FINAL REPORT

FORD MOTOR COMPANY

FLAT ROCK, MICHIGAN

FLAT ROCK ASSEMBLY PLANT (FRAP): VOC DE TEST REPORT

RWDI #2304077

September 19, 2023

SUBMITTED TO

Susan Hicks
Ford Motor Company
Environmental Engineer
Fairlane Plaza North, Suite 800
290 Town Center Drive
Dearborn, Michigan 48126

Mynal Lauder
Flat Rock Assembly Plant
1 International Drive
Flat Rock, Michigan 48134

SUBMITTED BY

Brad Bergeron, A.Sc.T., d.E.T.
Technical Director | Principal
Brad.Bergeron@rwdi.com | ext. 2428

Steve Smith, QSTI
Project Manager
Steve.Smith@rwdi.com

RWDI USA LLC
Consulting Engineers & Scientists
2239 Star Court
Rochester Hills, Michigan 48309

T: 248.841.8442
F: 519.823.1316

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EXECUTIVE SUMMARY

RWDI USA LLC (RWDI) has been retained by Ford Motor Company (Ford) to complete the emission sampling program at the Flat Rock Assembly Plant (FRAP) located at 1 International Drive, Flat Rock, Michigan. FRAP operates an automobile assembly plant that produces the Ford Mustang. The purpose of the emissions test program was to evaluate volatile organic compounds (VOC) destruction efficiency (DE) on three (3) regenerative catalytic oxidizers (RCOs) and a single thermal oxidizer (RTO) for compliance purposes. The testing consisted of concurrent measurements at the RCO Inlet, RCO Outlets (A, B & C), RTO Inlet and RTO Outlet. The test program was completed on July 26, 2023.

Executive Table i: Table of Results

Parameter	Test 1	Test 2	Test 3	Average
RCO VOC Destruction Efficiency	93.9%	93.2%	95.3%	94.1%
RTO VOC Destruction Efficiency	92.6%	94.2%	92.5%	92.9%
RCO Outlet NMOC Concentration (weighted average)	2.8 ppmv	3.5ppmv	3.5ppmv	3.3ppmv
RCO Inlet Emission Rate (lb/hr)	92.9	98.8	146.5	112.7
RCO Inlet Flow Rate (scfm)	343,810	333,844	330,003	335,886
RCO A Outlet Emission Rate (lb/hr)	2.9	2.9	3.4	3.1
RCO A Outlet Flow Rate (scfm)	118,072	116,181	99,671	111,308
RCO A Temperature (°F)	1,170	1,169	1,170	1,170
RCO B Outlet Emission Rate (lb/hr)	1.2	0.8	2.0	1.3
RCO B Outlet Flow Rate (scfm)	96,666	91,280	111,046	99,664
RCO B Temperature (°F)	1,323	1,321	1,324	1,323
RCO C Outlet Emission Rate (lb/hr)	2.6	4.7	2.3	3.2
RCO C Outlet Flow Rate (scfm)	134,661	149,047	112,656	132,121

Parameter	Test 1	Test 2	Test 3	Average
RCO C Temperature (°F)	1,116	1,115	1,118	1,116
RTO Inlet Emission Rate (lb/hr)	16.8	25.3	19.8	20.3
RTO Inlet Flow Rate (scfm)	26,801	27,532	26,466	26,933
RTO Outlet Emission Rate (lb/hr)	1.2	1.5	1.5	1.4
RTO Inlet Flow Rate (scfm)	28,744	27,821	28,727	28,431
RTO Temperature (°F)	1,460	1,457	1,459	1,459

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TABLE OF CONTENTS

LIST OF TABLES (WITHIN REPORT)

LIST OF TABLES

LIST OF GRAPHS

LIST OF FIGURES

LIST OF APPENDICES

1 INTRODUCTION

RWDI USA LLC (RWDI) has been retained by Ford Motor Company (Ford) to complete the emission sampling program at the Flat Rock Assembly Plant (FRAP) located at 1 International Drive, Flat Rock, Michigan. FRAP operates an automobile assembly plant that produces the Ford Mustang. The testing evaluated volatile organic compound (VOC) concentrations and emission rates concurrently from the outlets of three (3) regenerative catalytic oxidizers (RCO), inlet to the RCOs and inlet and outlet of the regenerative thermal oxidizer (RTO). The overall results determined the outlet concentrations from each of the RCO outlets, destruction efficiency of the RTOs and the overall destruction efficiency of the entire RCO system.

1.1 Location and Dates of Testing

The test program was completed on July 26th, 2023 at the Ford FRAP facility.

1.2 Purpose of Testing

The emissions test program is required by Michigan Department of Environment, Great Lakes, and Energy (EGLE) permit number MI-ROP-N0929-2018A. A Both documents are provided in **Appendix F**.

1.3 Description of Source

Vehicle body panels are stamped and assembled on site from sheet metal components. The bodies are cleaned, treated, and prepared for painting in the phosphate system. Drawing compounds, mill oils, and dirt are removed from the vehicle bodies utilizing both high pressure spray and immersion cleaning/rinsing techniques. Vehicle bodies are then dip coated in electro deposition corrosion primer paint for protection. The electro primer (e-coat) is heat cured to the vehicle body in a high-temperature bake oven. After completing the e-coat operation, vehicle bodies are conveyed to the sealer area for application of various sealants to body seams and joints. Vehicle bodies are then conveyed to an oven to cure the sealers.

After the sealer oven, the vehicles are routed to one of the two identical 3-wet paint systems. In the booth, the vehicles are painted with primer, a color basecoat, and a protective clearcoat layer using automatic bells on robot spray applicators. The vehicles are then passed through an oven to cure the 3-wet applications. The 3-wet booths allow for paint application of one layer after the other without the intermediate drying stage.

The vehicle paint process includes the electrodeposition (ECoat), primer (guidecoat) , basecoat and clearcoat (topcoat) and vehicle sealing operations. The majority of the process emissions associated with these coating activities are oxidized at elevated temperatures by the RCO and RTO emission control equipment.

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1.4 Personnel Involved in Testing

Table 1.4.1: Testing Personnel

<table>
<tr><td>Susan Hicks
Environmental Engineer
Shicks3@ford.com</td><td>Ford Motor Company</td><td>(313) 594-3185</td></tr>
<tr><td>Brad Bergeron
Technical Director
Brad.Bergeron@rwdi.com</td><td rowspan="8">RWDI USA LLC
2239 Star Court
Rochester Hills, MI
48309</td><td>(248) 234-3885</td></tr>
<tr><td>Steve Smith
Project Manager
Steve.Smith@rwdi.com</td><td>(734) 751-9701</td></tr>
<tr><td>Mason Sakshaug
USA Field Team Leader
Mason.Sakshaug@rwdi.com</td><td>(989) 353-0933</td></tr>
<tr><td>Michael Nummer
Senior Field Technician
Michael.Nummer@rwdi.com</td><td rowspan="5">(248) 841-8442</td></tr>
<tr><td>Ben Durham
Senior Field Technician
Ben.Durham@rwdi.com</td></tr>
<tr><td>Hunter Griggs
Junior Field Technician
Hunter.Griggs@rwdi.com</td></tr>
<tr><td>Cade Smith
Junior Field Technician
Cade.Smith@rwdi.com</td></tr>
<tr><td>Kate Strang
Junior Field Technician
Kate.Strang@rwdi.com</td></tr>
</table>

2 SUMMARY OF RESULTS

2.1 Operating Data

Operational data collected during the testing includes the number of vehicles produced during each test.

2.2 Applicable Permit Number

MI-ROP-N0929-2018A

3 SOURCE DESCRIPTION

3.1 Description of Process and Emission Control Equipment

FRAP operates three (3) RCOs and one RTO for emission control. See 1.3 for further description of the process.

3.2 Process Flow Sheet or Diagram

Each RCO and RTO controls VOC emissions from the painting process. This diagram can be found as **Figure 1**.

3.3 Type and Quantity of Raw and Finished Materials

The units associated with this process are EGECOAT, EGGUIDECOAT/EGTOPCOAT, and EGCOAT. These include body sealing agents, top/basecoat color paints, protective coatings, and electro deposition primer.

3.4 Normal Rated Capacity of Process

The plant was operating at normal production during the testing.

3.5 Process Instrumentation Monitored During the Test

The RCO and RTO temperature were monitored during the test. For the testing, the RCOs and RTO temperature average temperatures were as follows:

- RCO A – 1,170ºF, Setpoint 1,170ºF
- RCO B – 1,323ºF, Setpoint 1,320ºF
- RCO C – 1,116ºF, Setpoint 1,110ºF
- RTO – 1,459ºF, Setpoint 1,460ºF

4 SAMPLING AND ANALYTICAL PROCEDURES

4.1 Description of Sampling Train and Field Procedures

4.1.1 Sampling for Volatile Organic Compounds - USEPA Method 25A

VOC testing was performed simultaneously on the RCO inlet, each RCO outlet, RTO inlet and RTO outlet. A schematic of the sampling system is provided in **Figure 6**.

The measurements were taken continuously following the USEPA Method 25A on the inlet and outlet (using a non-methane/methane analyzer). As outlined in Method 25A, the measurement location was taken at the centroid of each source.

The compliance test consisted of a three (3) tests of at least 60-minutes from each unit at the preferred temperature. Regular performance checks on the CEMS were carried out by zero and span calibration checks using USEPA Protocol calibration gases. These checks verified the ongoing precision of the monitor with time by introducing pollutant-free (zero) air followed by known calibration gas (span) into the monitor. 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.

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 checks were 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 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 the gas analyzer, 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 or heated filter system. 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 in order to prevent condensation of stack gas moisture within the line.

Each analyzer was able to monitor Total Hydrocarbon (as propane) and Methane concurrently for each test on each of RCO Inlet, RCO A Outlet, RCO B Outlet, RCO C Outlet, RTO Inlet and RTO Outlet. The response factor for Methane to Propane (for each system) was determined via obtaining the concurrent response to methane calibration standard as both methane and THC (as Propane). This response factor was applied to each for the methane results to determine the total methane on the outlets of sources as Propane. During each run for each source, the Total Hydrocarbon (as Propane) and the Methane (corrected to as Propane) was determined and the methane response (as Propane) was subtracted from the Total Hydrocarbon (as Propane) value. This resulted in obtaining the Total Non-Methane Organic Compound (NMOC) values from each for the sources.

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

All sampling ports meet USEPA Method 1 locations and can be found in **Figures 2 to 5**.

