FINAL REPORT

GENERAL MOTORS, LLC

LAKE ORION, MICHIGAN

ORION ASSEMBLY PLANT
FGENGINES COMPLIANCE TESTING REPORT (EUENGINE1)

RWDI # 2409867

December 10, 2024

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EXECUTIVE SUMMARY

RWDI USA LLC (RWDI) was retained by the General Motors, LLC (GM) to complete the emission sampling program at the Orion Assembly Plant located at 4555 Giddings Road, Lake Orion, Michigan. GM operates an automotive assembly plant that operates under State of Michigan Department of Environment, Great Lakes, and Energy (EGLE) under Renewable Operating Permit (ROP) MI-ROP-B7227-2020a and Permit To Install (PTI) 124-22B and 40 CFR Part 60 Subpart JJJJ.

The objective of this testing program is to demonstrate compliance with total oxides of nitrogen (NO_x), carbon monoxide (CO), formaldehyde (CH_2O), NMEOC (VOCs on a propane equivalent basis, defined as non-methane/ethane hydrocarbons and excluding formaldehyde) and particulate matter (PM_{10}, $PM_{2.5}$) from one (1) of the five (5) landfill gas fired reciprocating internal combustion engines as noted in Flexible Group FGENGINES (EUENGINE1, EUENGINE2, EUENGINE3, EUENGINE4 and EUENGINE5).

Triplicate 120-minute tests were complete concurrently at the outlet of EUENGINE1. Testing for NO_x, CO, CH_2O, and NMEOC was conducted in unison with the Method 5/202 particulate matter tests so that the flow measurements from the particulate matter testing could be used for emission calculations.

EUENGINE1 was selected as the representative unit and the testing program was completed October 28th, 2024.

Executive Summary Table i: Emission Results – EUENGINE1

Source	Parameter	Emission Rates				
		Run 1	Run 2	Run 3	Average	Limit
EUENGINE1	NO_x	2.35 lb/hr 0.50 g/HP-hr	2.48lb/hr 0.53 g/HP-hr	2.38 lb/hr 0.50 g/HP-hr	2.40 lb/hr 0.51 g/HP-hr	2.97 lb/hr 2.0 g/HP-hr
	CO	9.58 lb/hr 2.04 g/HP-hr	9.81 lb/hr 2.09 g/HP-hr	9.45 lb/hr 2.00 g/HP-hr	9.61 lb/hr 2.04 g/HP-hr	17.3 lb/hr 3.5 g/HP-hr
	NMEOC (excluding CH_2O)	<0.004 lb/hr <0.001 g/HP-hr	<0.003 lb/hr <0.001 g/HP-hr	<0.003 lb/hr <0.001 g/HP-hr	<0.003 lb/hr <0.001 g/HP-hr	2.8 lb/hr 1.0 g/HP-hr
	CH_2O	1.31 lb/hr	1.48 lb/hr	1.31 lb/hr	1.37 lb/hr	2.1 lb/hr
	$PM_{10}/PM_{2.5}$	0.31 lb/hr	0.37 lb/hr	0.32 lb/hr	0.33 lb/hr	0.64 lb/hr

Note: "<" results from the removal of methane resulted in a negative concentration. 0.1 ppmv (wet) was used as Method Detection Limit (MDL) for emission calculations.

TABLE OF CONTENTS

1 INTRODUCTION 1
1.1 Location and Dates of Testing 1
1.2 Purpose of Testing 1
1.3 Description of Source 1
1.4 Sampling Locations Overview 2
1.5 Personnel Involved in Testing 2
2 SUMMARY OF RESULTS 3
2.1 Operating Data 3
2.2 Applicable Permit Number 3
3 SOURCE DESCRIPTION 3
3.1 Description of Process and Emission Control Equipment 3
3.2 Process Flow Sheet or Diagram (if applicable) 3
3.3 Type and Quantity of Raw and Finished Materials 3
3.4 Normal Rated Capacity of Process 3
3.5 Process Instrumentation Monitored During the Test 3
4 SAMPLING AND ANALYTICAL PROCEDURES 4
4.1 Description of Sampling Train and Field Procedures 4
4.1.1 Stack Velocity, Temperature, and Volumetric Flow Rate Determination 4
4.1.2 Sampling for O_2, CO_2, CO, NO_x, and CH_2O 4
4.1.3 Total Hydrocarbon / Methane / VOCs 7
4.1.4 Sampling for Particulate Matter (PM_{10}/$PM_{2.5}$) 8
4.2 Description of Recovery and Analytical Procedures 8
5 TEST RESULTS AND DISCUSSION 9
5.1 Process Upset Conditions During Testing 9
5.2 Maintenance Performed in Last Three Months 9
5.3 Audit Samples 9
5.4 Field Data Sheets 10
5.5 Calibration Sheets 10
5.6 Laboratory Data 10

LIST OF TABLES (IN REPORT)

Executive Summary Table i: Emission Results – EUENGINE1 ..... Executive Summary
Table 1.4: Summary of Stack Characteristics 2
Table 1.5: Testing Personnel 2
Table 5.1.1: Emission Results – EUENGINE1 9

LIST OF TABLES (TABLE TAB)

Table 1: Summary of Sampling Parameters and Methodology
Table 2: Sampling Summary
Table 3: EUENGINE1 Flow Measurements
Table 4: Summary of Emissions – EUENGINE1
Table 5: THC, Methane, and VOC Emissions
Table 6: EUENGINE1 Particulate Matter Results

FIGURES (REPORT)

Figure 4.1.2.1: MKS 2030 Multigas FTIR/ASC-10ST/Model 4710 Oxygen Analyzer Sampling System Schematic 5
Figure 4.1.2.2: Typical MKS 2030 Multigas FTIR and ASC-10ST Configuration 6

FIGURES (FIGURE TAB)

Figure 1: Schematic of EUENGINE1
Figure 2: USEPA Method 2 Schematic
Figure 3: USEPA Method 3A Schematic
Figure 4: USEPA Method 320 Schematic
Figure 5: USEPA Method 25A Schematic
Figure 6: USEPA Method 5/202 Schematic

LIST OF APPENDICES

Appendix A: Production Data

Appendix B: CEMS Data

- **Appendix B1:** FTIR Data – NO_X, CO, and CH_2O
- **Appendix B2:** VOC Data – Method 25A

Appendix C: Particulate Matter Data

Appendix D: Field Sheets

- **Appendix D1:** CEMS Data Sheets
- **Appendix D2:** Particulate Matter Data Sheets

Appendix E: Laboratory Data

- **Appendix E1:** Method 5 Data
- **Appendix E2:** Method 202 Data

Appendix F: Calibrations

Appendix G: Example Calculations

Appendix H: EGLE Correspondence and Source Testing Plan

1 INTRODUCTION

RWDI USA LLC (RWDI) was retained by the General Motors, LLC (GM) to complete the emission sampling program at the Orion Assembly Plant located at 4555 Giddings Road, Lake Orion, Michigan. GM operates an automotive assembly plant that operates under State of Michigan Department of Environment, Great Lakes, and Energy (EGLE) under Renewable Operating Permit (ROP) MI-ROP-B7227-2020a and 40 CFR Part 60 Subpart JJJJ.

