COMPLIANCE STACK EMISSION TEST REPORT

PAINT SHOP (FG-FACILITY)

Determination of Volatile Organic Compound Destruction Efficiency

Utilizing US EPA Methods 1, 2, 3, 4 wb/db, 4, and 25A

Test Date(s): August 27-28, 2019
State Registration Number: B7227
Facility Name: General Motors LLC - Orion Assembly Plant
Source Location: Lake Orion, Michigan
Permit: EGLE Renewable Operating Permit
No. MI-ROP-B7227-2015c

Prepared For:

General Motors LLC
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Test Plan: 049AS-579527-PP-8

ACCREDITED TO ASTM D7036 ONLY CERT #3925.01

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TEST RESULTS SUMMARY

Source Name:	**Paint Shop**
Source ID Number:	**FG-FACILITY**
Control Device:	**Regenerative Thermal Oxidizer (RTO)**
Test Date:	**August 27-28, 2019**
Sampling Locations:	**RTO Inlet (Booth), RTO Inlet (Oven), RTO Combined Inlet Duct, and RTO Outlet**
VOC Destruction Efficiency (%)	**96.4**
Average VOC Emissions (lb/hr as propane) - Inlet	**79.7**
Average VOC Emissions (lb/hr as propane) - Outlet	**2.8**
Permit No.	**EGLE Renewable Operating Permit No. MI-ROP-B7227-2015c**

REVIEW AND CERTIFICATION

The results of the Compliance Test conducted on August 27-28, 2019 are a product of the application of the United States Environmental Protection Agency (US EPA) Stationary Source Sampling Methods listed in 40 CFR Part 60, Appendix A, that were in effect at the time of this test.

All work, calculations, and other activities and tasks performed and presented in this document were carried out by me or under my direction and supervision. I hereby certify that, to the best of my knowledge, Montrose operated in conformance with the requirements of the Montrose Quality Management System and ASTM D7036-04 during this test project.

Signature: _____ Date: 10/15/19

Name: Matthew Young Title: Client Project Manager

I have reviewed, technically and editorially, details, calculations, results, conclusions, and other appropriate written materials contained herein. I hereby certify that, to the best of my knowledge, the presented material is authentic, accurate, and conforms to the requirements of the Montrose Quality Management System and ASTM D7036-04.

Signature: _____ Date: 10/15/19

Name: Randal Tysar Title: District Manager

1.0 INTRODUCTION

1.1 SUMMARY OF TEST PROGRAM

The General Motors LLC - Orion Assembly Plant (State Registration Number: B7227), located in Lake Orion, Michigan, contracted Montrose Air Quality Services, LLC (Montrose) of Detroit, Michigan, to conduct compliance stack emission testing for their Paint Shop (FG-FACILITY). The initial test mobilization occurred on June 17, 2019, with Mark Dziadosz (EGLE) in attendance, but the test was aborted. The rescheduled test was performed on August 27-28, 2019 to satisfy the emissions testing requirements pursuant to Michigan Department of Environment, Great Lakes and Energy (EGLE) Renewable Operating Permit No. MI-ROP-B7227-2015c.

Simultaneous sampling was performed at the regenerative thermal oxidizer (RTO) Inlet (Booth), RTO Inlet (Oven), RTO Combined Inlet Duct, and RTO Outlet to determine the volatile organic compound (VOC) destruction efficiency (DE) of the RTO associated with FG-FACILITY. Testing was conducted during representative Paint Shop operations and a minimum RTO combustion chamber temperature of 1,400°F. During this test emissions from FG-FACILITY were controlled by an RTO.

The test methods that were conducted during this test were US EPA Methods 1, 2, 3, 4 wb/db, 4, and 25A.

1.2 KEY PERSONNEL

The key personnel who coordinated this test program (and their phone numbers) were:

- Jessica Alderton, Senior Environmental Project Engineer, General Motors LLC 586-863-8490
- Kimberly Crame, Environmental Engineer, General Motors-Orion, 248-941-5305
- Mark Dziadosz, Environmental Quality Analyst, Michigan Department of Environment, Great Lakes and Energy, 586-753-3745
- Matthew Young QSTI, Client Project Manager, Montrose, 248-548-7980

2.0 SUMMARY AND DISCUSSION OF TEST RESULTS

2.1 OBJECTIVES AND TEST MATRIX

The purpose of this test was to determine the VOC DE of the RTO associated with FG-FACILITY during representative operations. Testing was performed to satisfy the emissions requirements pursuant to EGLE Renewable Operating Permit No. MI-ROP-B7227-2015b.

The specific test objectives for this test are as follows:

- Measure the concentrations of total gaseous organics (TGO) at the RTO Combined Inlet Duct and RTO Outlet.
- Measure the actual and dry standard volumetric flowrate of the gas stream at the RTO Inlet (Booth), RTO Inlet (Oven), and RTO Outlet.
- Utilize the above variables to determine the VOC DE of the RTO associated with FG-FACILITY during representative operations.

Table 2.1 presents the sampling matrix log for this test.

2.2 FIELD TEST CHANGES AND PROBLEMS

No field test changes or problems occurred during the performance of this test that would bias the accuracy of the results of this test.

2.3 PRESENTATION OF RESULTS

During each run, a single sampling train was used at the RTO Combined Inlet Duct and two sampling trains were used at the RTO Outlet to determine the VOC DE of the RTO associated with FG-FACILITY. At the RTO Combined Inlet Duct, the sampling train measured the gas stream concentration of VOC. At the RTO Outlet, one sampling train measured the gas stream dry molecular weight and moisture content, for only one run, while the second sampling train measured the gas stream concentration of VOC. Gas stream volumetric flowrates were measured at the RTO Inlet (Booth), RTO Inlet (Oven), and RTO Outlet during each concentration run.

Table 2.2 displays the volumetric flowrate measured at the RTO Inlet (Booth) during representative operations.

Table 2.3 displays the volumetric flowrate measured at the RTO Inlet (Oven) during representative operations.

Table 2.4 displays the VOC DE of the RTO associated with FG-FACILITY during representative emissions. Table 2.4 also displays the emissions of VOC measured at the RTO Combined Inlet Duct and the RTO Outlet.