5 TEST RESULTS AND DISCUSSION

5.1 Detailed Results

Detailed results are provided in **Appendices B** and **C.** Raw CEMS data

Table 5.1.1: Table of Results

Parameter	Test 1	Test 2	Test 3	Average
RCO VOC Destruction Efficiency	93.9%	93.2%	95.3%	94.1%
RTO VOC Destruction Efficiency	92.6%	94.2%	92.5%	92.9%
RCO Outlet NMOC Concentration (weighted average)	2.8 ppmv	3.5ppmv	3.5ppmv	3.3ppmv
RCO Inlet Emission Rate (lb/hr)	92.9	98.8	146.5	112.7
RCO Inlet Flow Rate (scfm)	343,810	333,844	330,003	335,886
RCO A Outlet Emission Rate (lb/hr)	2.9	2.9	3.4	3.1

Parameter	Test 1	Test 2	Test 3	Average
RCO A Outlet Flow Rate (scfm)	118,072	116,181	99,671	111,308
RCO A Temperature (°F)	1,170	1,169	1,170	1,170
RCO B Outlet Emission Rate (lb/hr)	1.2	0.8	2.0	1.3
RCO B Outlet Flow Rate (scfm)	96,666	91,280	111,046	99,664
RCO B Temperature (°F)	1,323	1,321	1,324	1,323
RCO C Outlet Emission Rate (lb/hr)	2.6	4.7	2.3	3.2
RCO C Outlet Flow Rate (scfm)	134,661	149,047	112,656	132,121
RCO C Temperature (°F)	1,116	1,115	1,118	1,116
RTO Inlet Emission Rate (lb/hr)	16.8	25.3	19.8	20.3
RTO Inlet Flow Rate (scfm)	26,801	27,532	26,466	26,933
RTO Outlet Emission Rate (lb/hr)	1.2	1.5	1.5	1.4
RTO Inlet Flow Rate (scfm)	28,744	27,821	28,727	28,431
RTO Temperature (°F)	1,460	1,457	1,459	1,459

5.2 Discussion of Results

Each of the RCO outlets were determined to have less than 5.0 ppmv as the in-stack concentration. The weighted average of RCO outlets was determined to be an average of 3.3 ppmv. The following equation was used to determine weighted average for Test 1 as an example:

Weighted Average of RCO Outlets: = (RCO A ppmv x (RCO A flow rate/RCO Total flow rate) + (RCO B ppmv x (RCO B flow rate / RCO Total flow rate) + (RCO C ppmv x (RCO C flow rate / RCO Total flow rate)

Weighted Average of RCO Outlets: = (3.6 ppmv x (118,072 scfm/ 349,349 scfm) + (1.8 ppmv x (96,666 scfm / 349,399 scfm) + (2.8 ppmv x (134,661 scfm/ 349,399 scfm)

Weighted Average of RCO Outlets: = 2.8 ppmv

The entire system destruction efficiency was determined to be 94.1% which consisted of the following calculations example for Test 1:

System Destruction Efficiency = 1 – (RCO A (lb/hr) + RCO B (lb/hr) + RCO C (lb/hr)) / (RCO Inlet (lb/hr) + RTO Inlet (lb/hr))

System Destruction Efficiency = 1 – (2.9 lb/hr + 1.2 lb/hr + 2.6 lb/hr) / (92.8 lb/hr + 15.7 lb/hr)

System Destruction Efficiency = 93.8%

The RTO destruction efficiency was determined to be 92.6% which consisted of the following calculations example for Test 1:

RTO Destruction Efficiency = 1 – (RTO outlet lb/hr) / (RTO Inlet lb/hr)

RTO Destruction Efficiency = 1 – (1.2 lb/hr) / (16.8 lb/hr)

RTO Destruction Efficiency = 92.6%

5.3 Variations in Testing Procedures

There were no sampling variations.

5.4 Process Upset Conditions During Testing

There were normal process breaks during production.

5.5 Maintenance Performed in Last Three Months

There was no maintenance performed outside of normal operations.

5.6 Re-Test

This was not a retest.

5.7 Audit Samples

This test did not require any audit samples.

5.8 Process Data

Process data can be found in **Appendix A**.

5.9 Flows and Moisture

Flow rate determination spreadsheets can be found in **Appendix C**.

5.10 Calibration Data

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

5.11 Example Calculations

Example calculation sheets can be found in **Appendix E**.

5.12 Laboratory Data

There was no laboratory data from this testing program.

TABLE

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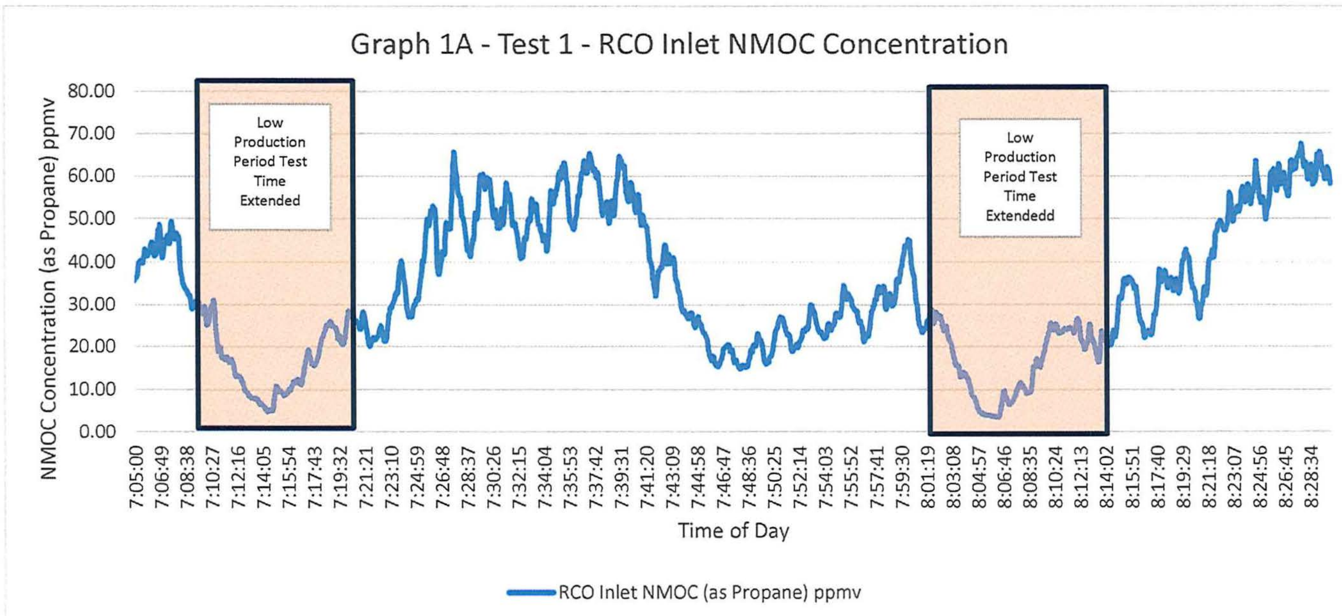
Table 1: Summary of Results
Ford FRAP VOC DE

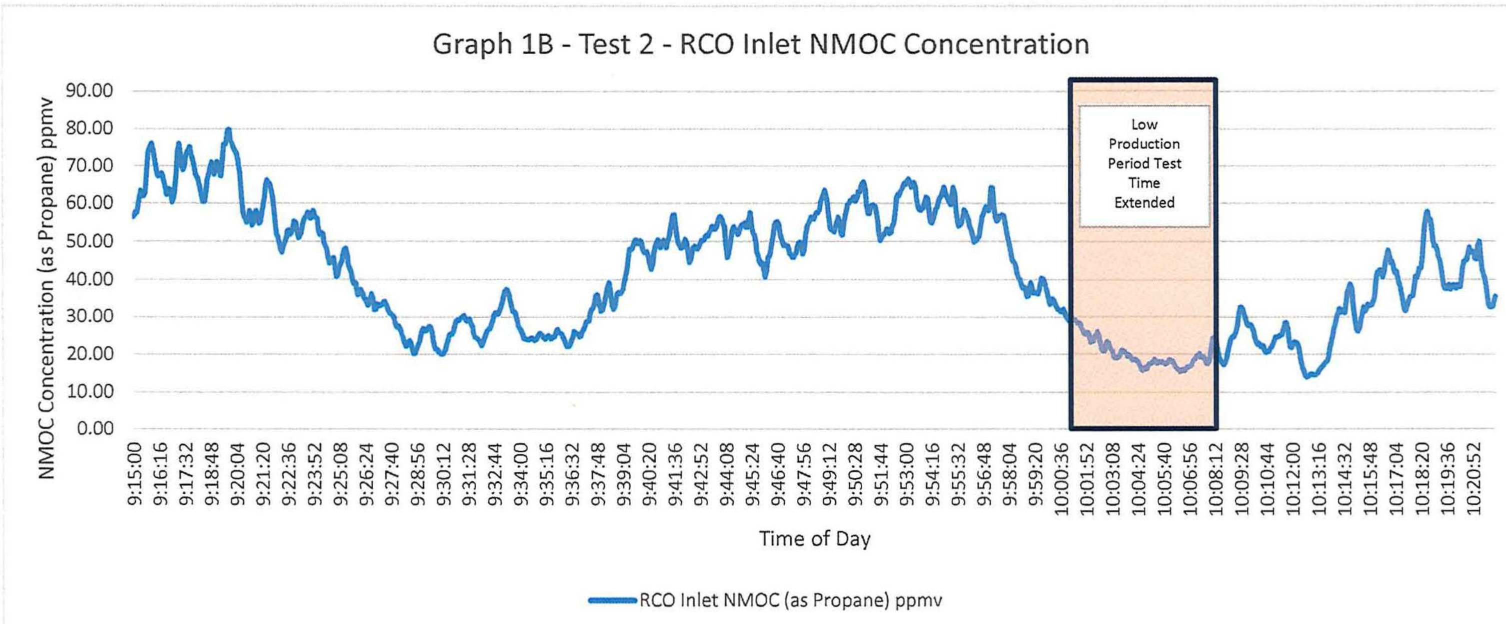
	Test 1	Test 2	Test 3	Average
Date	26-Jul-23	26-Jul-23	26-Jul-23	--
Start Time:	7:05 to 7:07, 7:21 to 8:01	9:15 to 10:00	12:45 to 13:21	--
Stop Time:	8:14 to 8:30	10:08 to 10:21	13:37 to 14:00	--
RCO Inlet Flowrate (scfm)	343,810	333,844	330,003	335,886
RCO A Outlet Flowrate (scfm)	118,072	116,181	99,671	111,308
RCO B Outlet Flowrate (scfm)	96,666	91,280	111,046	99,664
RCO C Outlet Flowrate (scfm)	134,661	149,047	112,656	132,121
RTO Inlet Flowrate (scfm)	26,801	27,532	26,466	26,933
RTO Outlet Flowrate (scfm)	28,744	27,821	28,727	28,431
RCO Inlet propane ppm	40.5	45.0	65.8	50.4
RCO Inlet methane ppm	2.6	4.3	2.2	3.0
RCO Inlet Response Factor	2.51	2.44	2.43	2.46
RCO Inlet Propane-methane ppm	39.5	43.3	64.9	49.2
RCO Inlet propane lb/hr	92.9	98.8	146.5	112.7
RCO A Outlet propane ppm	39.3	39.1	38.9	39.1
RCO A Outlet methane ppm	81.9	79.6	75.9	79.1
RCO A Outlet Response Factor	2.29	2.25	2.24	2.26
RCO A Outlet Propane-methane ppm	3.6	3.7	5.0	4.1
RCO A Outlet propane lb/hr	2.9	2.9	3.4	3.1
RCO B Outlet propane ppm	4.7	4.0	5.1	4.6
RCO B Outlet methane ppm	6.6	5.9	5.7	6.1
RCO B Outlet Response Factor	2.27	2.24	2.32	2.28
RCO B Outlet Propane-methane ppm	1.8	1.3	2.6	1.9
RCO B Outlet propane lb/hr	1.2	0.8	2.0	1.3
RCO C Outlet propane ppm	7.2	6.9	7.1	7.1
RCO C Outlet methane ppm	10.2	5.5	9.6	8.4
RCO C Outlet Response Factor	2.35	2.32	2.30	2.32
RCO C Outlet Propane-methane ppm	2.8	4.6	3.0	3.5
RCO C Outlet propane lb/hr	2.6	4.7	2.3	3.2
RTO Inlet propane ppm	93.9	136.6	111.7	114.1
RTO Inlet methane ppm	5.0	4.9	4.6	4.8
RTO Inlet Response Factor	2.36	2.23	2.16	2.25
RTO Inlet Propane-methane ppm	91.8	134.4	109.6	111.9
RTO Inlet propane lb/hr	16.8	25.3	19.8	20.7
RTO Outlet propane ppm	6.7	7.8	8.0	7.5
RTO Outlet methane ppm	0.8	0.0	0.8	0.6
RTO Outlet Response Factor	2.08	2.04	2.06	2.06
RTO Outlet Propane-methane ppm	6.3	7.8	7.6	7.2
RTO Outlet propane lb/hr	1.2	1.5	1.5	1.4
RCO DE	93.9%	93.2%	95.3%	94.1%
RTO DE	92.6%	94.2%	92.5%	93.1%
Flow Weighted Average RCO Outlets propane ppm	2.8	3.5	3.5	3.3