The objective of this testing program is to demonstrate compliance with total oxides of nitrogen (NO_x), carbon monoxide (CO), formaldehyde (CH_2O), NMEOC (VOCs on a propane equivalent basis, defined as non-methane/ethane hydrocarbons and excluding formaldehyde) and particulate matter (PM_{10}, $PM_{2.5}$) from one (1) of the five (5) landfill gas fired reciprocating internal combustion engines as noted in Flexible Group FGENGINES (EUENGINE1, EUENGINE2, EUENGINE3, EUENGINE4 and EUENGINE5).

Triplicate 120-minute tests were complete concurrently at the outlet of EUENGINE1. Testing for NO_x, CO, CH_2O, and NMEOC was conducted in unison with the Method 5/202 particulate matter tests so that the flow measurements from the particulate matter testing could be used for emission calculations.

EUENGINE1 was selected as the representative unit and the testing program was completed October 28th, 2024.

1.1 Location and Dates of Testing

The test program was completed on October 28th 2024 at the General Motors Orion Assembly Plant located at 4555 Giddings Road, Lake Orion, Michigan 48359

1.2 Purpose of Testing

The purpose of the emissions test program was to verify emissions required by Michigan Department of Environment, Great Lakes, and Energy (EGLE) Renewable Operating Permit (ROP) MI-ROP-B7227-2020a and 40 CFR Part 60 Subpart JJJJ under FGENGINES.

1.3 Description of Source

The five engines covered under FGENGINES are reciprocating internal combustion engines that burn landfill gas to produce electricity.

1.4 Sampling Locations Overview

The sampling location for EUENGINE1 is located outside the building which houses the engines. **Figures Section** outlines the stack diameters and upstream and downstream distances to flow disturbances. The sampling point selection and stratification test (using Oxygen (%) as diluent) was performed in accordance with EPA Reference Method 7E section 8.1.2. (applicable to instrumental analyzer methods). For the testing, it was decided to complete 3 points along the center line of the duct during each test run. Each point was maintained in position for 20 minutes. Sampling points were at 2.6". 7.75" and 12.9".

Table 1.4.1: Summary of the Stack Characteristics

Source	Parameter	Diameter	Approximate Duct Diameters from Flow Disturbance		Number of Ports	Points per Traverse	Total Points per Test
			Downstream (in/dia,)	Upstream (in/dia.)			
EUENGINE1	O_2, CO_2, CO, NOx, and CH_2O	15.5"	7.7 dia. / 120"	3.7 dia./58"	1	3 CEMs	3 CEMs
	THC/ Methane/ VOC				1	1 Total (Centroid of stack)	
	$PM_{10}/PM_{2.5}$				2	8	16

1.5 Personnel Involved in Testing

Table 1.5: Testing Personnel

Personnel	Company	Contract Information
Charles Kessler Environmental Supervisor	**GM Orion Assembly** 4555 Giddings Road Lake Orion, MI 48359	(248) 883-2629 Charles.Kessler@gm.com
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2 SUMMARY OF RESULTS

2.1 Operating Data

GM personnel monitored the process during the testing. All process data can be found in **Appendix A**.

2.2 Applicable Permit Number

GM Orion Assembly operates under Renewable Operating Permit (ROP) MI-ROP-B7227-2020a and 40 CFR Part 60 Subpart JJJJ under FGENGINES.

3 SOURCE DESCRIPTION

3.1 Description of Process and Emission Control Equipment

Refer to Section 1.3.

3.2 Process Flow Sheet or Diagram (if applicable)

Process flow diagram can be provided upon request.

3.3 Type and Quantity of Raw and Finished Materials

Landfill gas is combusted to produce electricity.

3.4 Normal Rated Capacity of Process

Testing was completed under normal operating conditions (greater than 90%). Each engine has a rated capacity of 2,242 BHP.

3.5 Process Instrumentation Monitored During the Test

General Motors personnel measured natural gas used (scf), power generated (kW), and operating hours.

4 SAMPLING AND ANALYTICAL PROCEDURES

4.1 Description of Sampling Train and Field Procedures

4.1.1 Stack Velocity, Temperature, and Volumetric Flow Rate Determination

The exhaust velocities and flow rates were determined following the US EPA Method 2, "Determination of Stack Gas Velocity and Flow Rate (Type S Pitot Tube)". Velocity measurements were taken with a pre-calibrated S-Type pitot tube and incline manometer. Volumetric flow rates were determined following the equal area method as outlined in US EPA Method 2. Temperature measurements were made simultaneously with the velocity measurements and were conducted using a chromel-alumel type "k" thermocouple in conjunction with a digital temperature indicator. A schematic of the sampling system setup is depicted in **Figure 2.**

The dry molecular weight of the stack gas was determined following calculations as per Equation 3-1 outlined in US EPA Method 3A, "Determination of Molecular Weight of Dry Stack Gas". Carbon dioxide and stack moisture content was determined using an extractive Fourier Transform Infrared (FTIR) spectroscopy and according to US EPA Method 320, "Measurement of Vapor Phase Organic and Inorganic Emissions by Extractive Fourier Transform Infrared (FTIR Spectroscopy)".

4.1.2 Sampling for O_2, CO_2, CO, NO_x, and CH_2O

Emissions testing was performed at the outlet of the exhaust stack. Each test was 120-minutes in length. Pollutant concentrations were determined utilizing RWDI's continuous emissions monitoring (CEM) system which consists of the FTIR and oxygen analyzer (measuring on wet basis).

