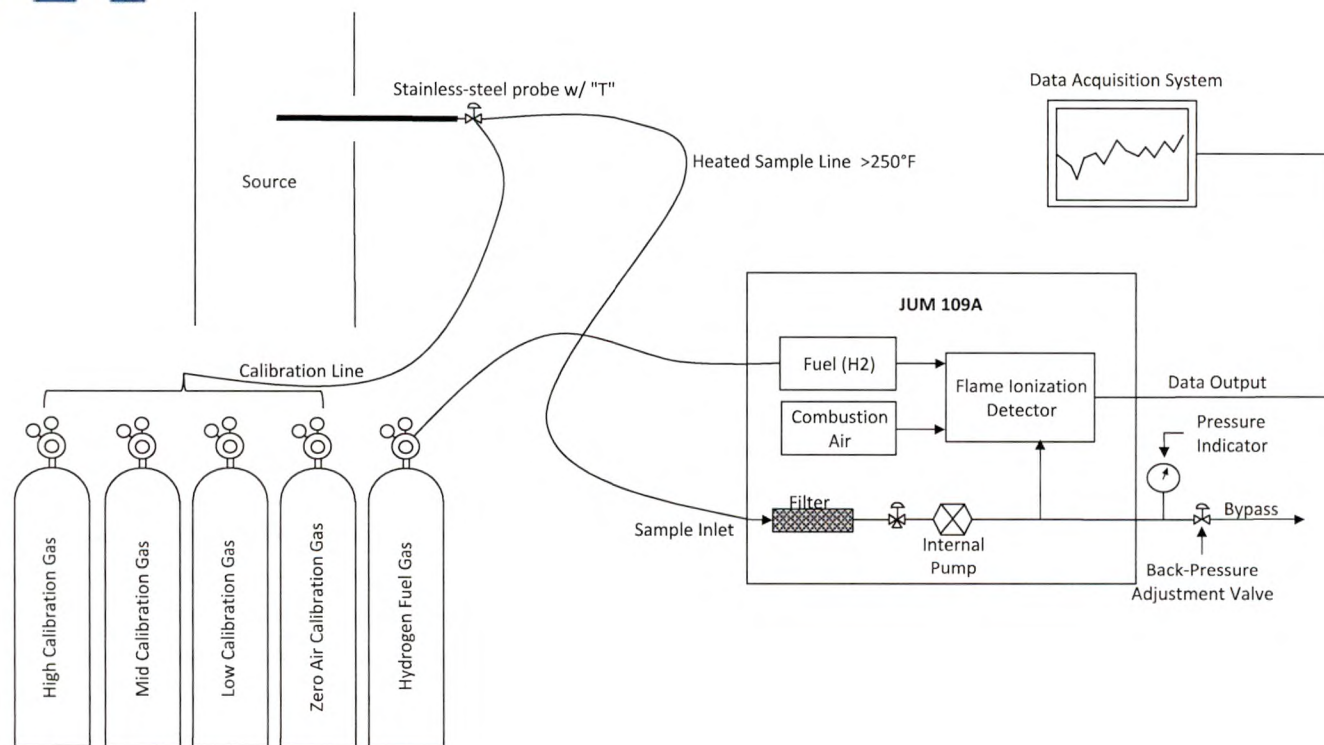
Project# 2403298

Date: 7/10-7/11 and 7/25, 2024





Figure No. 2: USEPA Method 25A Schematic



USEPA Method 25A

DT Midstream

Washington 10

EUENGINE1-3

Washington Township, Michigan

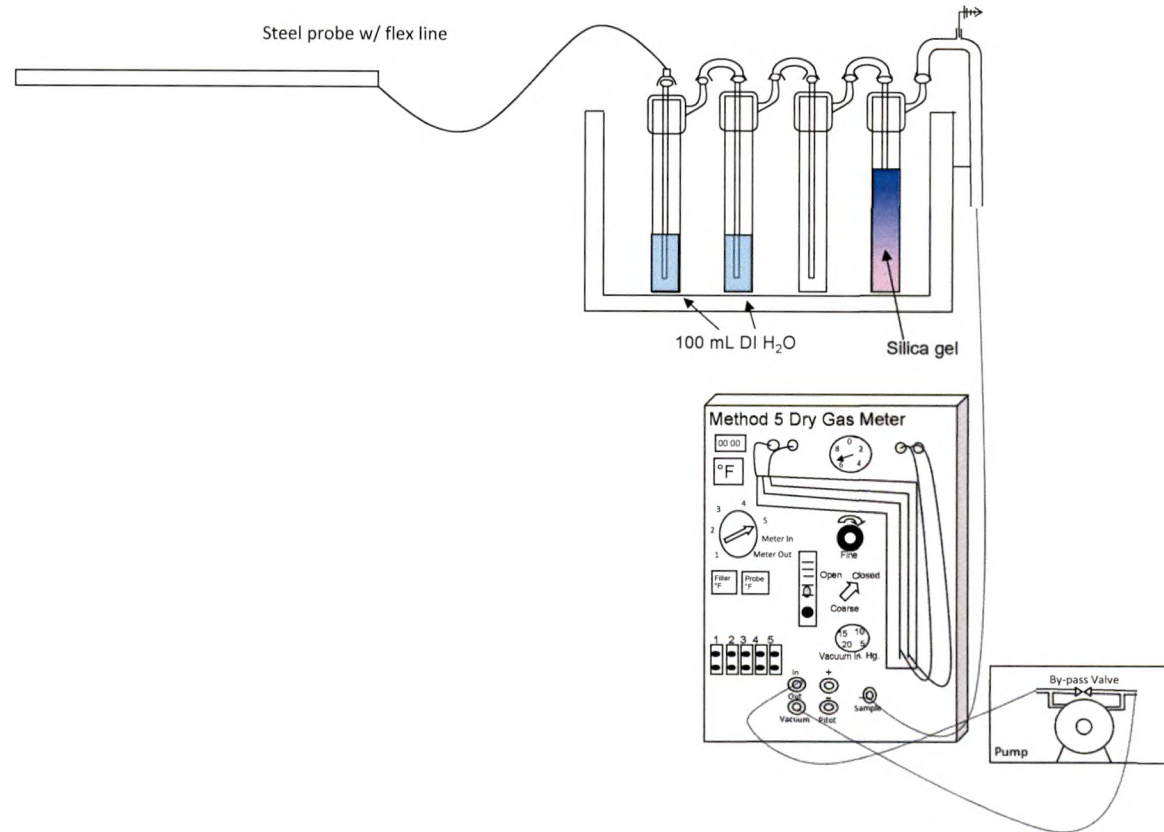
Project# 2403298

Date: 7/10 - 7/11 & 7/25, 2024





Figure No. 3: USEPA Method 4 Schematic



USEPA Method 4