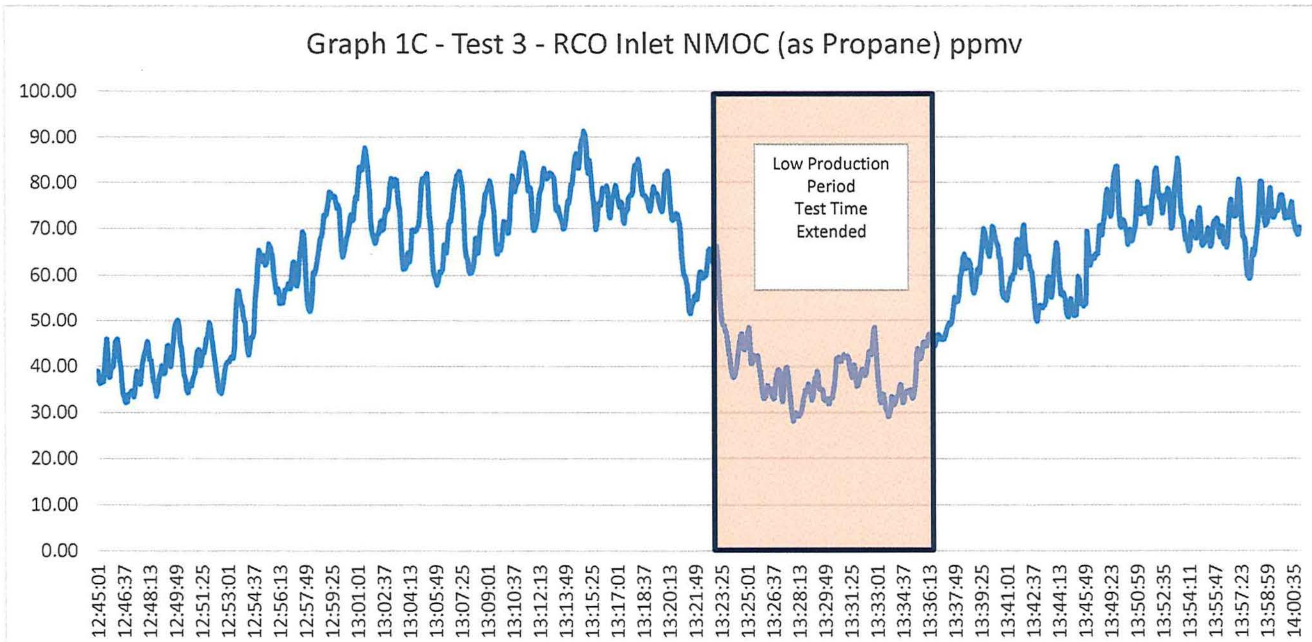
**RCO DE =1 -(RCOA + RCOB + RCOC))/(RCOIn + RTOIn)

GRAPHS



Graph 1A - Test 1 - RCO Inlet NMOC Concentration
NMOC Concentration (as Propane) ppmv
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
Low
Production
Period Test
Time
Extended
Low
Production
Period Test
Time
Extendedd
7:05:00
7:06:49
7:08:38
7:10:27
7:12:16
7:14:05
7:15:54
7:17:43
7:19:32
7:21:21
7:23:10
7:24:59
7:26:48
7:28:37
7:30:26
7:32:15
7:34:04
7:35:53
7:37:42
7:39:31
7:41:20
7:43:09
7:44:58
7:46:47
7:48:36
7:50:25
7:52:14
7:54:03
7:55:52
7:57:41
7:59:30
8:01:19
8:03:08
8:04:57
8:06:46
8:08:35
8:10:24
8:12:13
8:14:02
8:15:51
8:17:40
8:19:29
8:21:18
8:23:07
8:24:56
8:26:45
8:28:34
Time of Day
RCO Inlet NMOC (as Propane) ppmv


Graph 1B - Test 2 - RCO Inlet NMOC Concentration
NMOC Concentration (as Propane) ppmv
90.00
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
Low Production Period Test Time Extended
9:15:00
9:16:16
9:17:32
9:18:48
9:20:04
9:21:20
9:22:36
9:23:52
9:25:08
9:26:24
9:27:40
9:28:56
9:30:12
9:31:28
9:32:44
9:34:00
9:35:16
9:36:32
9:37:48
9:39:04
9:40:20
9:41:36
9:42:52
9:44:08
9:45:24
9:46:40
9:47:56
9:49:12
9:50:28
9:51:44
9:53:00
9:54:16
9:55:32
9:56:48
9:58:04
9:59:20
10:00:36
10:01:52
10:03:08
10:04:24
10:05:40
10:06:56
10:08:12
10:09:28
10:10:44
10:12:00
10:13:16
10:14:32
10:15:48
10:17:04
10:18:20
10:19:36
10:20:52
Time of Day
RCO Inlet NMOC (as Propane) ppmv



Graph 1C - Test 3 - RCO Inlet NMOC (as Propane) ppmv
100.00
90.00
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
Low Production Period Test Time Extended
12:45:01
12:46:37
12:48:13
12:49:49
12:51:25
12:53:01
12:54:37
12:56:13
12:57:49
12:59:25
13:01:01
13:02:37
13:04:13
13:05:49
13:07:25
13:09:01
13:10:37
13:12:13
13:13:49
13:15:25
13:17:01
13:18:37
13:20:13
13:21:49
13:23:25
13:25:01
13:26:37
13:28:13
13:29:49
13:31:25
13:33:01
13:34:37
13:36:13
13:37:49
13:39:25
13:41:01
13:42:37
13:44:13
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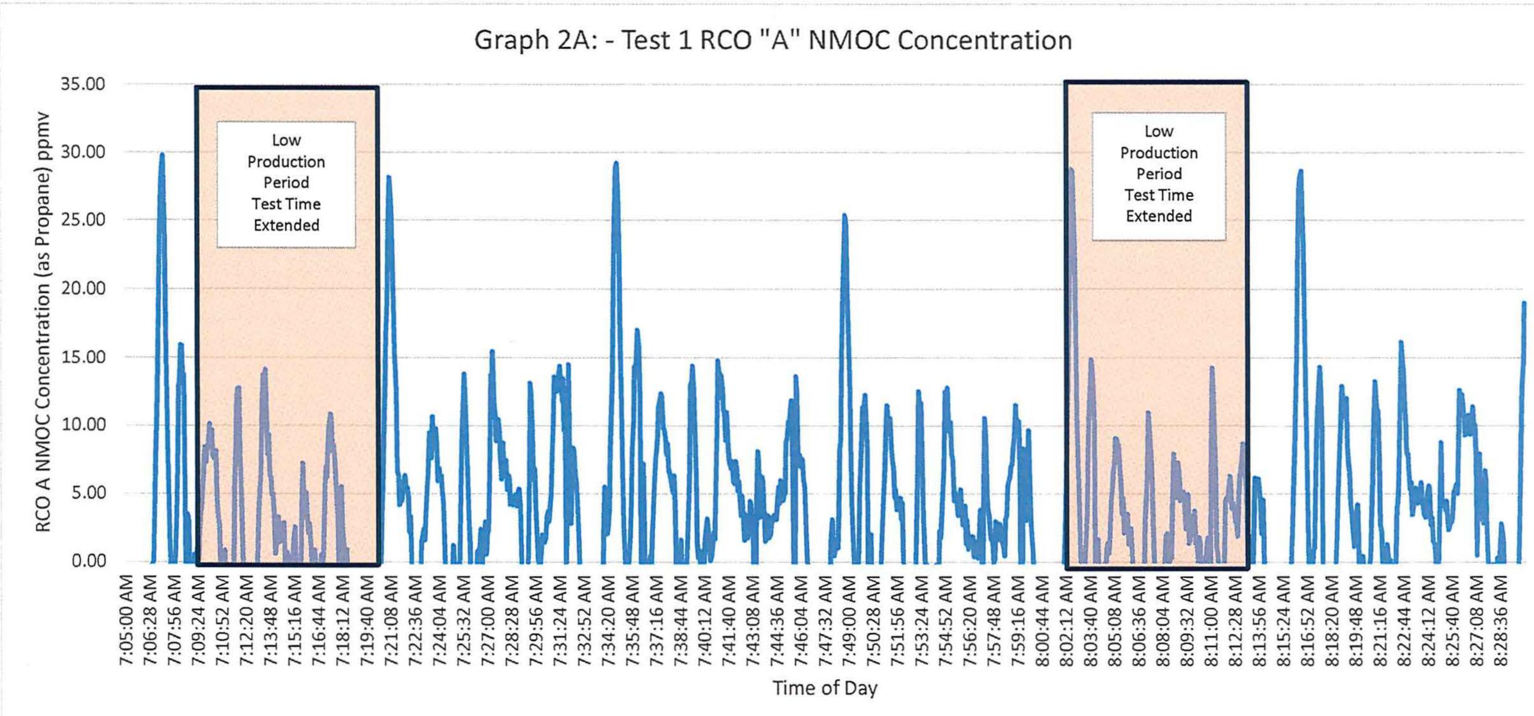
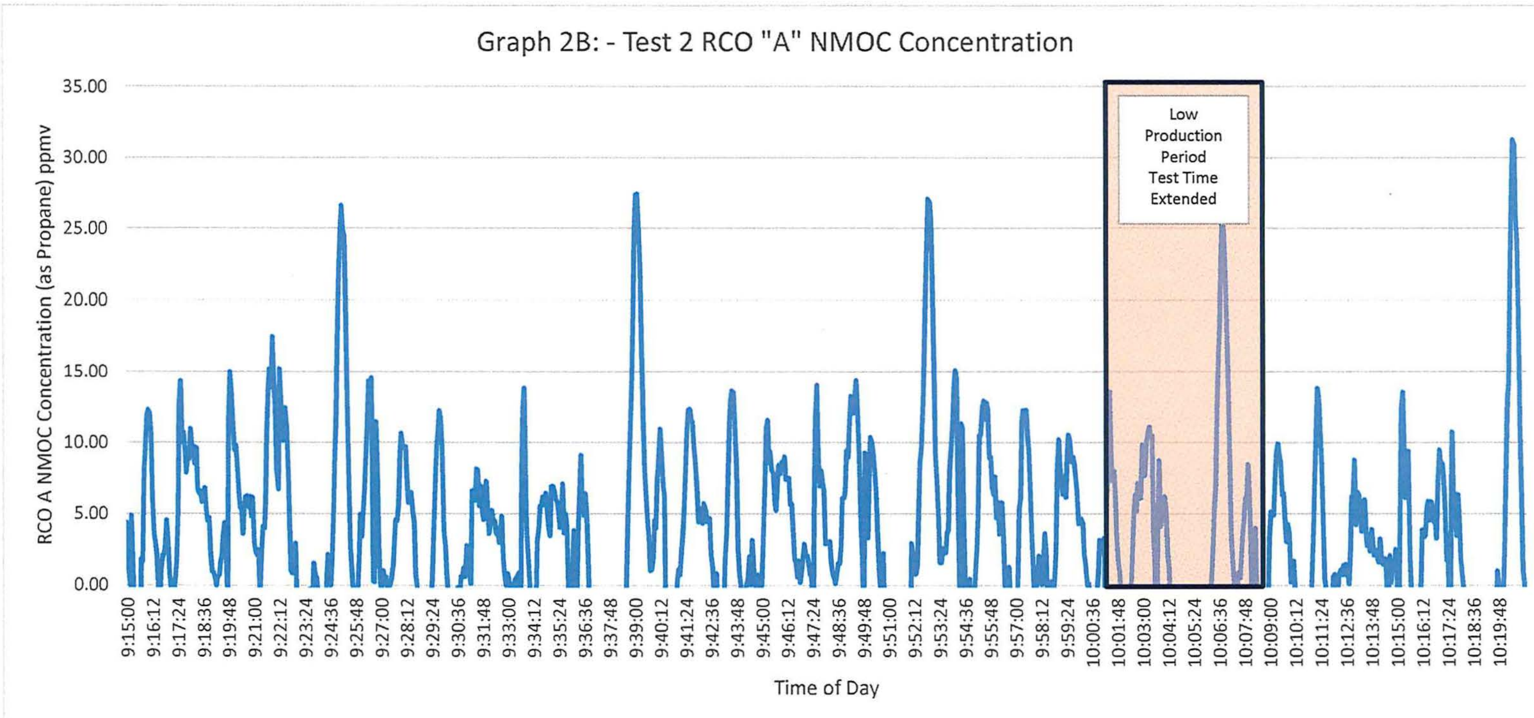
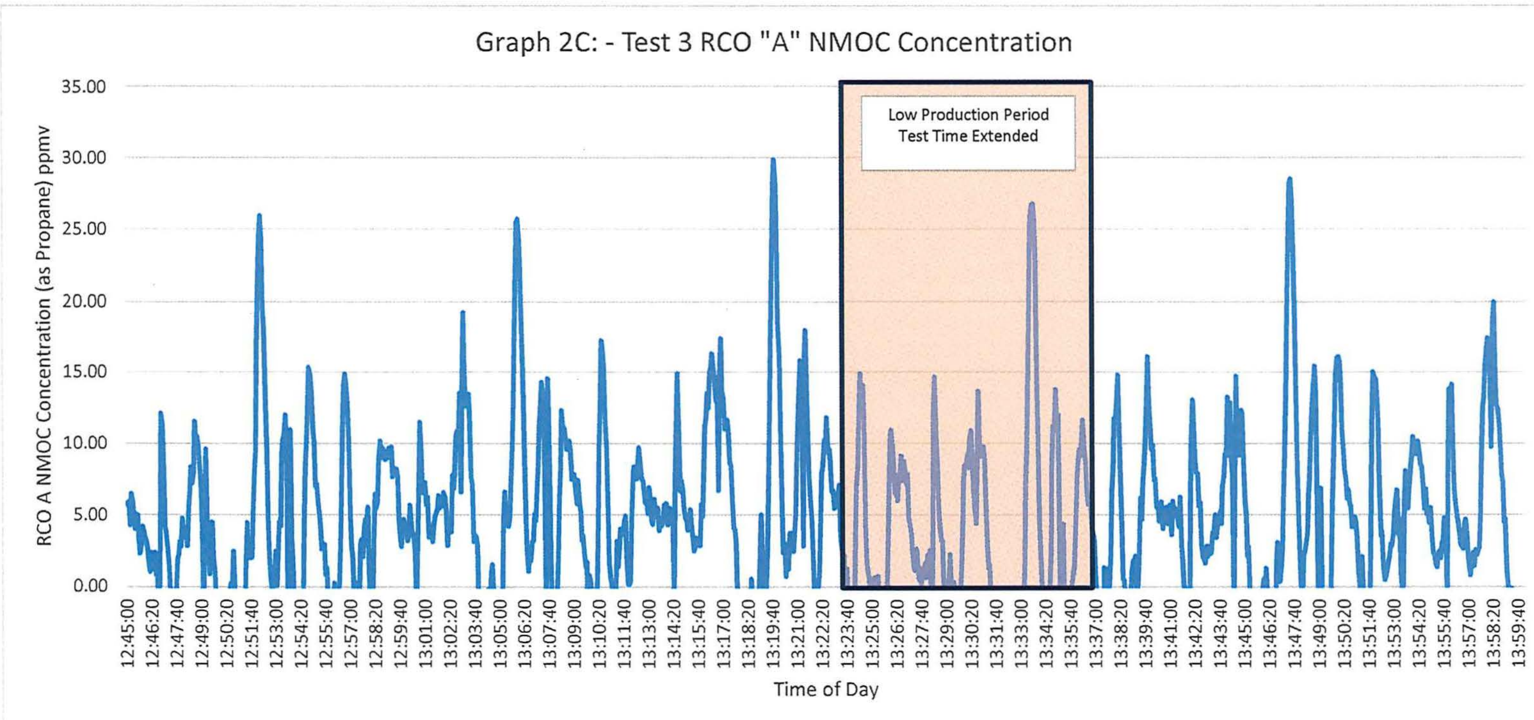
13:58:59
14:00:35