Stack gas concentrations for NO_x, CO, CH_2O, H_2O and O_2 were measured using EPA Reference Methods 320 and 3A.

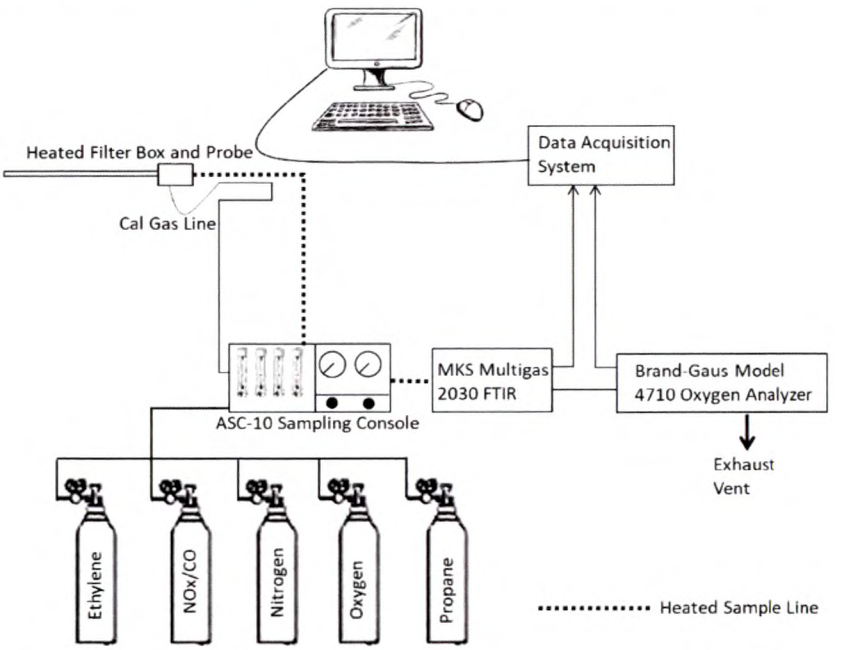
Oxygen measurements were taken continuously following US EPA Method 3A on the outlet. Stratification checks using O_2 as the surrogate for all pollutants, was completed on the engine exhaust at three points (16.7%, 50% and 83.3% of inner diameter) on a line passing through the centroidal area, as per the alternative approach in EPA Method 7E Section 8.1.2.

The compliance test consisted of three 120-minute tests at normal operating conditions as defined by GM. Regular performance checks on the CEM were carried out by zero and span calibration checks on the oxygen analyzer and necessary QA procedures on the FTIR using US EPA Protocol calibration gases. These checks verified the ongoing precision of the FTIR with time by introducing pollutant-free (zero) air followed by known calibration gas (span) into the FTIR. The response of the monitor to pollutant-free air and the corresponding sensitivity to the span gases was reviewed frequently as an ongoing indication of analyzer performance.

Monitoring was conducted by drawing a sample stream of flue gases through a stainless-steel probe attached to a heated filter and a heated sample line that is attached to the MAX Analytical ASC-10ST sampling console. Lengths of

unheated sample line were kept to a minimum and insulated. The ASC-10ST sampling console delivers a continuous sample to the MKS MultiGas 2030 FTIR and oxygen analyzer for analysis. The heated filter and line were maintained at approximately 191°C (375°F) and the MKS MultiGas 2030 FTIR and ASC-10ST gas components were kept at 191°C (375°F). The end of the probe was connected to a heated Teflon sample line, which delivered the sample gases from the stack to the FTIR system. The heated sample line is designed to maintain the gas temperature at approximately 375°F to prevent condensation of stack gas moisture within the line and condition air to the same temperature as the FTIR. A schematic of the sampling system setup is depicted in **Figure 4.1.2.1.**

Figure 4.1.2.1: MKS 2030 Multigas FTIR/ASC-10ST/Model 4710 Oxygen Analyzer Sampling System Schematic



The ASC-10ST was used to deliver calibration gases (Calibration Transfer Standard (CTS), QA Spike and Nitrogen) to the FTIR in direct (to analyzer) and system (to probe) modes.

A laptop computer was utilized for operating the MKS MultiGas 2030 FTIR and MAX Analytical ASC-10ST sampling console and logging the multi-gas FTIR data. Data was logged as one-minute averages for the actual test period (FTIR PRN files and Spectra). All concentration data was determined using the MKS 2030 MultiGas FTIR software. A typical MKS 2030 FTIR and ASC-10 ST configuration is depicted in **Figure 4.1.2.2.**

For oxygen measurement only, prior to testing, a 3-point analyzer calibration error check was conducted using US EPA 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 is within ±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 ±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 ±3% throughout a test run. The analyzer measured the respective gas concentrations on a wet volumetric basis which were converted to a dry volumetric number.

Figure 4.1.2.2: Typical MKS 2030 Multigas FTIR and ASC-10ST Configuration

4.1.3 Total Hydrocarbon / Methane / VOCs

The concentration of total hydrocarbon was determined using US EPA Reference Method 25A, *"Determination of Total Gaseous Organic Concentration Using a Flame Ionization Analyzer"*. Continuous samples of the stack gas were extracted and analyzed with flame ionization analyzers (FIA's). The sample gas was delivered to the analyzers through sampling systems that consist of heat traced, Teflon sample lines and stainless-steel probes. The temperature of the sample lines was set to 250°F or greater. The FIA output signals were recorded continuously and logged at 1-minute intervals on an internal data acquisition system.

The concentration of methane was monitored using the principles of US EPA Reference Method 25A, *"Determination of Total Gaseous Organic Concentration Using a Flame Ionization Analyzer"*. Continuous samples of the stack gas were extracted and analyzed with a JUM Model 109A flame ionization analyzer (FIA). The FIA is equipped with a heated catalyst that converts non-methane hydrocarbons to CO2 and allows methane to pass through to the detector. The detector was calibrated with Protocol 1 standards of methane in air to determine linearity and analyzer drift. Method 25A for methane was run in parallel with the THC (as propane) and methane (converted to a propane response) was subtracted from outlet of the unit.