Given the expected low moisture content of the gas stream at the RTO Inlet (Booth), the wet-bulb/dry-bulb approximation method (Method 4) was utilized to determine the stack gas moisture content. It is the opinion of Montrose that the use of the wet-bulb/dry-bulb approximation method had little to no affect on the overall results of this test event.

The graphs that present the raw, uncorrected concentration data measured in the field by the US EPA Method 25A sampling systems at the RTO Combined Inlet Duct and RTO Outlet are located in the Field Data section of the Appendix.

TABLE 2.1
SAMPLING MATRIX OF TEST METHODS UTILIZED

Date	Run No.	Sampling Location	US EPA METHODS 1/2 (Flow)	US EPA METHOD 3 (Dry Molecular Wt.)	US EPA METHOD 4 wb/db ($\%H_2O$)	US EPA METHOD 4 ($\%H_2O$)
			Sampling Time / Duration (min)	Sampling Time / Duration (min)	Sampling Time / Duration (min)	Sampling Time / Duration (min)
8/27/2019	1	RTO Inlet (Booth)	9:49 - 9:58 / 9	9:49 - 9:58 / 9	-	-
8/27/2019	2	RTO Inlet (Booth)	12:15 - 12:21 / 6	12:15 - 12:21 / 6	10:00 - 10:01 / 1	-
8/28/2019	3	RTO Inlet (Booth)	9:15 - 9:22 / 7	9:15 - 9:22 / 7	-	-
8/27/2019	1	RTO Inlet (Oven)	9:30 - 9:38 / 8	9:30 - 9:38 / 8	-	-
8/27/2019	2	RTO Inlet (Oven)	12:55 - 13:01 / 6	12:55 - 13:01 / 6	-	12:58 - 13:28 / 30
8/28/2019	3	RTO Inlet (Oven)	8:59 - 9:06 / 7	8:59 - 9:06 / 7	-	-

Date	Run No.	Sampling Location	US EPA METHODS 1/2 (Flow)	US EPA METHOD 3 (Dry Molecular Wt.)	US EPA METHOD 4 ($\%H_2O$)	US EPA METHOD 25A (VOC)
			Sampling Time / Duration (min)	Sampling Time / Duration (min)	Sampling Time / Duration (min)	Sampling Time / Duration (min)
8/27/2019	1	RTO Combined Inlet Duct	-	-	-	8:20 - 9:20
8/27/2019	2	RTO Combined Inlet Duct	-	-	-	12:10 - 13:10
8/28/2019	3	RTO Combined Inlet Duct	-	-	-	8:55 - 9:55
8/27/2019	1	RTO Outlet	8:40 - 8:52 / 12	8:40 - 8:52 / 12	8:36 - 9:06 / 30	8:20 - 9:20
8/27/2019	2	RTO Outlet	12:30 - 12:38 / 8	12:30 - 12:38 / 8	-	12:10 - 13:10
8/28/2019	3	RTO Outlet	9:40 - 9:51 / 11	9:40 - 9:51 / 11	-	8:55 - 9:55

All times are Eastern Daylight Time.

TABLE 2.2
EMISSION RESULTS

Parameter	RTO Inlet (Booth)			
	Run 1	Run 2	Run 3	Average
Stack Gas Average Flow Rate (scfm)	31,429	27,643	31,884	30,319
Stack Gas Average Flow Rate (dscfm)	30,286	26,638	30,725	29,217
Stack Gas Average Velocity (fpm)	3,155	2,775	3,190	3,040
Stack Gas Average Static Pressure (in-H_2O)	-1.60	-1.60	-1.60	-1.60
Stack Gas Average Temperature (°F)	106	106	106	106
Stack Gas Percent by Volume Moisture (%H_2O)	3.63	3.63	3.63	3.63
Measured Stack Inner Diameter (in)		45.3		
Percent by Volume Carbon Dioxide in Stack Gas (%-dry)	0.00	0.00	0.00	0.00
Percent by Volume Oxygen in Stack Gas (%-dry)	20.90	20.90	20.90	20.90
Percent by Volume Nitrogen in Stack Gas (%-dry)	79.10	79.10	79.10	79.10

TABLE 2.3
EMISSION RESULTS

Parameter	RTO Inlet (Oven)			
	Run 1	Run 2	Run 3	Average
Stack Gas Average Flow Rate (scfm)	23,277	23,832	23,968	23,692
Stack Gas Average Flow Rate (dscfm)	22,526	23,063	23,198	22,929
Stack Gas Average Velocity (fpm)	3,024	3,055	3,096	3,059
Stack Gas Average Static Pressure (in-H_2O)	-1.83	-1.83	-1.83	-1.83
Stack Gas Average Temperature (°F)	279	269	277	275
Stack Gas Percent by Volume Moisture (%H_2O)	3.22	3.22	3.21	3.22
Measured Stack Inner Diameter (in)		45.5		
Percent by Volume Carbon Dioxide in Stack Gas (%-dry)	0.00	0.00	0.00	0.00
Percent by Volume Oxygen in Stack Gas (%-dry)	20.90	20.90	20.90	20.90
Percent by Volume Nitrogen in Stack Gas (%-dry)	79.10	79.10	79.10	79.10

TABLE 2.4
EMISSION RESULTS

Parameter	RTO Combined Inlet Duct				RTO Outlet			
	Run 1	Run 2	Run 3	Average	Run 1	Run 2	Run 3	Average
VOC Destruction Efficiency (%)	-	-	-	-	96.4	96.5	96.5	96.4
VOC Emissions (lb/hr as propane)	82.2	75.1	81.9	79.7	2.97	2.65	2.90	2.84
VOC Concentration (ppmvw as propane)	218.7	212.4	213.7	214.9	7.35	6.52	7.01	6.96
Stack Gas Average Flow Rate (acfm)	-	-	-	-	84,171	85,086	83,316	84,191
Stack Gas Average Flow Rate (scfm)	54,705	51,474	55,852	54,011	58,856	59,260	60,154	59,423
Stack Gas Average Flow Rate (dscfm)	-	-	-	-	56,967	57,358	58,229	57,518
Stack Gas Average Velocity (fpm)	-	-	-	-	3,387	3,424	3,353	3,388
Stack Gas Average Static Pressure (in-H_2O)	-	-	-	-	-0.74	-0.74	-0.74	-0.74
Stack Gas Average Temperature (°F)	-	-	-	-	262	265	242	256
Stack Gas Percent by Volume Moisture (%H_2O)	-	-	-	-	3.21	3.21	3.20	3.21
Measured Stack Inner Diameter (in)	-	-	-	-			67.5	
Percent by Volume Carbon Dioxide in Stack Gas (%-dry)	-	-	-	-	0.00	0.00	0.00	0.00
Percent by Volume Oxygen in Stack Gas (%-dry)	-	-	-	-	20.90	20.90	20.90	20.90
Percent by Volume Nitrogen in Stack Gas (%-dry)	-	-	-	-	79.10	79.10	79.10	79.10