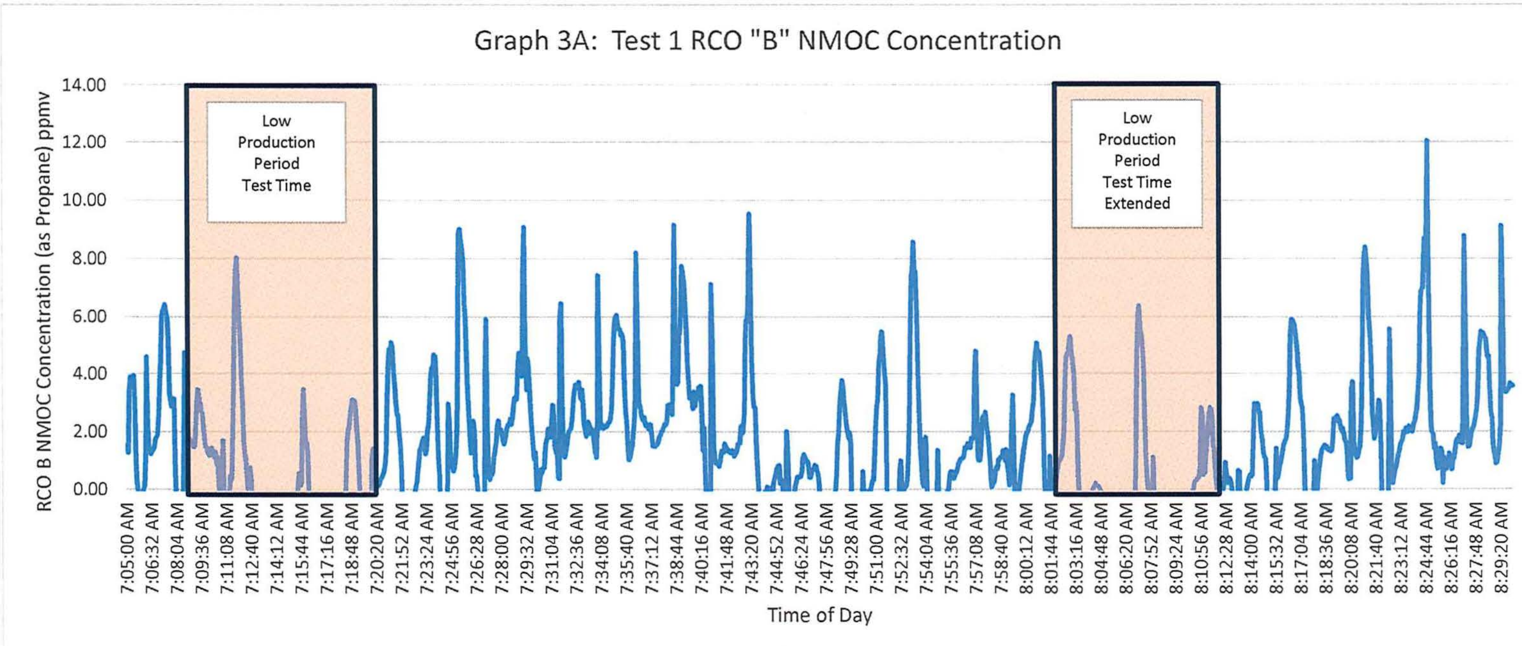

Graph 2A: - Test 1 RCO "A" NMOC Concentration
RCO A NMOC Concentration (as Propane) ppmv
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
Low Production Period Test Time Extended
Low Production Period Test Time Extended
7:05:00 AM
7:06:28 AM
7:07:56 AM
7:09:24 AM
7:10:52 AM
7:12:20 AM
7:13:48 AM
7:15:16 AM
7:16:44 AM
7:18:12 AM
7:19:40 AM
7:21:08 AM
7:22:36 AM
7:24:04 AM
7:25:32 AM
7:27:00 AM
7:28:28 AM
7:29:56 AM
7:31:24 AM
7:32:52 AM
7:34:20 AM
7:35:48 AM
7:37:16 AM
7:38:44 AM
7:40:12 AM
7:41:40 AM
7:43:08 AM
7:44:36 AM
7:46:04 AM
7:47:32 AM
7:49:00 AM
7:50:28 AM
7:51:56 AM
7:53:24 AM
7:54:52 AM
7:56:20 AM
7:57:48 AM
7:59:16 AM
8:00:44 AM
8:02:12 AM
8:03:40 AM
8:05:08 AM
8:06:36 AM
8:08:04 AM
8:09:32 AM
8:11:00 AM
8:12:28 AM
8:13:56 AM
8:15:24 AM
8:16:52 AM
8:18:20 AM
8:19:48 AM
8:21:16 AM
8:22:44 AM
8:24:12 AM
8:25:40 AM
8:27:08 AM
8:28:36 AM
Time of Day