The FIA's were calibrated as specified in the Reference Method with ultra-zero air (< 0.1 ppm THC), low-level, mid-level, and high-level mixtures of propane or methane in air. The calibration standards were certified by US EPA Protocol 1 *"Traceability Protocol for Establishing True Concentrations of Gases Used for and Audits of Continuous Source Emission Monitors"*. The span was defined as the span selected on the analyzer (i.e. 0-100 ppm, 0-1,000 ppm etc.). Prior to the first test and each subsequent test, the linearity of the sampling system was established by introducing the high-level span gas and zero gas through the sampling system to the analyzer and making the necessary adjustments. The mid-level and the low-level calibration gas was then introduced to each sampling system to check for calibration error. The measurement system response time was also be determined at this time. After each test, the sampling system and analyzer response to zero air and the midlevel span gas was checked to determine drift.

The calibration standards were prepared using a gas dilution system. Gas standards from cylinders certified by US EPA Protocol 1 *"Traceability Protocol for Establishing True Concentrations of Gases Used for Calibration and Audits of Continuous Source Emission Monitors"* were be diluted with zero air. The gas dilution system was verified in the field using USEPA Method 205, *"Verification of Gas Dilution Systems for Field Instrument Use"*. For analyzer calibrations, calibration gases were mixed to desired concentrations using an Environics Series 4040 Computerized Gas Dilution System. The Series 4040 consists of a single chassis with four mass flow controllers. 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. A field quality assurance check of the system was performed pursuant to Method 205 by setting the diluted concentration to a value identical to a Protocol 1 calibration gas and then verifying that the analyzer response is the same with the diluted gas as with the Protocol 1 gas.

Each flame ionization analyzer (FIA) was calibrated with propane and/or methane calibration gases. The sampling probe of each analyzer was inserted into the appropriate duct port. Airflows were measured during the particulate matter testing. Three (3) two-hour (2) periods were monitored while the unit was operating at normal load.

4.1.4 Sampling for Particulate Matter ($PM_{10}/PM_{2.5}$)

Sampling for particulate matter ($PM_{10}/PM_{2.5}$) was performed in accordance with US EPA Method 5, "Determination of Particulate Matter Emissions from Stationary Sources", and US EPA Method 202, "Dry Impinger Method for Determining Condensable Particulate Emissions from Stationary Sources". The Method 5 filter was kept at the method stated 248°F, and the back half consisted of Method 202, in which the CPM filter was kept between 65°F and 85°F. An additional modification to the methodology involved the use of flex lines due to location of the sampling ports.

All samples were recovered in accordance with the above methodologies and submitted to RWDI for the Method 5 analysis and ALS Global Laboratories in Burlington, Ontario for the Method 202 analysis.

4.2 Description of Recovery and Analytical Procedures

All sample recovery and analytical procedures following the prescribed methods of US EPA Method 1 to 5 and 202. Upon completion of each test, a leak was performed to ensure a leak-free system. The probe, filter, and moisture train are disconnected and capped for transport to a recovery area. The stainless-steel steel nozzle and probe were rinsed and brushed six (6) times with acetone into a sample jar. The front half of the filter holder were rinsed and brushed three (3) times with acetone into the same sample jar. The filter was removed from the filter holder and placed into a clean petri-dish. The impingers were weighed to determine moisture content. The first two (2) impingers and CPM filter holder were then recovered following US EPA Method 202 which included, 1-hour purge with nitrogen, followed by two (2) rinses of deionized water and collected in a separate jar, followed by one (1) rinses of acetone and two (2) rinses of hexane and collected together in a separate jar. The 1st test sampling train was also recovered twice for the additional recovery blank quality assurance sample. The acetone sample and filter petri-dish were then sealed shut and transported to RWDI's in-house laboratory where they were analyzed gravimetrically for PM. The CPM filter, deionized water and acetone/hexane collection from the back half was sent to ALS Global Laboratory in Burlington, Ontario for analysis.

5 TEST RESULTS AND DISCUSSION

The following tables give a summary of the testing complete at GM Orion Assembly. More detailed data for the CEMS testing can be found in **Appendix B**, and detailed Particulate Matter results are in **Appendix C**.

Table 5.1: Emission Results – EUENGINE1

Source	Parameter	Emission Rates				
		Run 1	Run 2	Run 3	Average	Limit
EUENGINE1	NO_X	2.35 lb/hr 0.50 g/HP-hr	2.48lb/hr 0.53 g/HP-hr	2.38 lb/hr 0.50 g/HP-hr	2.40 lb/hr 0.51 g/HP-hr	2.97 lb/hr 2.0 g/HP-hr
	CO	9.58 lb/hr 2.04 g/HP-hr	9.81 lb/hr 2.09 g/HP-hr	9.45 lb/hr 2.00 g/HP-hr	9.61 lb/hr 2.04 g/HP-hr	17.3 lb/hr 3.5 g/HP-hr
	NMEOC (excluding CH_2O)	<0.004 lb/hr <0.001 g/HP-hr	<0.003 lb/hr <0.001 g/HP-hr	<0.003 lb/hr <0.001 g/HP-hr	<0.003 lb/hr <0.001 g/HP-hr	2.8 lb/hr 1.0 g/HP-hr
	CH_2O	1.31 lb/hr	1.48 lb/hr	1.31 lb/hr	1.37 lb/hr	2.1 lb/hr
	$PM_{10}/PM_{2.5}$	0.31 lb/hr	0.37 lb/hr	0.32 lb/hr	0.33 lb/hr	0.64 lb/hr

Note: "<" results from the removal of methane resulted in a negative concentration. 0.1 ppmv (wet) was used as Method Detection Limit (MDL) for emission calculations.

5.1 Process Upset Conditions During Testing

There were no interruptions to the process during testing.

5.2 Maintenance Performed in Last Three Months

Only routine maintenance has been performed within the last three months.

5.3 Audit Samples

This test did not require any audit samples.

5.4 Field Data Sheets

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

5.5 Calibration Sheets

Calibration sheets can be found in **Appendix F**.

5.6 Laboratory Data

Laboratory data can be found in **Appendix E**.