3.0 PLANT AND SAMPLING LOCATION DESCRIPTIONS

3.1 PROCESS DESCRIPTION AND OPERATION

General Motors LLC - Orion Assembly Plant operates a Paint Shop (FG-FACILITY) associated with automotive assembly and painting operations. FG-FACILITY includes an ELPO operation, sealer application and two main paint booths where primer and topcoat are applied. The ELPO tank, clearcoat booths, primer and basecoat heated flashes, ELPO oven, sealer oven, and topcoat ovens are ducted to the RTO for removal of volatile organic compounds (VOC). FG-FACILITY was in operation for this test event.

Figure 3.1 depicts the sampling location schematic.

3.2 CONTROL EQUIPMENT DESCRIPTION

During this test, emissions from FG-FACILITY were controlled by an RTO.

3.3 SAMPLING LOCATION(S)

3.3.1 RTO Inlet (Booth)

The RTO Inlet (Booth) had a measured inner diameter of 45.3-inches, was oriented in the vertical plane, and had downward flow. Two sampling ports were located 90° apart from one another at a location that met US EPA Method 1, Section 11.1.1 criteria. Prior to emissions sampling, the inlet was traversed to verify the absence of cyclonic flow. An average yaw angle of 0.0° was measured. Therefore, the sampling location also met US EPA Method 1, Section 11.4.2 criteria. During emissions sampling, the inlet was traversed for gas stream volumetric flowrate. A single point was utilized to determine dry molecular weight. The gas stream moisture content was determined using the wet bulb/dry bulb approximation method.

3.3.2 RTO Inlet (Oven)

The RTO Inlet (Oven) had a measured inner diameter of 45.5-inches and was oriented in the horizontal plane. Two sampling ports were located 90° apart from one another at a location that met US EPA Method 1, Section 11.1.1 criteria. Prior to emissions sampling, the inlet was traversed to verify the absence of cyclonic flow. An average yaw angle of 3.8° was measured. Therefore, the sampling location also met US EPA Method 1, Section 11.4.2 criteria. During emissions sampling, the inlet was traversed for gas stream volumetric flowrate. A single point was utilized to determine gas stream dry molecular weight and moisture content.

3.3.3 RTO Combined Inlet Duct

During emissions sampling, a single point, located within the central 10% of the RTO Combined Inlet Duct's cross-sectional area, was utilized for TGO concentration determination.

3.3.4 RTO Outlet

The RTO Outlet had a measured inner diameter of 67.5-inches, was oriented in the vertical plane, and was accessed from a permanent platform. Two sampling ports were located 90° apart from one another at a location that met US EPA Method 1, Section 11.1.1 criteria. Prior to emissions sampling, the outlet was traversed to verify the absence of cyclonic flow. An average yaw angle of 2.2° was measured. Therefore, the sampling location also met US EPA Method 1, Section 11.4.2 criteria. During emissions sampling, the outlet was traversed for gas stream volumetric flow rate. A single point, located within the central 10% of the outlet cross-sectional area, was utilized for TGO concentration determination. A second point was utilized to determine gas stream molecular weight and moisture content.

Figures 3.2 to 3.4 schematically illustrate the traverse point and sample port locations utilized.

3.4 PROCESS SAMPLING LOCATION(S)

The US EPA Reference Test Methods performed did not specifically require that process samples were to be taken during the performance of this testing event. It is in the best knowledge of Montrose that no process samples were obtained and therefore no process sampling location was identified in this report.