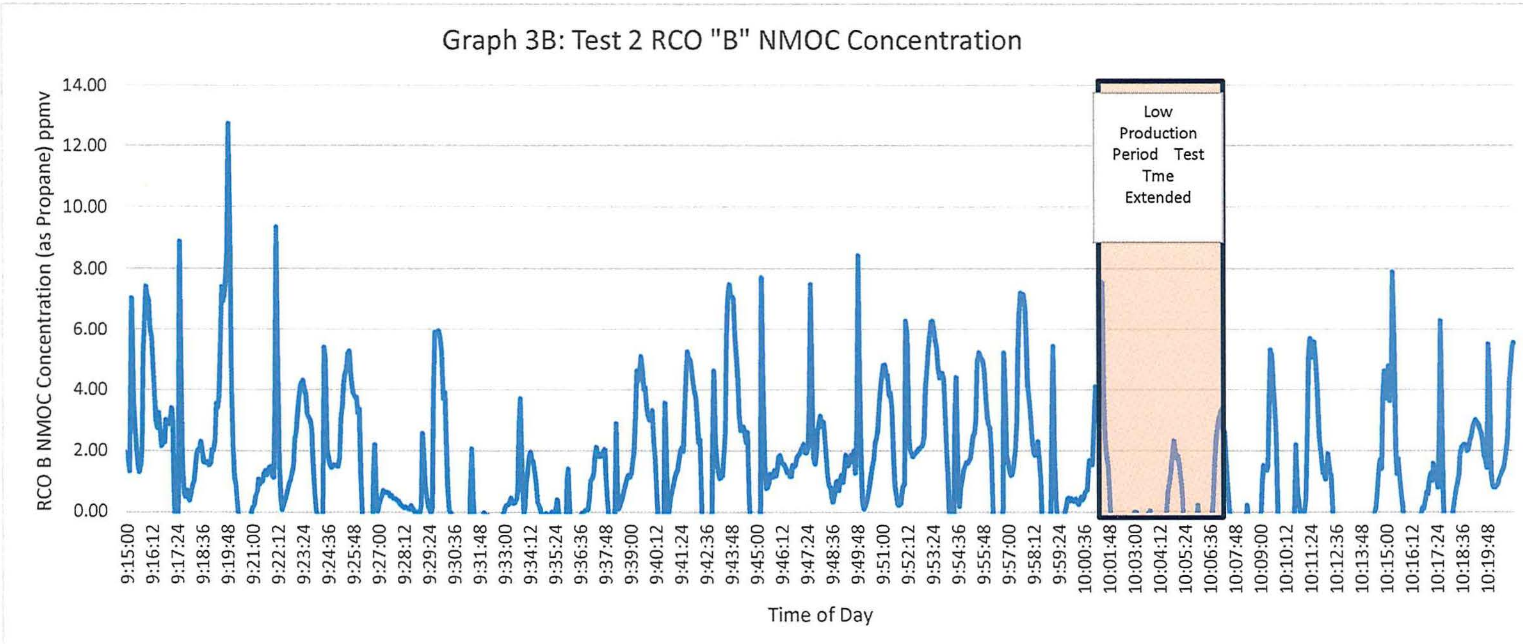


Graph 2B: - Test 2 RCO "A" NMOC Concentration
RCO A NMOC Concentration (as Propane) ppmv
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
Low Production Period Test Time Extended
9:15:00
9:16:12
9:17:24
9:18:36
9:19:48
9:21:00
9:22:12
9:23:24
9:24:36
9:25:48
9:27:00
9:28:12
9:29:24
9:30:36
9:31:48
9:33:00
9:34:12
9:35:24
9:36:36
9:37:48
9:39:00
9:40:12
9:41:24
9:42:36
9:43:48
9:45:00
9:46:12
9:47:24
9:48:36
9:49:48
9:51:00
9:52:12
9:53:24
9:54:36
9:55:48
9:57:00
9:58:12
9:59:24
10:00:36
10:01:48
10:03:00
10:04:12
10:05:24
10:06:36
10:07:48
10:09:00
10:10:12
10:11:24
10:12:36
10:13:48
10:15:00
10:16:12
10:17:24
10:18:36
10:19:48
Time of Day



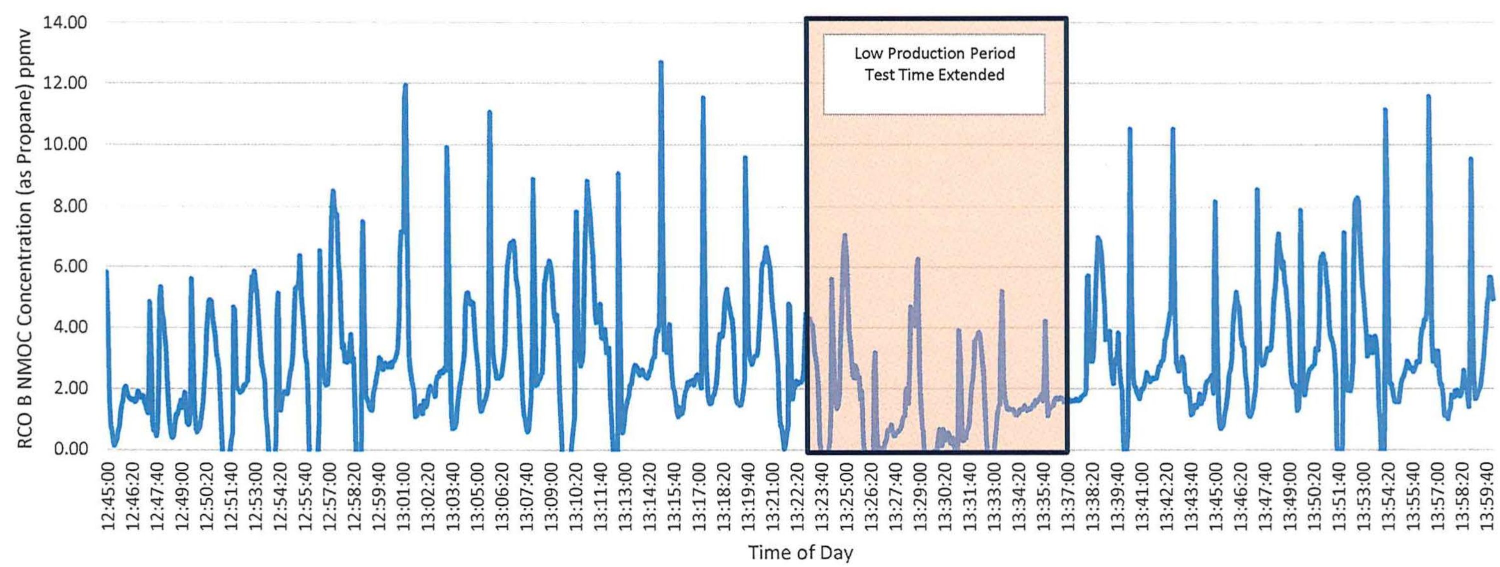
Graph 2C: - Test 3 RCO "A" NMOC Concentration
Low Production Period
Test Time Extended
RCO A NMOC Concentration (as Propane) ppmv
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
12:45:00
12:46:20
12:47:40
12:49:00
12:50:20
12:51:40
12:53:00
12:54:20
12:55:40
12:57:00
12:58:20
12:59:40
13:01:00
13:02:20
13:03:40
13:05:00
13:06:20
13:07:40
13:09:00
13:10:20
13:11:40
13:13:00
13:14:20
13:15:40
13:17:00
13:18:20
13:19:40
13:21:00
13:22:20
13:23:40
13:25:00
13:26:20
13:27:40
13:29:00
13:30:20
13:31:40
13:33:00
13:34:20
13:35:40
13:37:00
13:38:20
13:39:40
13:41:00
13:42:20
13:43:40
13:45:00
13:46:20
13:47:40
13:49:00
13:50:20
13:51:40
13:53:00
13:54:20
13:55:40
13:57:00
13:58:20
13:59:40
Time of Day

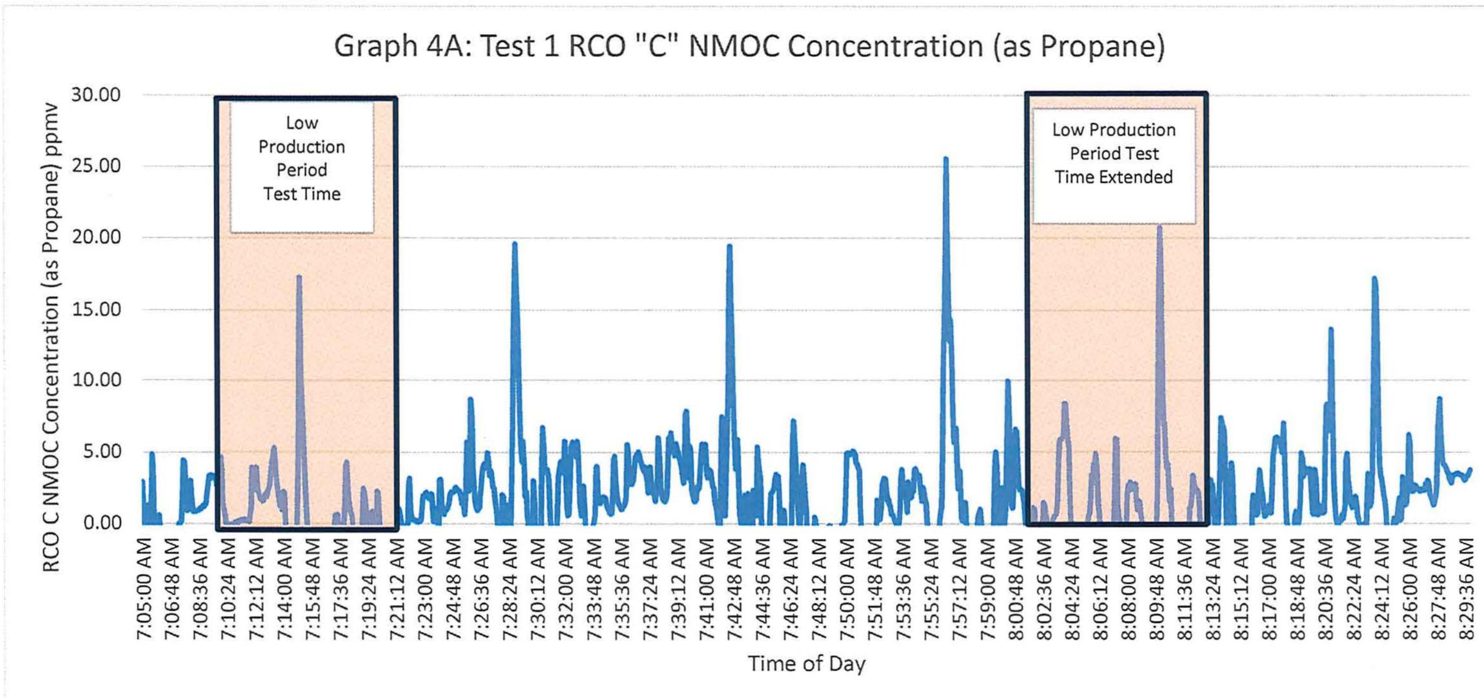

Graph 3A: Test 1 RCO "B" NMOC Concentration
RCO B NMOC Concentration (as Propane) ppmv
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
Low Production Period Test Time
Low Production Period Test Time Extended
7:05:00 AM
7:06:32 AM
7:08:04 AM
7:09:36 AM
7:11:08 AM
7:12:40 AM
7:14:12 AM
7:15:44 AM
7:17:16 AM
7:18:48 AM
7:20:20 AM
7:21:52 AM
7:23:24 AM
7:24:56 AM
7:26:28 AM
7:28:00 AM
7:29:32 AM
7:31:04 AM
7:32:36 AM
7:34:08 AM
7:35:40 AM
7:37:12 AM
7:38:44 AM
7:40:16 AM
7:41:48 AM
7:43:20 AM
7:44:52 AM
7:46:24 AM
7:47:56 AM
7:49:28 AM
7:51:00 AM
7:52:32 AM
7:54:04 AM
7:55:36 AM
7:57:08 AM
7:58:40 AM
8:00:12 AM
8:01:44 AM
8:03:16 AM
8:04:48 AM
8:06:20 AM
8:07:52 AM
8:09:24 AM
8:10:56 AM
8:12:28 AM
8:14:00 AM
8:15:32 AM
8:17:04 AM
8:18:36 AM
8:20:08 AM
8:21:40 AM
8:23:12 AM
8:24:44 AM
8:26:16 AM
8:27:48 AM
8:29:20 AM
Time of Day