TABLES

Table 1: Summary of Sampling Parameters and Methodology

Source Location	No. of Tests	Sampling Parameter	Sampling Method
EUENGINE1	3	Velocity, Moisture, Temperature and Flow Rate	U.S. EPA[1] Methods 1, 2, 3A, 4 and 320
		Oxygen	U.S. EPA [1] Method 3A
		Nitrogen Oxides, Carbon Monoxide, Formaldehyde, Carbon Dioxide	U.S. EPA [1] Method 320
		Volatile Organic Compounds	U.S. EPA [1] Method 25A
		Filterable Particulate Matter	U.S. EPA [1] Method 5
		Condensable Particulate Matter	U.S. EPA [1] Method 202

Notes:

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

Table 2: Sampling Summary

Unit	Test #	Sampling Date	Start Time	End Time
EUENGINE1	Test #1	28-Oct-24	8:50 AM	11:00 AM
	Test #2	28-Oct-24	12:00 PM	2:06 PM
	Test #3	28-Oct-24	2:50 PM	4:54 PM

Table 3: EUENGINE1 Flow Measurements

GM Orion Assembly Plant

Facility: GM Orion Assembly Plant
City: Lake Orion, MI
Source: EUENGINE1

Parameter	Units	Test 1	Test 2	Test 3	Average
Stack Gas Temperature	°F	949.2	947.8	947.1	948.0
Stack Gas Moisture	%	11.8	10.6	9.9	10.77
Velocity	ft/sec	178.0	180.7	176.0	178.2
Actual Flowrate	acfm	13,993	14,204	13,839	14,012
Dry Reference Flowrate	dscfm	4,493	4,627	4,548	4,556
Dry Reference Flowrate	m^3/s	2.12	2.18	2.15	2.15

Table 4: Summary of Emissions - EUENGINE1

GM Orion Assembly Plant

Facility: GM Orion Assembly Plant
City: Lake Orion, MI
Source: EUENGINE1
Date: 10/28/2024

	Symbol	Units	Test 1	Test 2	Test 3	Average	Limits
Nitrogen Oxides Concentration	NO_x	ppmvd	73.39	74.98	73.32	73.90	-
Carbon Monoxide Concentration	CO	ppmvd	490.30	487.78	477.90	485.33	-
Formaldehyde Concentration	HCOH	ppmvd	62.62	68.51	61.69	64.27	
Oxygen Concentration	O_2	$\%_{wet}$	6.84	6.89	7.35	7.03	-
Oxygen Concentration	O_2	$\%_{dry}$	7.58	7.69	8.11	7.79	-
Nitrogen Oxides Emission Rate	NO_x	pph	2.35	2.48	2.38	2.40	2.97
Carbon Monoxide Emission Rate	CO	pph	9.58	9.81	9.45	9.61	17.3
Formaldehyde Emission Rate	CH2O	pph	1.31	1.48	1.31	1.37	2.1
Nitrogen Oxides Concentration	NO_x	g/HP-hr	0.50	0.53	0.50	0.51	2.0
Carbon Monoxide Concentration	CO	g/HP-hr	2.04	2.09	2.00	2.04	3.5

Table 5: THC, Methane and VOC EMISSIONS TABLE

Source: EUENGINE1
RWDI Project: 2409867

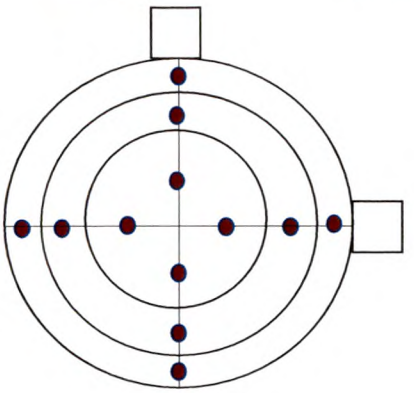
Parameter	Test 1	Test 2	Test 3	Average	ROP Limit
Date	28-Oct-24	28-Oct-24	28-Oct-24	--	--
Start Time:	8:50 - 9:50	12:00 - 13:00	14:50 -15:50	--	--
Stop Time:	10:00 - 11:00	13:06 - 14:06	15:56 - 16:55	--	--
Duration (mins):	120	120	120	--	--
Flowrate (scfm):	4,493	4,627	4,548	4,556	--
Moisture:	11.8%	10.6%	9.9%	10.8%	--
THC Concentration (as propane) ppm(wet):	381.8	431.7	450.3	421.3	--
CH4 Concentration (as methane) ppm(wet):	928.4	1048.0	1063.2	1013.2	--
Methane Concentration (as Propane) ppm(wet)	421.3	489.8	494.5	468.5	--
VOC Concentration (minus methane) ppm (wet)	<0.10	<0.10	<0.10	<0.10	--
VOC Concentration (minus methane) ppm (dry)	<0.11	<0.11	<0.11	<0.11	--
VOC Concentration (as propane) lb/hr:	<0.0035	<0.0032	<0.0031	<0.0033	2.8
Engine Power (hp):	2,131	2,126	2,139	2,132	--
VOC Emission Rate (g/hp-hr)	<0.0007	<0.0007	<0.0007	<0.0007	1.0
Response Factor	2.20	2.14	2.15	2.16	--

Table 6: EUENGINE1 Particulate Matter Results

Company		GM Lake Orion			
Source		FG Engine 1			
Date		28-Oct-24	28-Oct-24	28-Oct-24	
Test Number		Test 1	Test 2	Test 3	Average
Start Time		8:50	12:00	14:50	-
End Time		11:00	14:06	16:54	-
Stack Information					
Flow Rate (ft^3/min) (Actual)		13,993	14,204	13,839	14,012
Flow (ft^3/min) (Standard Wet)		5,095	5,177	5,046	5,106
Flow (ft^3/min) (Standard Dry)		4,493	4,627	4,548	4,556
Flow (m^3/min) (Standard Dry)		127	131	129	129
Particulate Results					
Nozzle/Probe/Filter Weight (mg)		1.8	2.7	2.2	2.2
Organic Condensable Particulate (mg)		1.7	2.5	2.2	2.1
Inorganic Condensable Particulate (mg)		39.9	44.1	38.5	40.8
Condensable Blank Correction (mg)		0.9	0.9	0.9	0.9
Total Particulate (mg)		42.5	48.4	42.0	44.3	***ROP Limit***
Total Particulate Emission Rate (lb/hr)		0.31	0.37	0.32	0.33	0.64