FIGURE 3.1
FG-FACILITY SAMPLING LOCATIONS SCHEMATIC

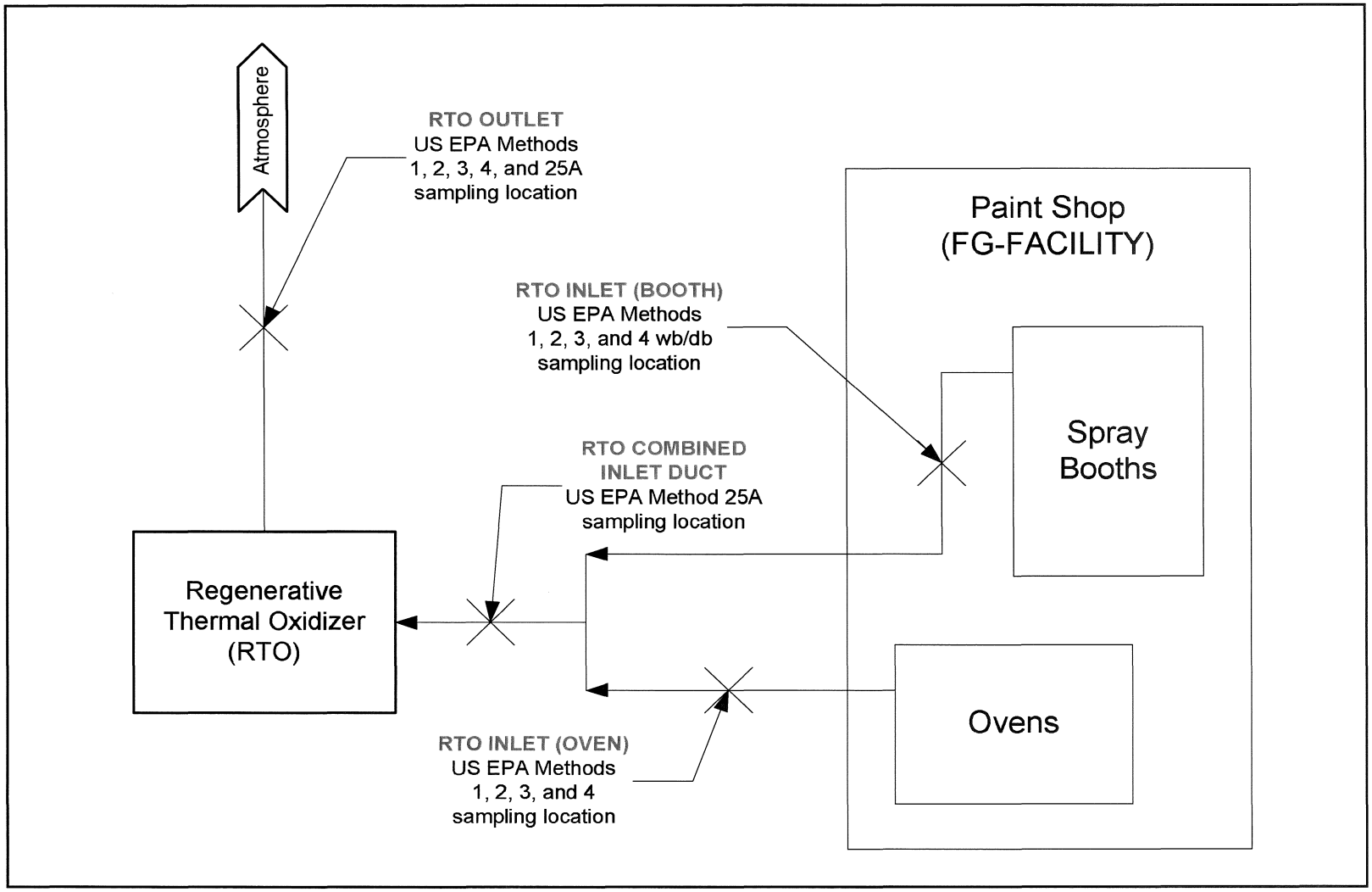
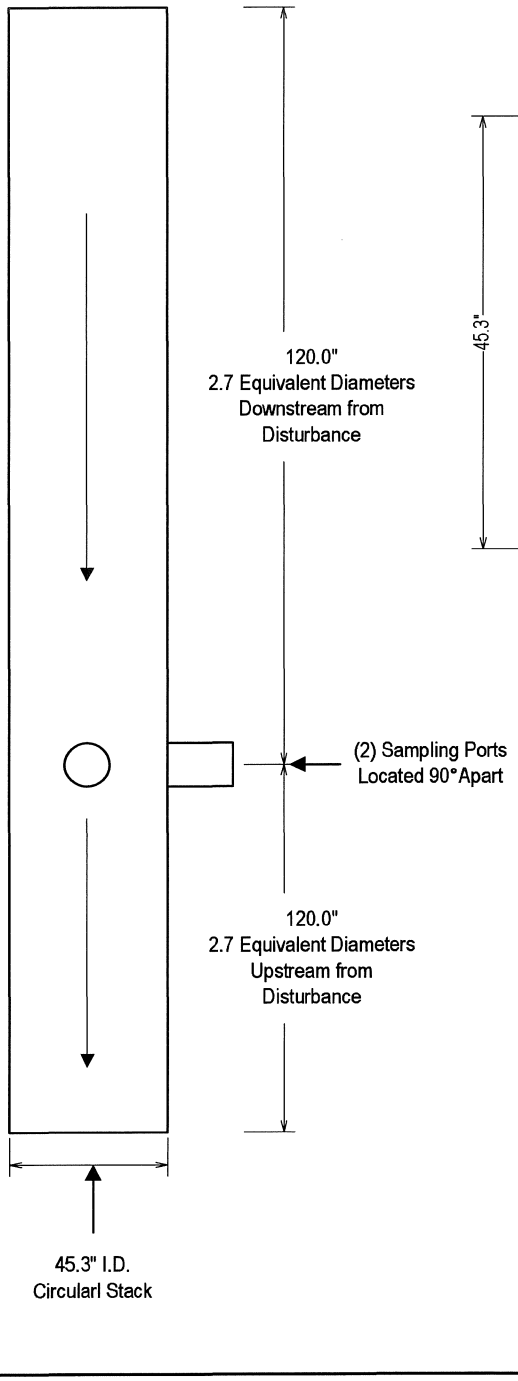
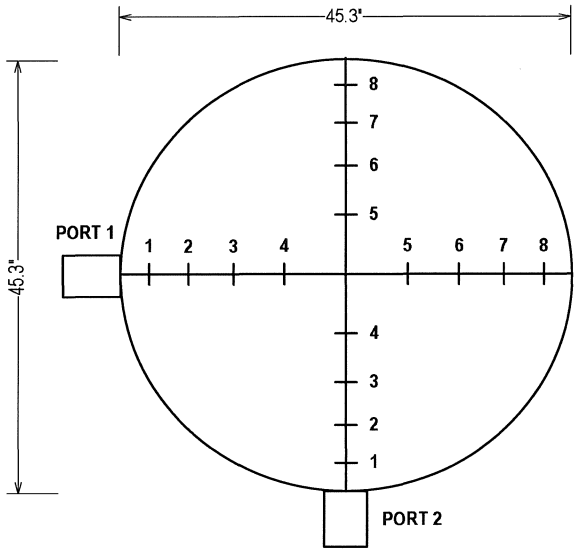


