



EXECUTIVE SUMMARY

RWDI USA LLC (RWDI) was retained by FCA US LLC (FCA) to complete the emission sampling program at their Detroit Assembly Complex - Mack (DACM) located at 4000 Saint Jean Street, Detroit, Michigan. DACM operates an automobile assembly plant that produces the all-new Jeep Grand Cherokee L. Under Permit to Install (PTI) 14-19A (copy of PTI is provided in **Attachment A**) this compliance testing covers the required testing for validation of destruction efficiency (DE) for the regenerative thermal oxidizer (RTO) serving the E-Coat Tank and curing oven (EUECOAT), Primer Curing Oven (EUPRIMER), and basecoat/clearcoat curing ovens (EUTOPCOAT) in addition to the desorb portion from the two (2) Concentrators. The testing included the removal efficiency for two (2) Zeolite Concentrators servicing the primer and tutone booths (EUPRIMER) and the basecoat/clearcoat booths (EUTOPCOAT). In addition to destruction efficiency of the RTO and removal efficiencies of the concentrators, particulate measurements were also completed on the RTO exhaust (outlet) for PM/PM10/PM2.5 and oxides of nitrogen (NOx) and NOX on the concentrators outlet (clean air exhaust). The test program commenced on September 8, 2021 and was completing on September 10, 2021.

Executive Table i: RTO Average - Destruction Efficiency

Parameter	Concentration & Emission Rate			
	Run 1	Run 2	Run 4	Average
THC Inlet- Booth (as propane)	638.5 ppmv 75.5 lb/hr	674.1 ppmv 80.7 lb/hr	583.8 ppmv 69.7 lb/hr	632.1 ppmv 75.3 lb/hr
THC Inlet- Oven (as propane)	56.7 ppmv 22.8 lb/hr	64.8 ppmv 26.3 lb/hr	94.7 ppmv 38.0 lb/hr	72.0ppmv 29.0 lb/hr
THC Inlet (Combined Emission Rate; Booth + Oven) (as propane)	98.3 lb/hr	107.0 lb/hr	107.7 lb/hr	104.3 lb/hr
THC Outlet (as propane)	8.18 ppmv 4.28 lb/hr	8.45 ppmv 4.43 lb/hr	6.65 ppmv 3.60 lb/hr	7.76 ppmv 4.10 lb/hr
Destruction Efficiency	95.6 %	95.9 %	96.7 %	96.1 %
Residence Time (seconds)	1.27	1.27	1.21	1.25
RTO Combustion Chamber Temperature (°F)	1,453	1,447	1,453	1,451

Note: Destruction Efficiency (%) calculated using emission rate; Run 3 can be found in the detailed tables of the report, but is not included in the average due to a lack of production

Destruction Efficiency was calculated by dividing the calculated mass emission rate (in lbs/hr) of the outlet in Total Hydrocarbon (THC) by the combined inlet emission rate (Booth plus Oven, in lbs/hr) for THC.



Executive Table ii: Combined Concentrators - Removal Efficiency

Parameter	Concentration & Emission Rate (ppmv, lb/hr & % Removal)			
	Run 1	Run 2	Run 3	Average
THC Inlet (as propane)	143.12 ppmv	113.09 ppmv	91.80 ppmv	116.00 ppmv
Methane Inlet (as propane)	0.84 ppmv	0.86 ppmv	1.07 ppmv	0.92 ppmv
Non-Methane Inlet (as propane)	142.28 ppmv	112.23 ppmv	90.74 ppmv	115.08 ppmv
THC Outlet (as propane)	7.85 ppmv	6.23 ppmv	5.50 ppmv	6.53 ppmv
Methane Outlet (as propane)	1.07 ppmv	1.03 ppmv	0.97 ppmv	1.02 ppmv
Non-Methane Outlet (as propane)	6.79 ppmv 4.56 lb/hr	5.19 ppmv 3.56 lb/hr	4.52 ppmv 2.99 lb/hr	5.50 ppmv 3.70 lb/hr
Removal Efficiency (Non-Methane Inlet and Outlet)	95.2%	95.4%	95.0%	95.2%
Desorb Temperature (°F) Concentrator 1	370	368	371	370
Desorb Temperature (°F) Concentrator 2	369	368	368	369

Removal efficiency was taken as NMOC (THC minus Methane) from the inlet and outlet based on concentration.