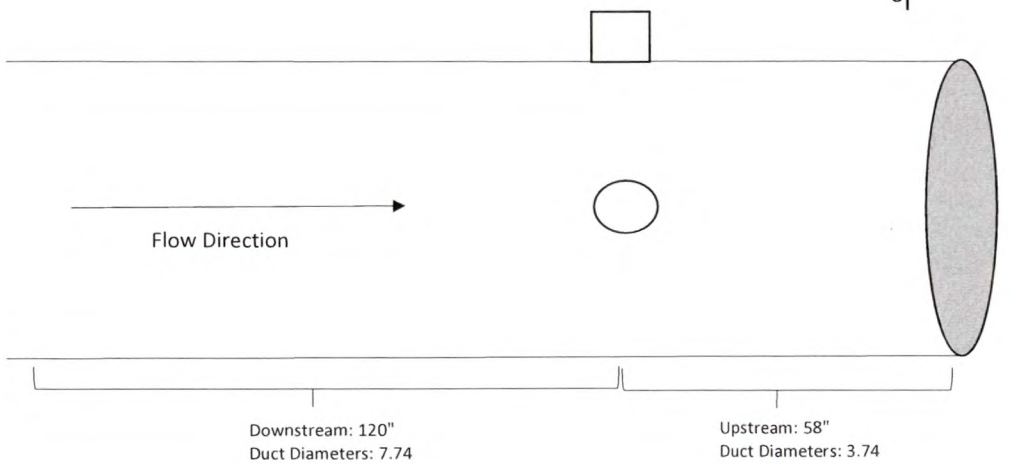
FIGURES

Figure No. 1: USEPA Method 1 Schematic



Diameter ("): 15.5

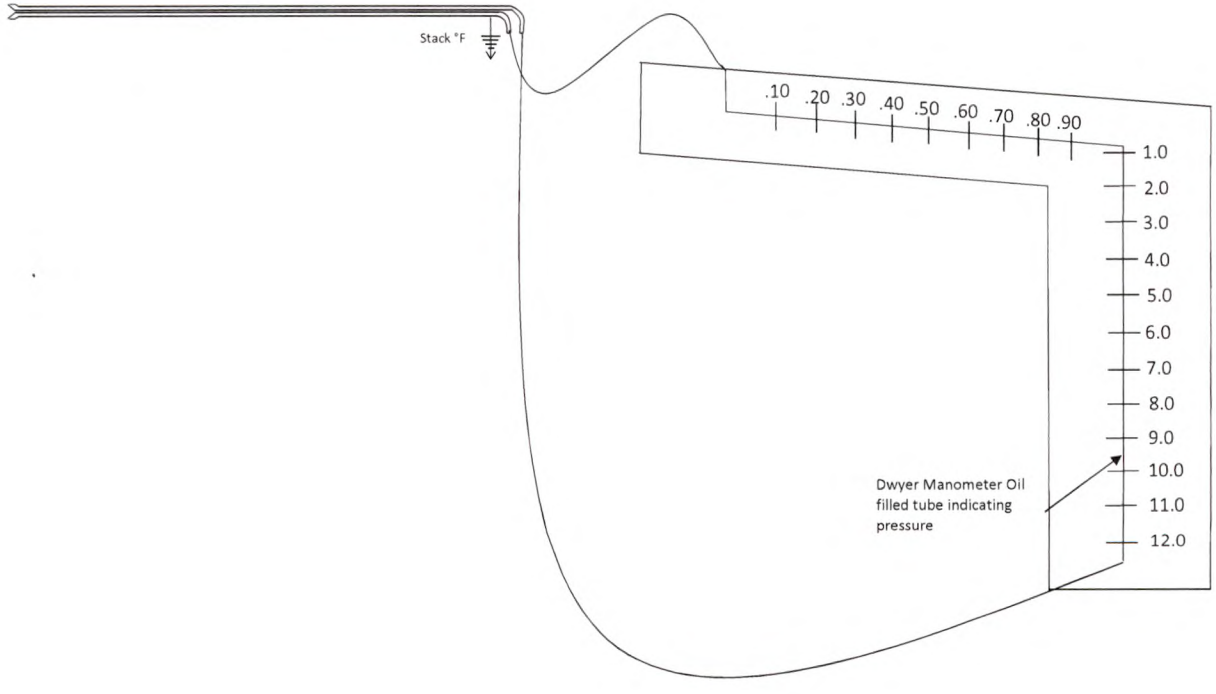
Sampling Points (in.)	
1	0.50
2	1.63
3	3.01
4	5.01
5	10.49
6	12.49
7	13.87
8	15.00



EUENGINE1
General Motors, LLC
Orion Assembly Plant
Lake Orion, MI

Date: 10/28/2024

RWDI USA LLC
24445 Forterra Dr
Warren, MI 48089



USEPA Method 2

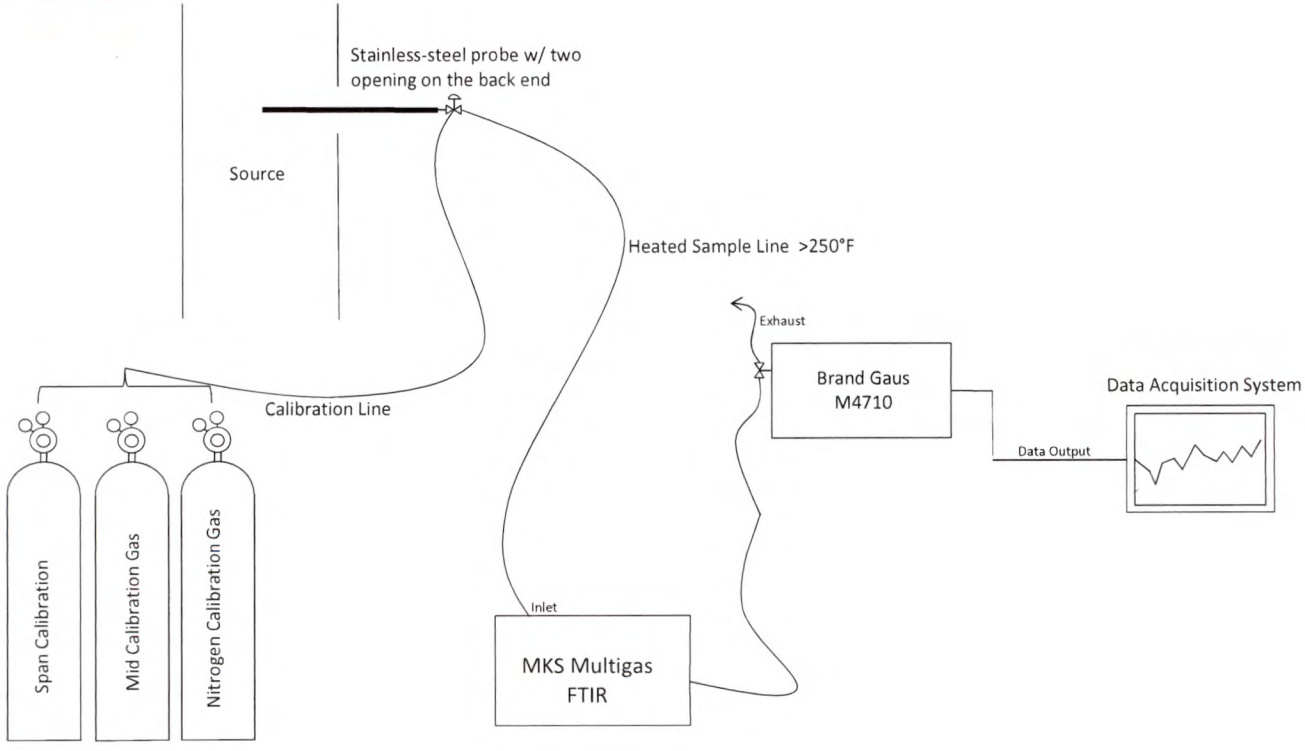
General Motors, LLC
Orion Assembly Plant
EUENGINE1
Lake Orion, Michigan