Graph 3B: Test 2 RCO "B" NMOC Concentration
RCO B NMOC Concentration (as Propane) ppmv
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
Low Production Period Test Tme Extended
9:15:00
9:16:12
9:17:24
9:18:36
9:19:48
9:21:00
9:22:12
9:23:24
9:24:36
9:25:48
9:27:00
9:28:12
9:29:24
9:30:36
9:31:48
9:33:00
9:34:12
9:35:24
9:36:36
9:37:48
9:39:00
9:40:12
9:41:24
9:42:36
9:43:48
9:45:00
9:46:12
9:47:24
9:48:36
9:49:48
9:51:00
9:52:12
9:53:24
9:54:36
9:55:48
9:57:00
9:58:12
9:59:24
10:00:36
10:01:48
10:03:00
10:04:12
10:05:24
10:06:36
10:07:48
10:09:00
10:10:12
10:11:24
10:12:36
10:13:48
10:15:00
10:16:12
10:17:24
10:18:36
10:19:48
Time of Day

Graph 3C - Test 3 RCO "B" NMOC Concentration





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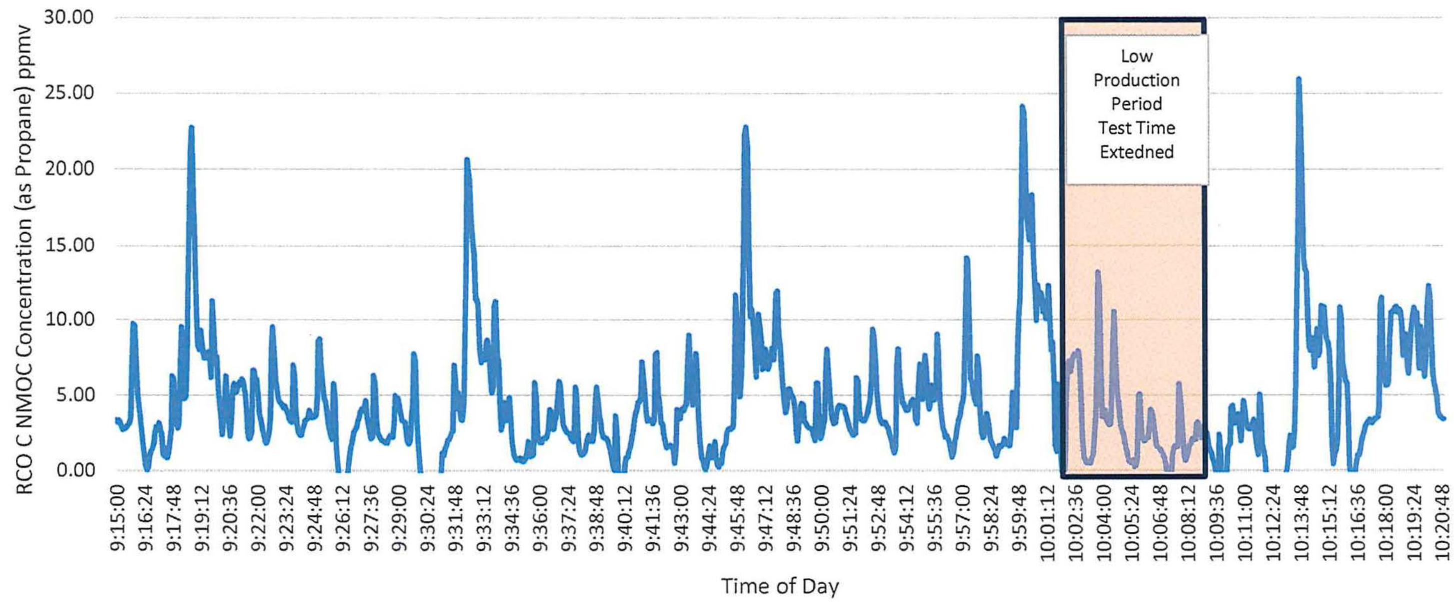
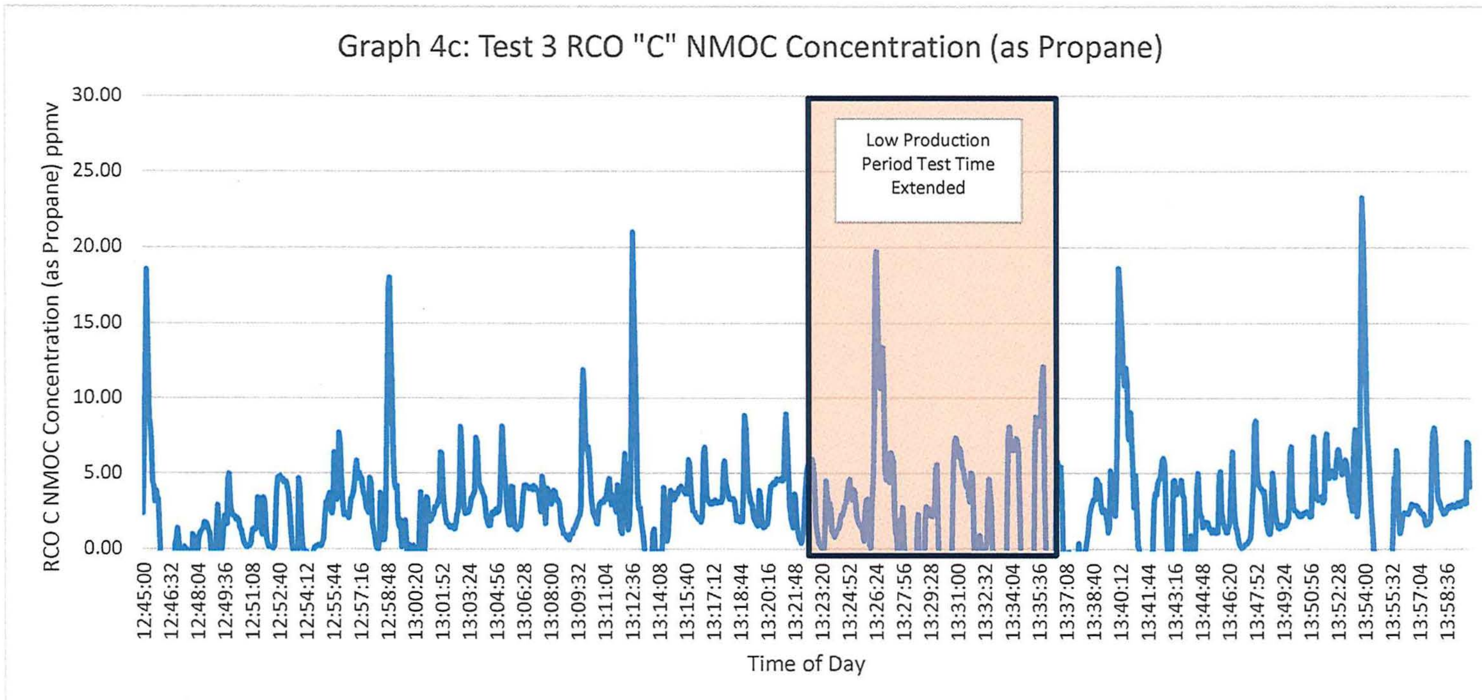
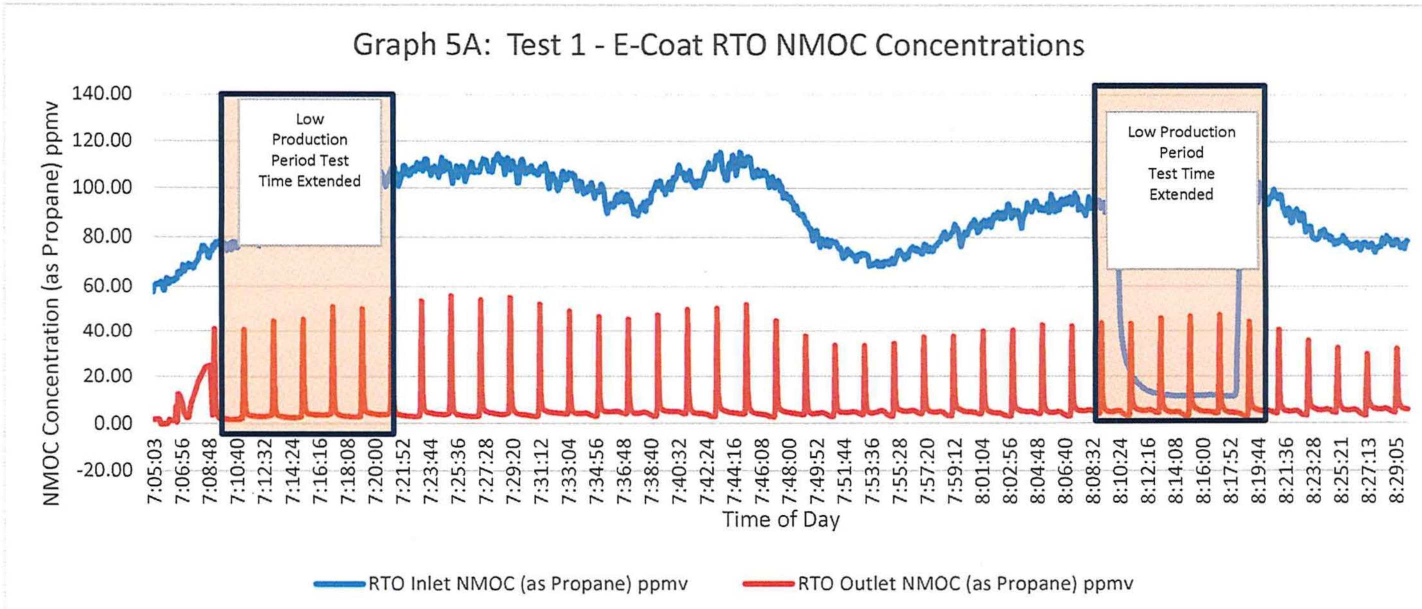
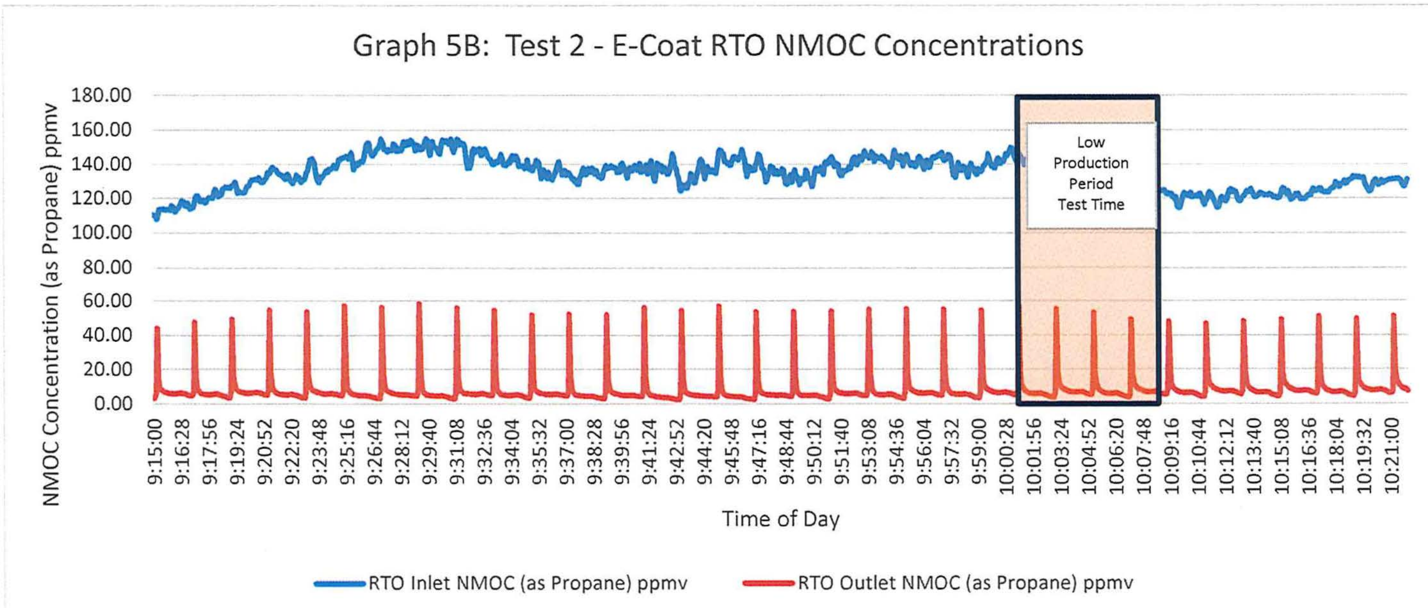
Graph 4b: Test 2 RCO "C" NMOC Concentration (as Propane)