Executive Table iii: RTO - Average Emission Data - Particulate Testing

Parameter	Concentration & Emission Rate (grains/dscf & lb/hr)			
	Run 1	Run 2	Run 3	Average
RTO Outlet (average Test 1, 2 & 3) ⁽¹⁾	0.00136 grains/dscf 0.95 lb/hr	<0.00327 grains/dscf <2.24 lb/hr	< 0.00088 grains/dscf <0.57 lb/hr	< 0.00184 grains/dscf < 1.25 lb/hr
RTO Outlet (average Test 1 & 2)	0.00136 grains/dscf 0.95 lb/hr	N/A ⁽¹⁾	< 0.00088 grains/dscf <0.57 lb/hr	< 0.00112 grains/dscf < 0.76 lb/hr

Note: ⁽¹⁾ Upon review of the laboratory data, the extractable condensable portion of M202 results from Test 2 seem suspect in comparison to Test 1 and 3. The results from Test 2 are approximately 3 times the values from Test 1 and 3 which are comparable. Therefore, averages of test results are shown for Tests 1 and 2 only, as well as Tests 1, 2, and 3.

Executive Table iv: RTO & Combined Concentrators - Average Emission Data - NOx Testing

Parameter	Concentration & Emission Rate (ppmv & lb/hr)			
	Run 1	Run 2	Run 3	Average
RTO Outlet	3.63 ppmv 2.08 lb/hr	4.56 ppmv 2.61 lb/hr	5.13 ppmv 2.81 lb/hr	4.44 ppmv 2.50 lb/hr
Combined Concentrator Outlet	-0.10 ppmv -0.07 lb/hr	0.02 ppmv 0.01 lb/hr	-0.15 ppmv -0.05 lb/hr	-0.10 ppmv -0.04 lb/hr



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1 INTRODUCTION

RWDI USA LLC (RWDI) was retained by FCA US LLC (FCA) to complete the emission sampling program at their Detroit Assembly Complex - Mack (DACM) located at 4000 Saint Jean Street, Detroit, Michigan. DACM operates an automobile assembly plant that produces the all-new Jeep Grand Cherokee L. Under Permit to Install (PTI) 14-19A (copy of PTI is provided in **Attachment A**) this compliance testing covers the required testing for validation the following:

- Destruction Efficiency (DE) for the regenerative thermal oxidizer (RTO) serving the E-Coat Tank and curing oven (EUECOAT), Primer Curing Oven (EUPRIMER), and basecoat/clearcoat curing ovens (EUTOPCOAT) in addition to the desorb portion from the two (2) Concentrators.
- Removal Efficiency (RE) for two (2) Zeolite Concentrators servicing the primer and tutone booths (EUPRIMER) and the basecoat/clearcoat booths (EUTOPCOAT).
- Particulate measurements were completed on the RTO exhaust (outlet) for PM/PM10/PM2.5; and
- Oxides of nitrogen (NOx) on the RTO (outlet) and the Concentrators outlet (clean air exhaust).

The testing satisfies the following conditions under FGAUTOASSEMBLY:

- V(1): Particulate emissions from the RTO. Note that particulate emissions from the concentrator clean air stack are expected to be negligible and therefore not included as representative particulate emission units.
- V(2): NOx emissions from the exhaust of the RTO and clean air exhaust from the concentrators.
- V(5): Destruction efficiency of the RTO and removal efficiency of the concentrators.