Project #2409867

Figure No. 2
USEPA Method 2 Schematic

Date: October 28, 2024

Figure No. #3: USEPA Method 3A Schematic



USEPA Method 3A

General Motors, LLC

EUENGINE1

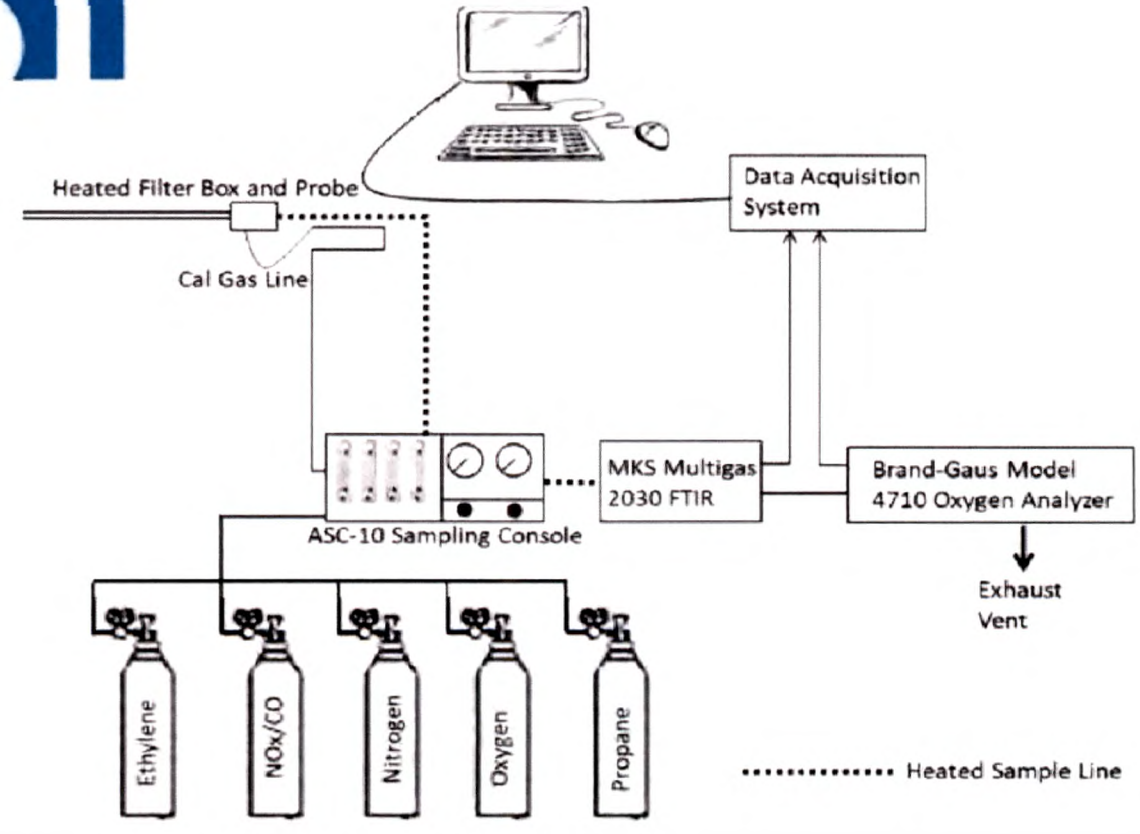
Orion Assembly Plant

Lake Orion, MI

Project #: 2409867

Date: October 28, 2024

Figure No. #4 USEPA Method 320 Schematic



USEPA Method 320

General Motors, LLC

Orion Assembly Plant

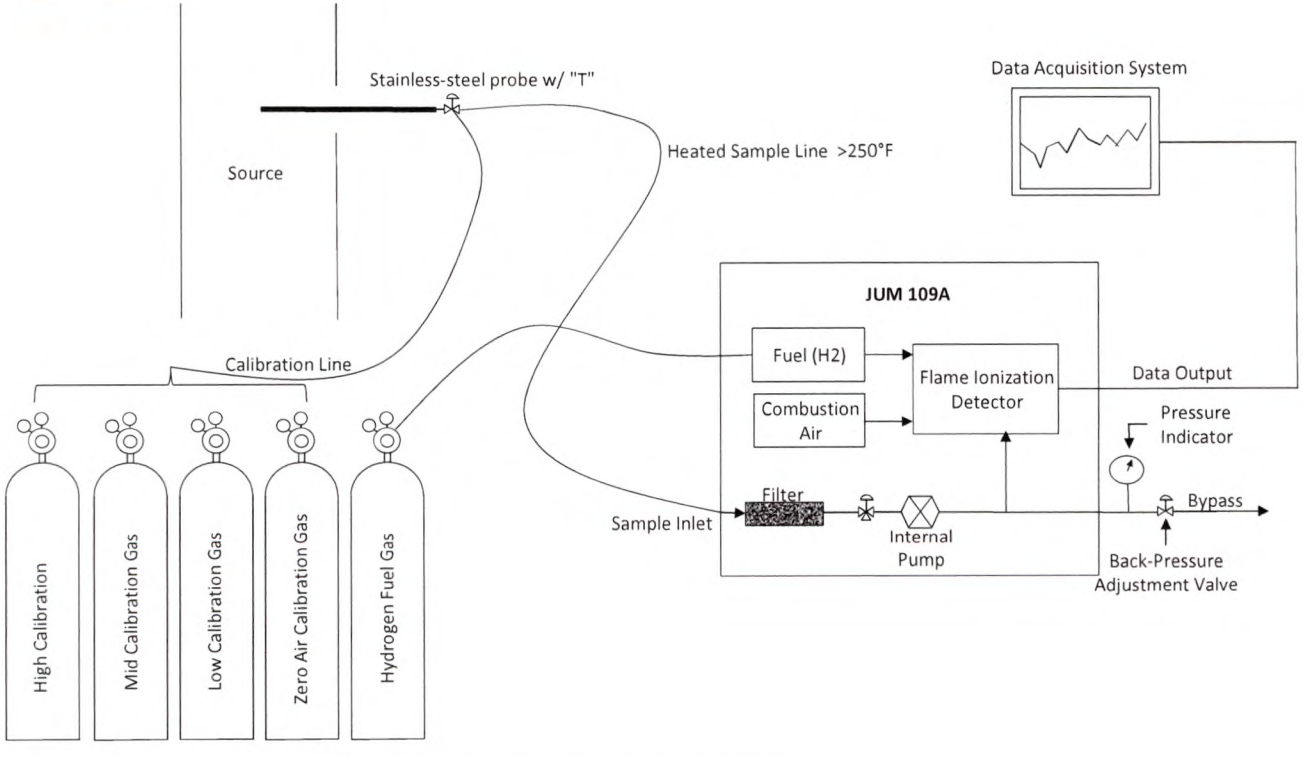
EUENGINE1