DT Midstream

Washington 10 Compressor Station

EUENGINE1 to 3

Washington Township, MI

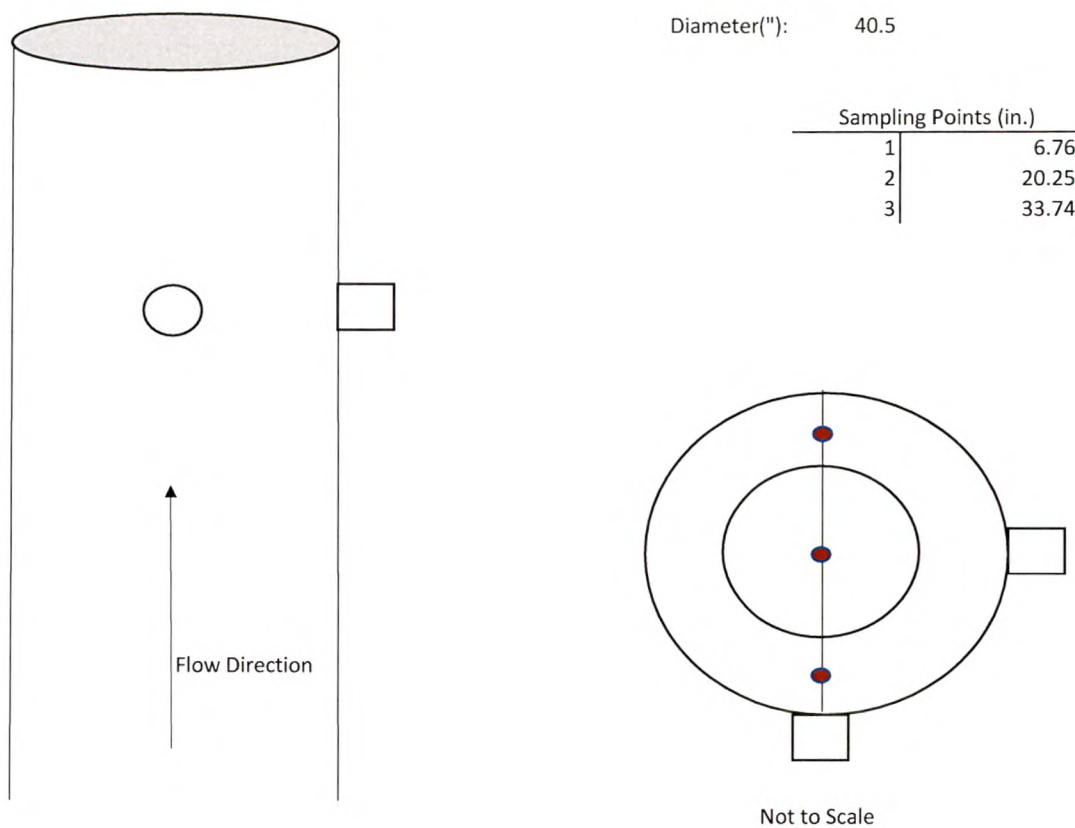
Project # 2403298

Date: 7/10 - 7/11 & 7/25, 2024





Figure No. 4: EUENGINES1-3 Stacks Schematic



EUENGINES1-3
DT Midstream
Washington 10
Washington Township, MI

Date:
July 10, 11, and 25, 2024

RWDI USA LLC
2239 Star Court
Rochester Hills, MI 48309