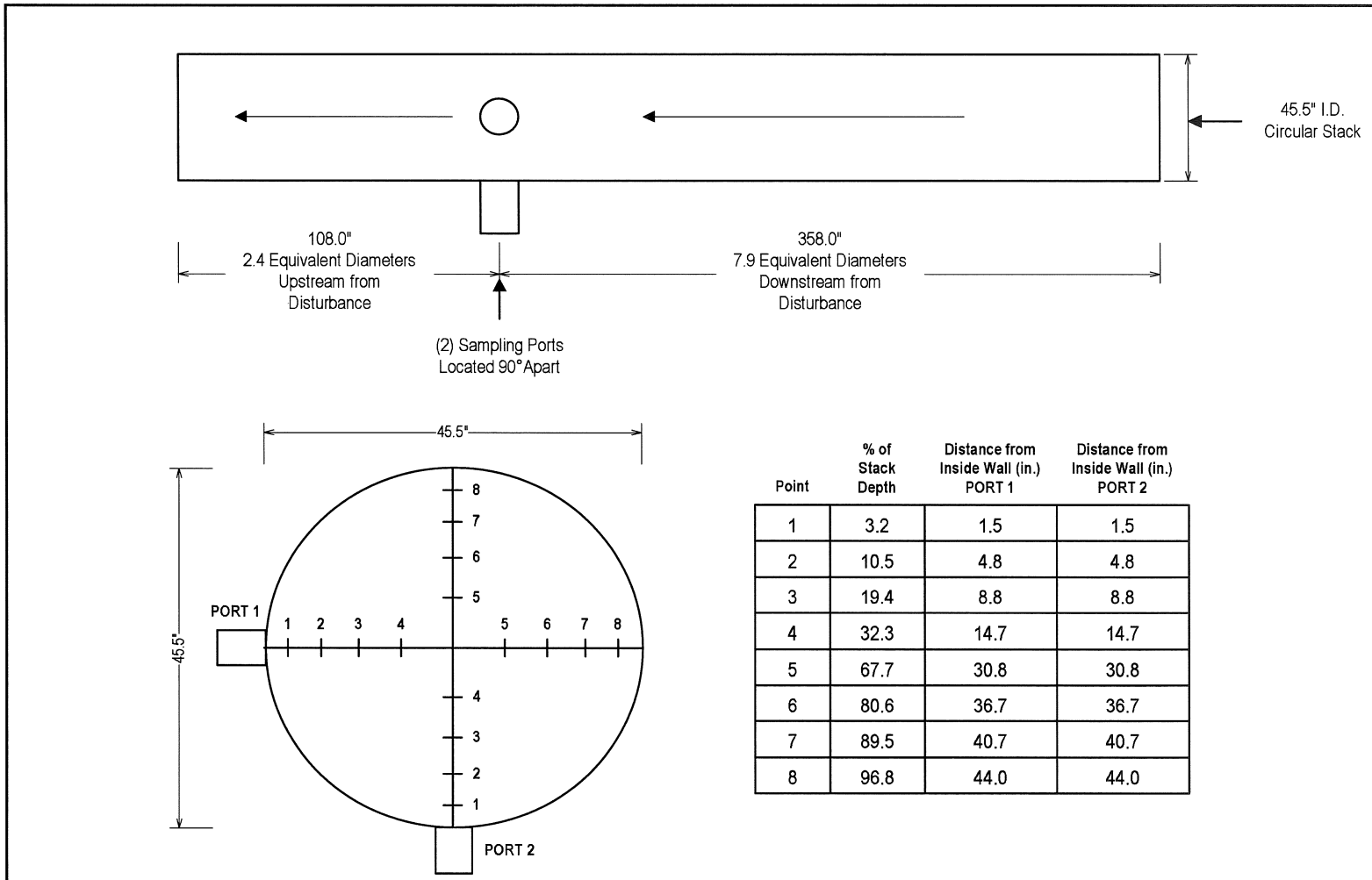
FIGURE 3.2
RTO INLET (BOOTH) TRAVERSE POINT LOCATION DRAWING





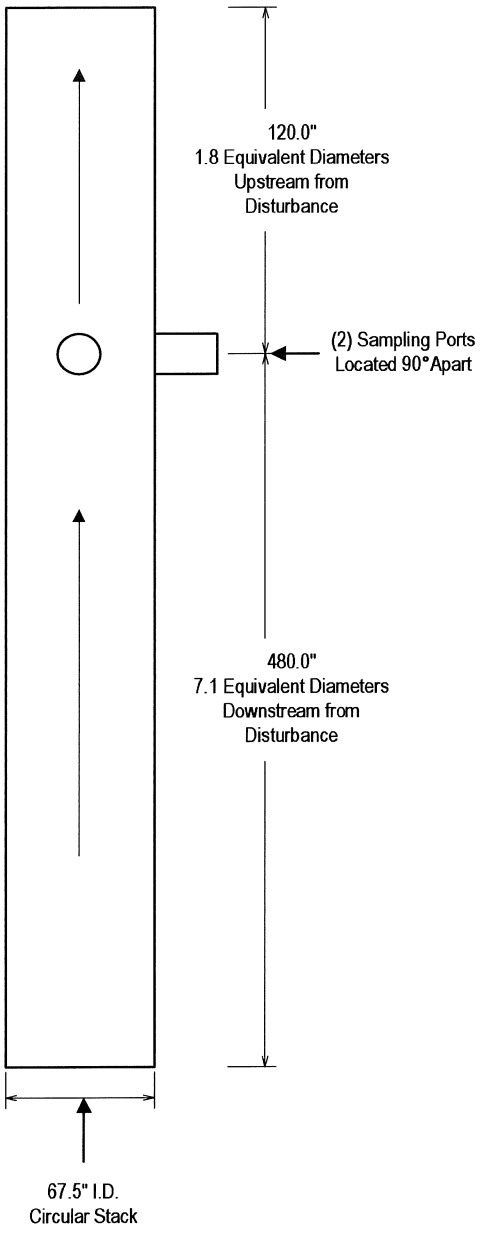
Point	% of Stack Depth	Distance from Inside Wall (in.) PORT 1	Distance from Inside Wall (in.) PORT 2
1	3.2	1.4	1.4
2	10.5	4.8	4.8
3	19.4	8.8	8.8
4	32.3	14.6	14.6
5	67.7	30.6	30.6
6	80.6	36.5	36.5
7	89.5	40.5	40.5
8	96.8	43.8	43.8

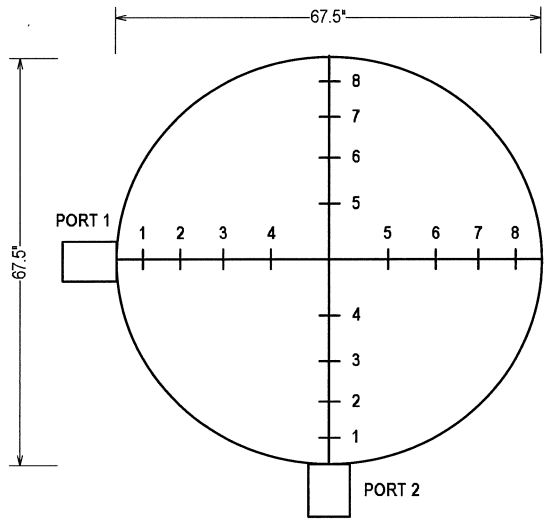
FIGURE 3.3
RTO INLET (OVEN) TRAVERSE POINT LOCATION DRAWING