DACM recorded the production rate of vehicles processed during each Destruction Efficiency test from the RTO and each Removal Efficiency test from the concentrators. The two (2) concentrators have a combined inlet and a combined clean air exhaust from the units. Therefore, the two (2) concentrators were tested as a single unit. DACM recorded the RTO combustion chamber temperature during each of the Destruction Efficiency tests and the desorption gas inlet temperatures for each of the Zeolite Concentrators during each Removal Efficiency test.

The Results of the sampling program are outlined in the tables below. Results of individual tests are presented in the Appendices. The test program was complete the week of September 6, 2021, completing the on-site testing on September 10, 2021.



2 SOURCE DESCRIPTION

2.1 Plant and Sources Overview

This section gives a detailed description of each process that that is controlled by either the RTO and/or Concentrator 1 & 2.

2.1.1 EUECOAT

An electrodeposition (E-Coat) coating process consisting of a series dip tanks, rinses, a curing oven, a cooling tunnel, followed by a prep booth (light sanding) and spot prime coating booth. Repairs take place in a prep sanding booth (light sanding), followed by manual application of a small amount of spot prime coating in a spot prime coating booth. Emissions from the E-coat tanks and the curing oven are controlled by the RTO. Emissions from the prep booth are filtered, recirculated, and exhausted in-plant. Emissions from the spot prime booth are filtered and exhausted to atmosphere.

2.1.2 EUPRIMER

A prep tunnel, two (2) automatic primer booths, one for solvent borne main primer and one for solvent borne tutone coloring primer, a primer observation zone, an ambient flash-off area, two natural gas fired primer ovens, a cooling tunnel and two (2) booths (color prep and reprocess heavy sand) for repair of surface blemishes. Coating booth overspray is controlled by a waterwash particulate control system. A portion of the primer coating booth exhaust is filtered and recirculated to the booth air make-up system. The primer coating booth emissions are exhausted through a bank of particulate filters, the concentrator and the RTO (via concentrator desorption exhaust). Primer Oven emissions are exhausted directly to the RTO. Emissions from the observation and ambient flash-off zones are controlled by particulate control system and exhausted to the ambient air.

2.1.3 EUTOPCOAT

An automatic topcoat spray application process with two parallel lines, each consisting of a waterborne basecoat coating booth, a basecoat observation zone, a basecoat ambient flash-off area, a basecoat heated flash-off area, a solvent borne clearcoat coating booth, a clearcoat observation zone, a clearcoat ambient flash-off area and a natural gas fired curing oven.

Approximately 85 percent of the air from the spray zones is recirculated back into the process and the 15 percent is exhausted to the concentrator and RTO. Coating booth overspray is controlled by a waterwash particulate control system. A portion of the basecoat and clearcoat coating booth exhaust is filtered and recirculated to the booth air make-up system. All booth and some ambient flash-off area emissions are exhausted through a bank of particulate filters, the concentrator, and the RTO. Oven emissions are exhausted directly to the RTO. Solvent-based robots (clearcoat) capture and recover coatings and cleaning solvents in a purge pot collection system. Emissions from the observation zones and the balance of ambient flash-off zones are controlled by particulate control systems and exhausted to the ambient air.



2.2 Sampling Locations Overview

The sampling locations for the RTO are located outside. This following table summarizes the sampling locations.

Table 2.2.1: Summary of the Stack Characteristics- SV RTO

Source	Parameter	Diameter	Approximate Duct Diameters from Flow Disturbance	Number of Ports	Points per Traverse	Total Points per Test	Stack Temperature
SVRTO Booth Inlet	THC	35.5"	>8 downstream and ~7 upstream	2	8 Flow	1 THC 16 Flow	~140°F
SVRTO Oven Inlet	THC	76"	~5 downstream and ~1.5 upstream	2	8 Flow	1 THC 16 Flow	~265°F
SVRTO Outlet	THC, NOx, PM/PM10/PM2.5	68"	~8 downstream and ~2 Upstream	2	8 Flow	1 THC 16 PM/Flow 1 NOx	~320°F

Table 2.2.2: Summary of the Stack Characteristics - SVBOOTHCONC

Source	Parameter	Diameter	Approximate Duct Diameters from Flow Disturbance	Number of Ports	Points per Traverse	Total Points per Test	Stack Temperature
SVBOOTH CONC Concentrator Inlet (Combined)	THC	N/A	<1 Downstream and <0.5 upstream	1	-	1 THC	N/A
SVBOOTH CONC Concentrator Outlet (Combined)	THC and NOx	83.5"	~5 downstream and >2 upstream	2	8 Flow	1 THC 1 NOx 16 Flow	~93°F

Further notes and photos of the system are provided in **Appendix A**.