Graph 4c: Test 3 RCO "C" NMOC Concentration (as Propane)
RCO C NMOC Concentration (as Propane) ppmv
30.00
25.00
20.00
15.00
10.00
5.00
0.00
Low Production Period Test Time Extended
12:45:00
12:46:32
12:48:04
12:49:36
12:51:08
12:52:40
12:54:12
12:55:44
12:57:16
12:58:48
13:00:20
13:01:52
13:03:24
13:04:56
13:06:28
13:08:00
13:09:32
13:11:04
13:12:36
13:14:08
13:15:40
13:17:12
13:18:44
13:20:16
13:21:48
13:23:20
13:24:52
13:26:24
13:27:56
13:29:28
13:31:00
13:32:32
13:34:04
13:35:36
13:37:08
13:38:40
13:40:12
13:41:44
13:43:16
13:44:48
13:46:20
13:47:52
13:49:24
13:50:56
13:52:28
13:54:00
13:55:32
13:57:04
13:58:36
Time of Day

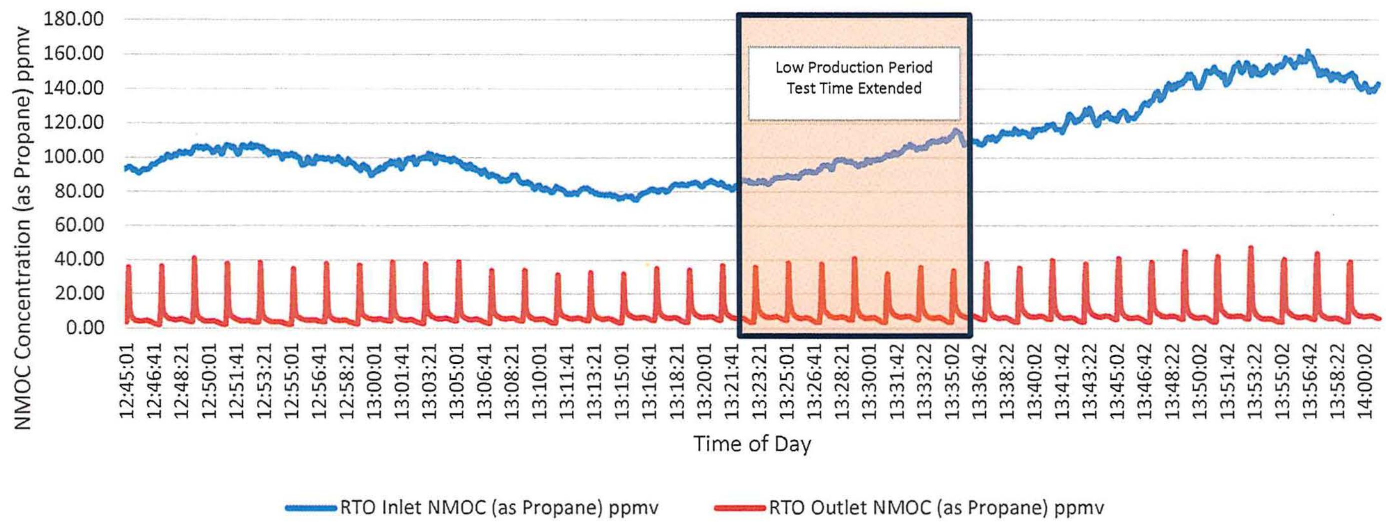


Graph 5A: Test 1 - E-Coat RTO NMOC Concentrations
NMOC Concentration (as Propane) ppmv
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
-20.00
Low
Production
Period Test
Time Extended
Low Production
Period
Test Time
Extended
7:05:03
7:06:56
7:08:48
7:10:40
7:12:32
7:14:24
7:16:16
7:18:08
7:20:00
7:21:52
7:23:44
7:25:36
7:27:28
7:29:20
7:31:12
7:33:04
7:34:56
7:36:48
7:38:40
7:40:32
7:42:24
7:44:16
7:46:08
7:48:00
7:49:52
7:51:44
7:53:36
7:55:28
7:57:20
7:59:12
8:01:04
8:02:56
8:04:48
8:06:40
8:08:32
8:10:24
8:12:16
8:14:08
8:16:00
8:17:52
8:19:44
8:21:36
8:23:28
8:25:21
8:27:13
8:29:05
Time of Day
RTO Inlet NMOC (as Propane) ppmv
RTO Outlet NMOC (as Propane) ppmv



Graph 5B: Test 2 - E-Coat RTO NMOC Concentrations
NMOC Concentration (as Propane) ppmv
180.00
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
9:15:00
9:16:28
9:17:56
9:19:24
9:20:52
9:22:20
9:23:48
9:25:16
9:26:44
9:28:12
9:29:40
9:31:08
9:32:36
9:34:04
9:35:32
9:37:00
9:38:28
9:39:56
9:41:24
9:42:52
9:44:20
9:45:48
9:47:16
9:48:44
9:50:12
9:51:40
9:53:08
9:54:36
9:56:04
9:57:32
9:59:00
10:00:28
10:01:56
10:03:24
10:04:52
10:06:20
10:07:48
10:09:16
10:10:44
10:12:12
10:13:40
10:15:08
10:16:36
10:18:04
10:19:32
10:21:00
Time of Day
Low Production Period Test Time
RTO Inlet NMOC (as Propane) ppmv
RTO Outlet NMOC (as Propane) ppmv

Graph 5C: Test 3 - E-Coat RTO NMOC Concentrations



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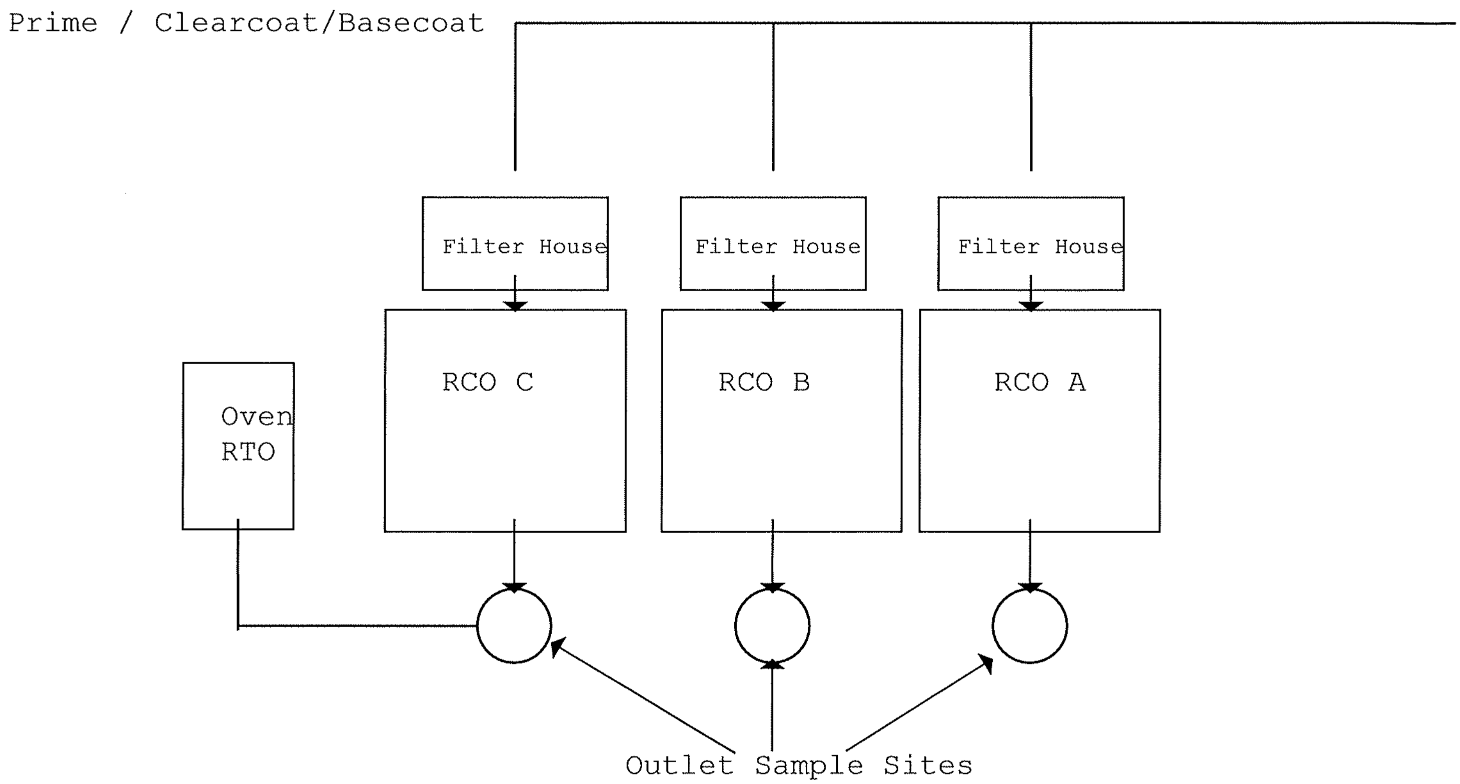
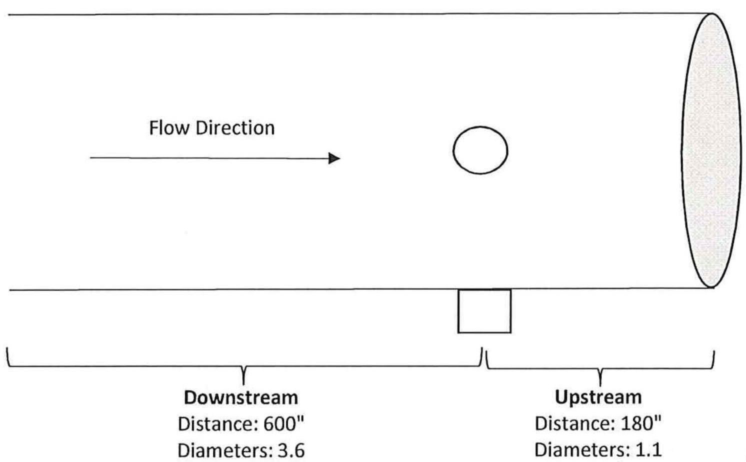