Point	% of Stack Depth	Distance from Inside Wall (in.) PORT 1	Distance from Inside Wall (in.) PORT 2
1	3.2	1.5	1.5
2	10.5	4.8	4.8
3	19.4	8.8	8.8
4	32.3	14.7	14.7
5	67.7	30.8	30.8
6	80.6	36.7	36.7
7	89.5	40.7	40.7
8	96.8	44.0	44.0

FIGURE 3.4
RTO OUTLET TRAVERSE POINT LOCATION DRAWING





Point	% of Stack Depth	Distance from Inside Wall (in.) PORT 1	Distance from Inside Wall (in.) PORT 2
1	3.2	2.2	2.2
2	10.5	7.1	7.1
3	19.4	13.1	13.1
4	32.3	21.8	21.8
5	67.7	45.7	45.7
6	80.6	54.4	54.4
7	89.5	60.4	60.4
8	96.8	65.3	65.3

4.0 SAMPLING AND ANALYTICAL PROCEDURES

4.1 TEST METHODS

4.1.1 US EPA Method 1: "Sample and Velocity Traverses for Stationary Sources"

Principle: To aid in the representative measurement of pollutant emissions and/or total volumetric flow rate from a stationary source, a measurement site where the effluent stream is flowing in a known direction is selected, and the cross-section of the stack is divided into a number of equal areas. A traverse point is then located within each of these equal areas. This method was utilized in its entirety as per the procedures outlined in 40 CFR Part 60, Appendix A.

4.1.2 US EPA Method 2: "Determination of Stack Gas Velocity and Volumetric Flow Rate (Type S Pitot Tube)"

Principle: The average gas velocity in a stack is determined from the gas density and from measurement of the average velocity head with a Type S (Stausscheibe or reverse type) pitot tube. This method was utilized in its entirety as per the procedures outlined in 40 CFR Part 60, Appendix A.

4.1.3 US EPA Method 3: "Gas Analysis for the Determination of Dry Molecular Weight"

Principle: A gas sample is extracted from a stack by one of the following methods: (1) single-point, grab sampling; (2) single-point, integrated sampling; or (3) multi-point, integrated sampling. The gas sample is analyzed for percent CO_2, percent O_2, and if necessary, for percent CO. For dry molecular weight determination, either an Orsat or a Fyrite analyzer may be used for the analysis. This method was utilized in its entirety as per the procedures outlined in 40 CFR Part 60, Appendix A.

4.1.4 US EPA Method 4 wb/db: "Determination of Moisture Content in Stack Gases (Approximation Technique)"

Principle: The gas stream of a duct or stack is measured using a sling psychrometer to determine the approximate moisture content and relative humidity. This method was utilized in its entirety as per the procedures outlined in 40 CFR Part 60, Appendix A.

4.1.5 US EPA Method 4: "Determination of Moisture Content in Stack Gases"

Principle: A gas sample is extracted at a constant rate from the source; moisture is removed from the sample stream and determined either volumetrically or gravimetrically. This method was utilized in its entirety as per the procedures outlined in 40 CFR Part 60, Appendix A.

4.1.6 US EPA Method 25A: "Determination of Total Gaseous Organic Concentration Using a Flame Ionization Analyzer"

Principle: A gas sample is extracted from the source through a heated sample line, if necessary, and glass fiber filter to a flame ionization analyzer (FIA). Results are reported as volume concentration equivalents of the calibration gas or as carbon equivalents. Performance specifications and test procedures are provided to ensure reliable data. This method was utilized in its entirety as per the procedures outlined in 40 CFR Part 60, Appendix A.

The sampling trains utilized during this testing project are depicted in Figures 4.1 and 4.2.

4.2 PROCEDURES FOR OBTAINING PROCESS DATA

Process data was recorded by General Motors LLC - Orion Assembly Plant personnel utilizing their typical record keeping procedures. Recorded process data was provided to Montrose personnel at the conclusion of this test event. The process data is located in the Appendix.