Lake Orion, MI

Project #: 2409867

Date: October 28, 2024

Figure No. 5: USEPA Method 25A Schematic



USEPA Method 25A

General Motors, LLC

Orion Assembly Plant

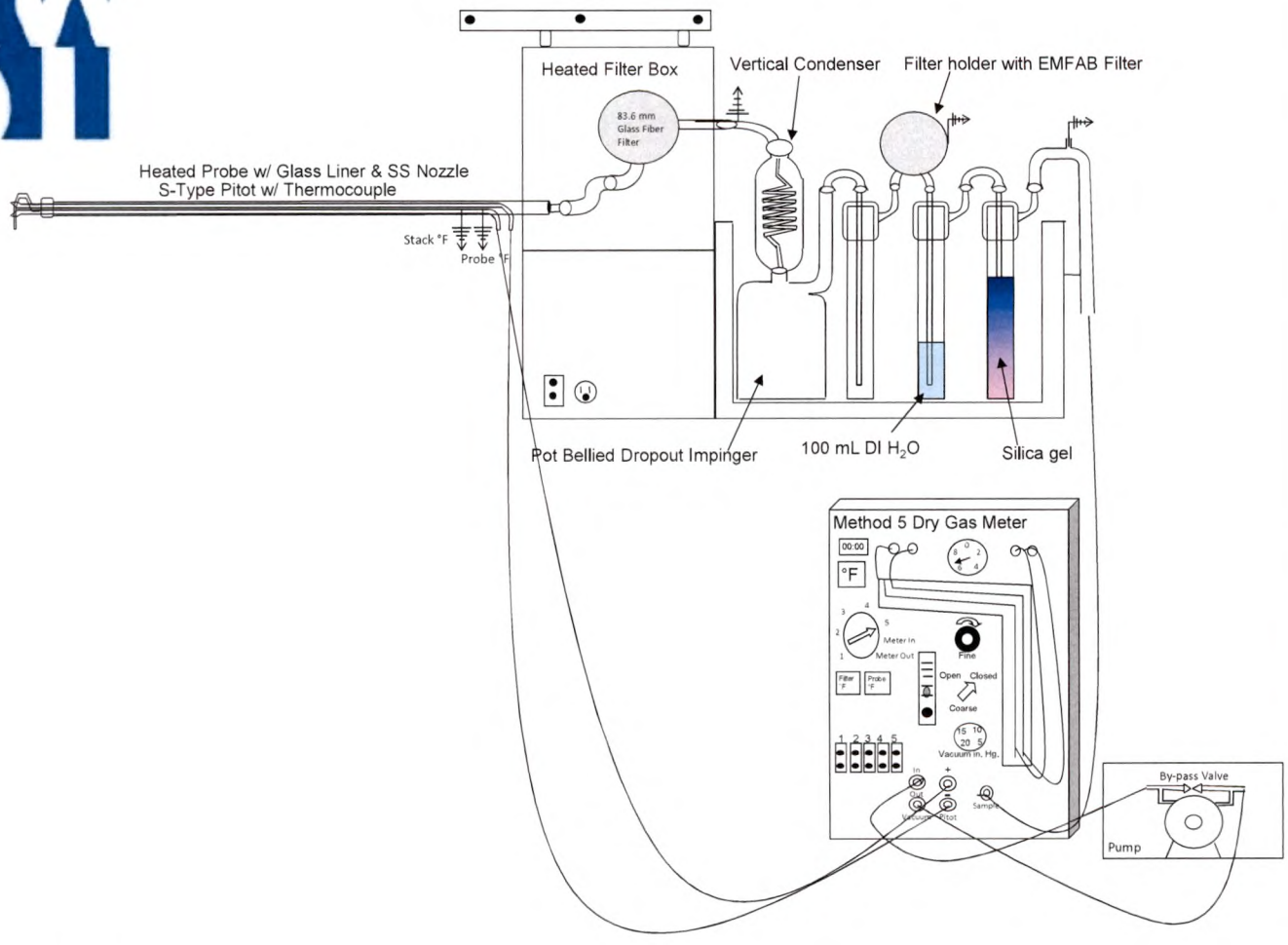
EUENGINE1

Lake Orion, MI

Project# 2409867

Date: Oct. 28, 2024

Figure No. #6 USEPA Method 5/202 Schematic



USEPA Method 5/202

General Motors, LLC
Orion Assembly Plant
EUENGINE1
Lake Orion, MI

Project #: 2409867

Date: October 28, 2024