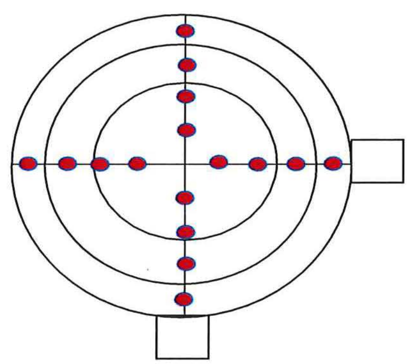
Figure 1
Flat Rock Assembly Plant
Abatement System Layout and Sampling Locations

Figure No. 2: RCO Inlet Traverse Points

Diameter (in.): 168



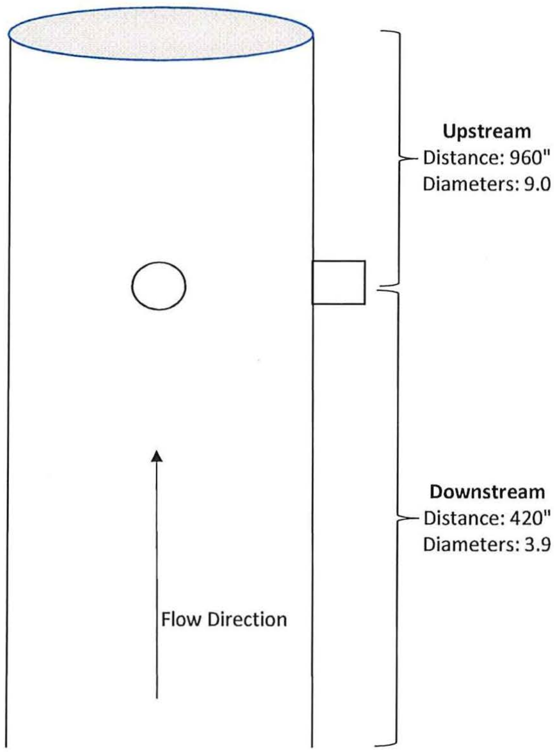
Sampling Points (in.)	
1	5.4
2	17.6
3	32.6
4	54.3
5	113.7
6	135.4
7	150.4
8	162.6



Not to Scale

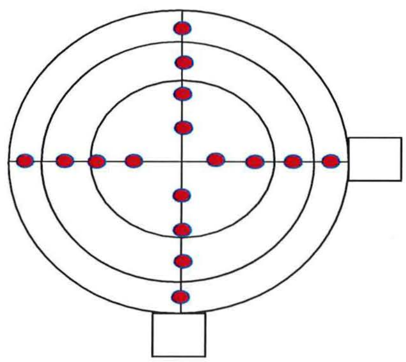
RCO Inlet	**Date:**	**RWDI USA LLC**
Ford Motor Company	26-Jul-23	2239 Star Court
Flat Rock Assembly Plant		Rochester Hills, MI 48309
Flat Rock, Michigan		

Figure No. 3: RCO Outlets Traverse Points



Diameter (in.): 107

Sampling Points (in.)	
1	3.4
2	11.2
3	20.8
4	34.6
5	72.4
6	86.2
7	95.8
8	103.6



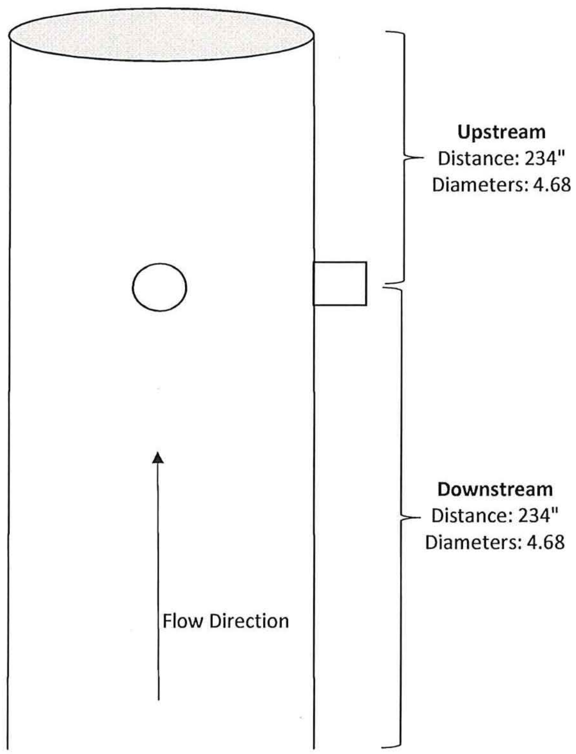
Not to Scale

RCO Outlet A,B,C
Ford Motor Company
Flat Rock Assembly Plant
Flat Rock, Michigan

Date:
26-Jul-23

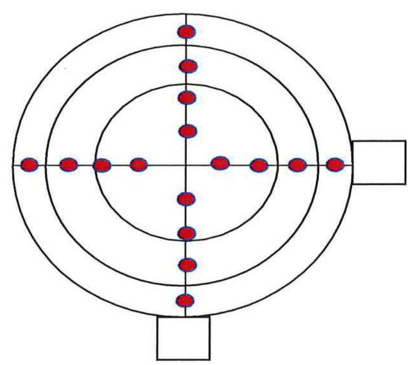
RWDI USA LLC
2239 Star Court
Rochester Hills, MI 48309

Figure No. 4: RTO Inlet Traverse Points



Diameter (in.): 50

Sampling Points (in.)	
1	1.6
2	5.3
3	9.7
4	16.2
5	33.9
6	40.3
7	44.8
8	48.4



Not to Scale

RTO Inlet
Ford Motor Company
Flat Rock Assembly Plant
Flat Rock, Michigan

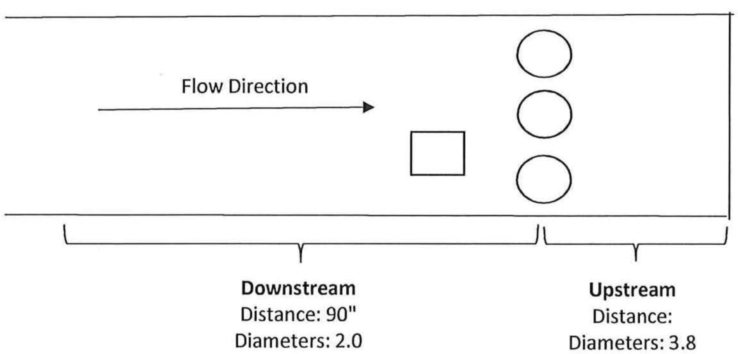
Date:
26-Jul-23

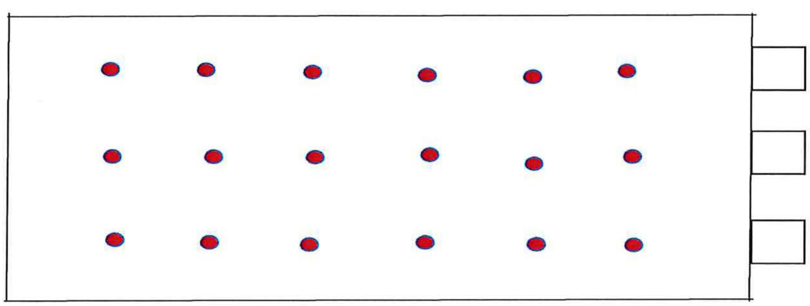
RWDI USA LLC
2239 Star Court
Rochester Hills, MI 48309

Figure No. 5: RTO Outlet Traverse Points

Diameter (in.): 46 x42

Sampling Points (in.)	
1	3.8
2	11.5
3	19.2
4	26.8
5	34.5
6	42.2





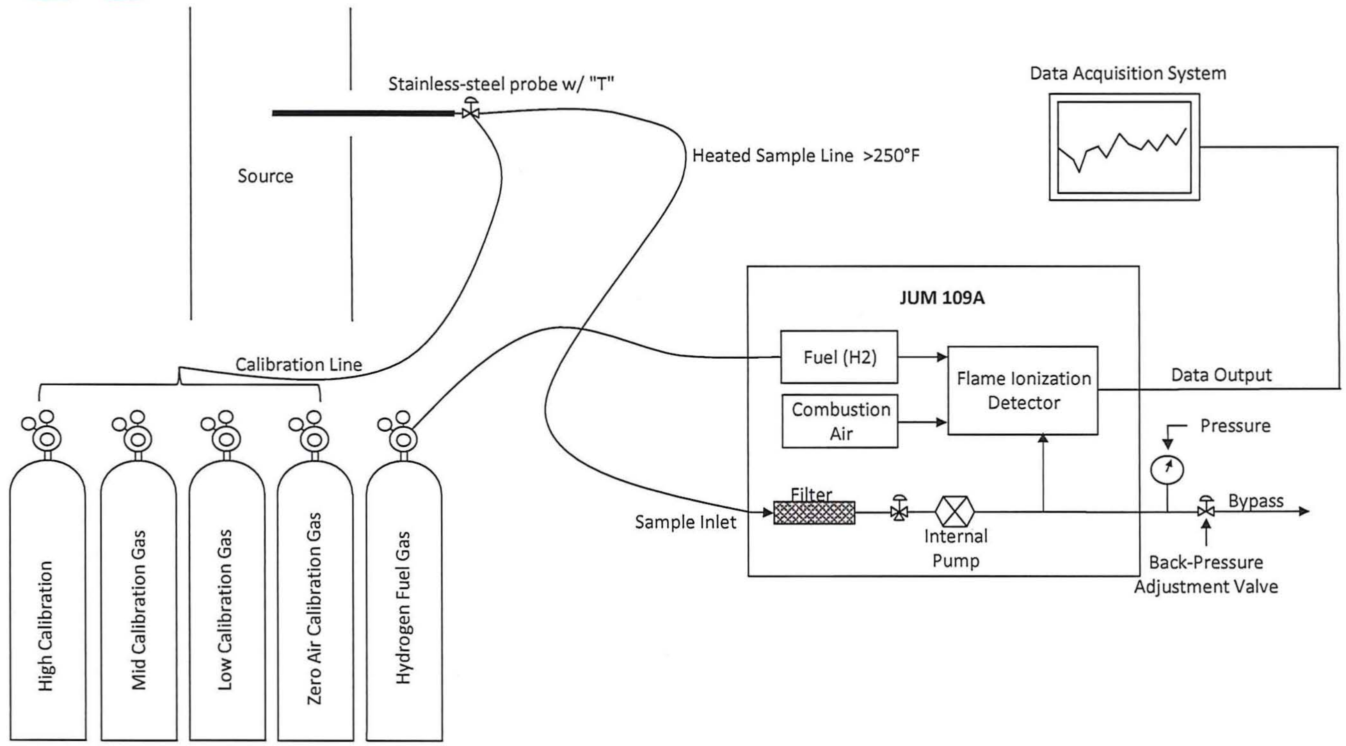
Not to Scale

RTO Outlet
Ford Motor Company
Flat Rock Assembly Plant
Flat Rock, Michigan

Date:
26-Jul-23

RWDI USA LLC
2239 Star Court
Rochester Hills, MI 48309

Figure No. 6: USEPA Method 25A Schematic



USEPA Method 25A

Ford Motor Company
Flat Rock Assembly Plant
Flat Rock, Michigan

Date: July 26, 2023