FIGURE 4.1
US EPA METHOD 4 SAMPLING TRAIN SCHEMATIC

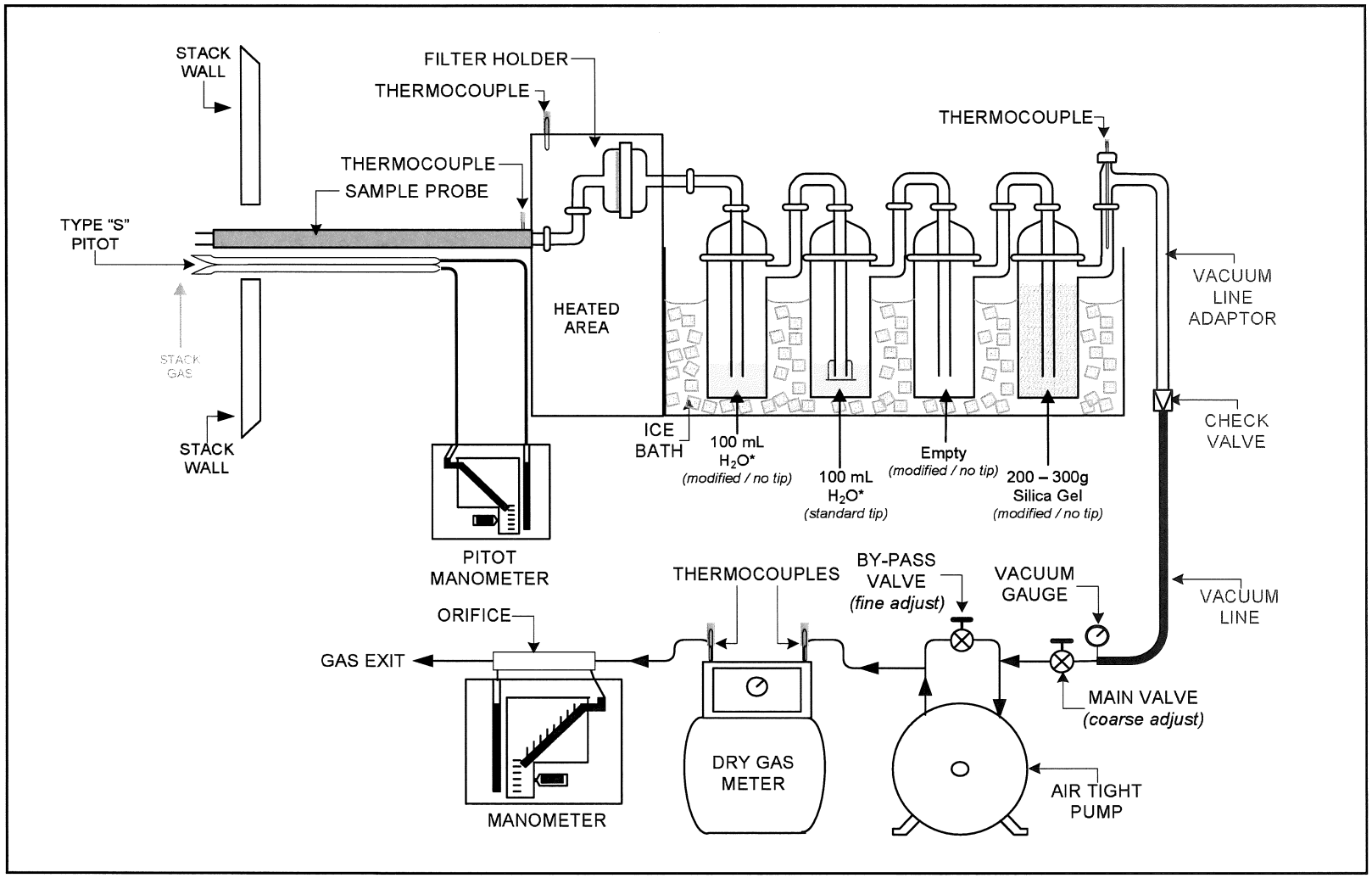
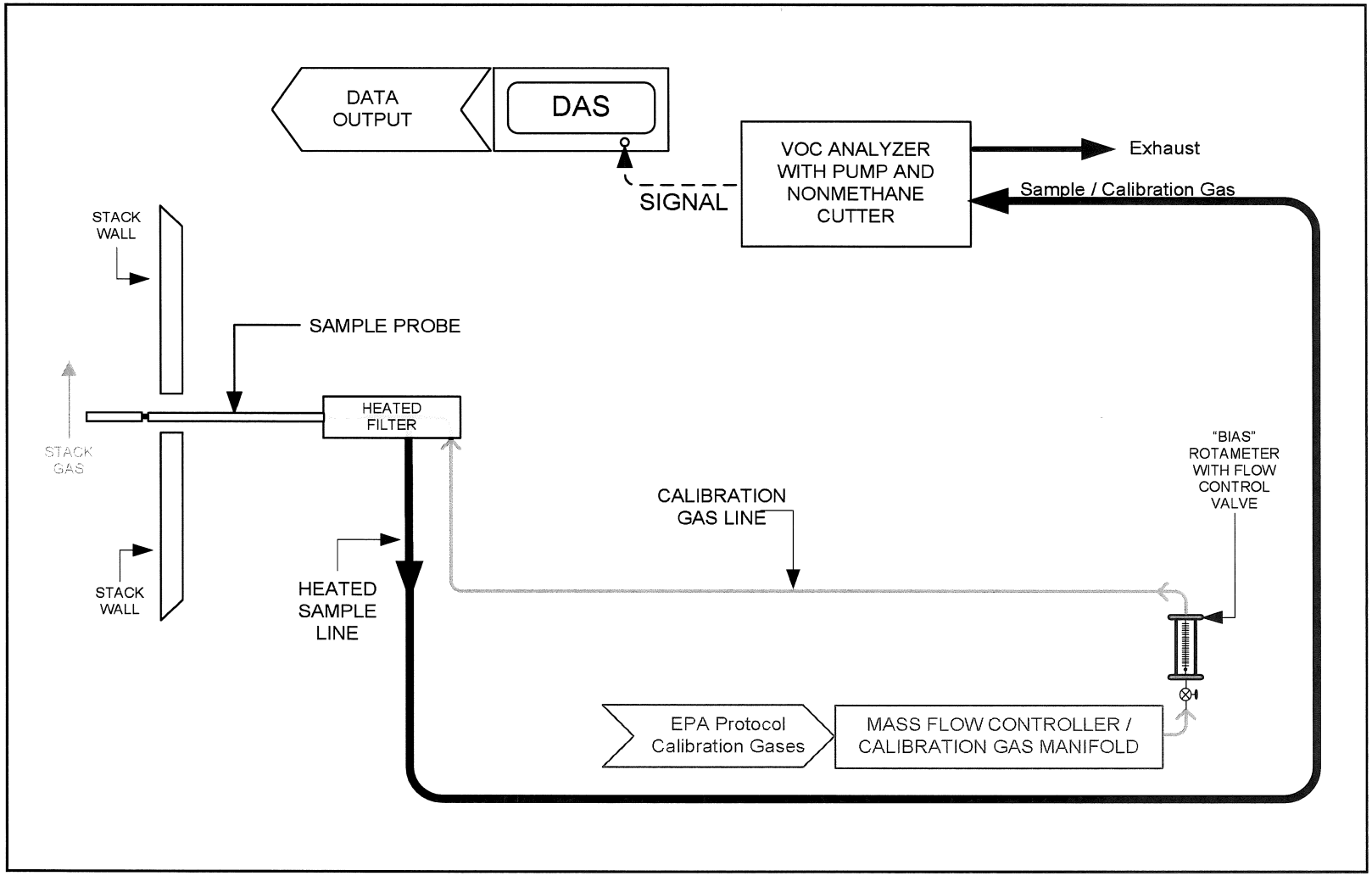


FIGURE 4.2
US EPA METHOD 25A SAMPLING TRAIN SCHEMATIC



5.0 INTERNAL QA/QC ACTIVITIES

5.1 QA AUDITS

Tables 5.1 to 5.5 illustrate the QA audits that were performed during this test.

All meter boxes and sampling trains used during sampling performed within the requirements of their respective methods as is shown in Tables 5.1 and 5.2. All post-test leak checks were well below the applicable limit. Minimum metered volumes were also met where applicable.

Table 5.3 displays the US EPA Method 3 Fyrite Audits which were performed during this test in accordance with US EPA Method 3, Section 10.1 requirements. As shown, all Fyrite analyzer results were within ±0.5% of the respective Audit Gas concentrations.

Table 5.4 illustrates the FIA calibration audits which were performed during this test (and integral to performing US EPA Method 25A correctly) were, except where noted, within the Measurement System Performance Specifications of ±3% of span for the Zero and Calibration Drift Checks, and ±5% of the respective cylinder concentrations for the Calibration Error Checks.

Table 5.5 displays the US EPA Method 205 field evaluation of the calibration gas dilution system utilized during this test event. As shown, the average concentration output at each dilution level was within ±2% of the predicted value. The average concentration output of the direct inject gas was also within ±2% of the certified concentration.

5.2 QA/QC PROBLEMS

No QA/QC problems occurred during this test event.

5.3 QUALITY STATEMENT

Montrose is qualified to conduct this test program and has established a quality management system that led to accreditation with ASTM Standard D7036-04 (Standard Practice for Competence of Air Emission Testing Bodies). Montrose participates in annual functional assessments for conformance with D7036-04 which are conducted by the American Association for Laboratory Accreditation (A2LA). All testing performed by Montrose is supervised on site by at least one Qualified Individual (QI) as defined in D7036-04 Section 8.3.2. Data quality objectives for estimating measurement uncertainty within the documented limits in the test methods are met by using approved test protocols for each project as defined in D7036-04 Sections 7.2.1 and 12.10. Additional quality assurance information is presented in the report appendices.

TABLE 5.1
US EPA METHOD 4 SAMPLING TRAIN AUDIT RESULTS

Parameter	Average
Sampling Location	**RTO Inlet (Oven)**
Post-Test Leak Rate Observed (cfm)	0.005
Applicable Method Allowable Leak Rate (cfm)	0.020
Acceptable	Yes
Volume of Dry Gas Collected (dscf)	22.670
Recommended Volume of Dry Gas Collected (dscf)	21.000
Acceptable	Yes
Sampling Location	**RTO Outlet**
Post-Test Leak Rate Observed (cfm)	0.005
Applicable Method Allowable Leak Rate (cfm)	0.020
Acceptable	Yes
Volume of Dry Gas Collected (dscf)	22.778
Recommended Volume of Dry Gas Collected (dscf)	21.000
Acceptable	Yes

TABLE 5.2
US EPA METHOD 4 DRY GAS METER AUDIT RESULTS

Sampling Location	Pre-Test Dry Gas Meter Calibration Factor (Y)	Average Post-Test Dry Gas Meter Calibration Check Value (Yqa)	Post Test Dry Gas Meter Calibration Check Value Difference From Pre-Test Calibration Factor (%)	Applicable Method Allowable Difference (%)	Acceptable
RTO Inlet (Oven)	1.0150	1.0270	-1.18%	5.00%	Yes
RTO Outlet	1.0050	0.9903	1.46%	5.00%	Yes

TABLE 5.3
US EPA METHOD 3 FYRITE AUDIT

Audit Date	**August 19, 2019**	
Audit Gas	**%CO_2**	**%O_2**
Audit Gas Concentration (%)	**10.1**	**10.1**
Fyrite Response 1 (%)	10.0	10.0
Fyrite Response 2 (%)	10.0	10.0
Fyrite Response 3 (%)	10.0	10.0
Average (%)	10.0	10.0
Average Within ±0.5%	YES	YES

Audit Gas Cylinder Number: CC469695

TABLE 5.4
US EPA METHOD 25A ANALYZER CALIBRATION AND QA

	RTO Combined Inlet Duct					
FIA ANALYZER	**RUN 1**	**Acceptable**	**RUN 2**	**Acceptable**	**RUN 3**	**Acceptable**
Analyzer Span During Test Run (ppmv as propane)	500.6	YES	500.6	YES	500.6	YES
Average Stack Gas Concentration (ppmv as propane)	219.6	YES	214.2	YES	211.0	YES
Zero Drift (% of Span)	0.76	YES	0.17	YES	0.30	YES
Calibration Drift for Mid-Level Gas (% of Span)	1.00	YES	-0.77	YES	-1.37	YES
Calibration Error for Mid-Level Gas (% of Cal. Gas Tag Value)	-0.03	YES	-0.03	YES	-0.43	YES
Calibration Error for High-Level Gas (% of Cal. Gas Tag Value)	0.74	YES	0.74	YES	-0.01	YES

	RTO Outlet					
FIA ANALYZER	**RUN 1**	**Acceptable**	**RUN 2**	**Acceptable**	**RUN 3**	**Acceptable**
Analyzer Span During Test Run (ppmv as propane)	90.7	YES	90.7	YES	90.7	YES
Average Stack Gas Concentration (ppmv as propane)	7.6	YES	6.8	YES	7.5	YES
Zero Drift (% of Span)	0.67	YES	-0.54	YES	0.74	YES
Calibration Drift for Mid-Level Gas (% of Span)	-0.93	YES	-1.04	YES	-0.86	YES
Calibration Error for Mid-Level Gas (% of Cal. Gas Tag Value)	0.13	YES	0.13	YES	-0.20	YES
Calibration Error for High-Level Gas (% of Cal. Gas Tag Value)	-0.14	YES	-0.14	YES	-0.34	YES

TABLE 5.5
US EPA METHOD 205 GAS DILUTION SYSTEM QA

Analyzer Serial Number: 2020405
Dilution System Serial Number: 3737
CGD Mass Flow Controllers Used: 2

	Dilution Level 1	Dilution Level 2	Direct Inject Gas
Calibration Tag Value (ppm):	500.6	500.6	90.68
Dilution Ratio:	2.50	5.01	-
Predicted Diluted Value (ppm):	199.90	99.90	-
Injection 1 Response (ppm):	199.97	102.78	91.56
Injection 2 Response (ppm):	204.65	99.38	90.93
Injection 3 Response (ppm):	199.63	101.82	90.34
Average Response (ppm):	201.42	101.33	90.94
Difference From Predicted (%):	-0.76	-1.43	-0.29
Acceptable (YES/NO):	YES	YES	YES