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3 TESTING METHODOLOGIES

3.1 Description of Testing Methodologies

The following section provides brief descriptions of the sampling methods and discusses any modifications to the reference test methods that were completed with the testing.

3.1.1 Summary of Specific Methodologies

3.1.1.1 *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 1. 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.

The dry molecular weights of the stack gas were determined following calculations outlined in US EPA Method 3/3A, "Determination of Molecular Weight of Dry Stack Gas". Stack moisture content were determined through direct condensation and according to US EPA Method 4, "Determination of Moisture Content of Stack Gas". Moistures were collected at a single point during each test. Flow rate determination, temperature and moisture were collected at the outlet from the concentrators, inlet from the ovens and outlet of the RTO. For the concentrators, the two (2) concentrators combine and exhaust clean air from a single stack. The inlet to each air house combine prior to being directed to each of the two (2) concentrators. Since the inlet to the concentrators is not ideal, RWDI completed flow rate determination, temperature, and moisture from the combined exhaust only (outlet).

For the moisture tests, the following locations were tested as well as details on testing schedule/durations /volumes:

- RTO Inlets – approximately 30-minute moisture tests per Destruction Efficiency Test per inlet (2 inlets) to achieve a minimum sample volume of 21 cubic feet.
- RTO Outlet – moisture tests were completed with the Particulate Testing to obtain moisture data from the exhaust since the moisture content should not vary significantly. Velocity and temperature readings PM testing and separate velocity, temperature and moisture tests during DE Test 3 and 4 since PM testing was completed. Since Method 3A was also recorded at the same time as the Method 25A and 7E tests, this data is provided during each destruction efficiency test (only during THC/NOx testing). The PM tests consisted of a grab sample following Method 3 for gas composition determination.



- Concentrator combined Outlet – approximately 30-minute moisture tests per Removal Efficiency Test to achieve a minimum sample volume of 21 cubic feet.
- Concentrator combined Inlet – flowrate determination was not completed at the inlet due to non-ideal sampling location. As such no moisture measurements was taken.

3.1.1.2 *Sampling for Total Hydrocarbons (Destruction Efficiency)*

THC Destruction/Removal Efficiency testing was performed simultaneously on the inlet and outlet of the RTO as well as the inlet and clean air exhaust of the Zeolite Concentrators. The following section lists notes clarifying the inlet and outlet locations of the RTO and each of the concentrators:

- The inlet locations to the RTO are split prior to combining right before the RTO. Since there is no ideal measurement location in the combined duct prior to the RTO, RWDI completed separate THC, velocity, temperature, and moisture readings at each of the inlets (booth (concentrators desorption stream) and oven). The inlet data was converted into a mass emission rate (lb/hr) per each inlet stream and added together to determine the overall inlet mass emission rate to be used for the destruction efficiency calculation.
- The outlet of the RTO is in one (1) duct (exhaust stack) and was used for the outlet location for velocity, temperature, moisture, THC, NOx and Particulate.
- For the two (2) concentrators, the exhaust from the air houses supplying the concentrators is combined prior to splitting to each concentrator. Since the outlet is combined for the clean air exhaust, we completed the inlet THC measurements at the combined inlet location. This is a non-ideal location for flow rate and as such we calculated removal efficiency based on concentration and calculated the emission rate from the two (2) concentrators combined as lb/hr based on the velocity, temperature, and moisture readings from the exhaust location.

The measurements were taken continuously following the USEPA Method 25A on the inlet(s) and outlet (using a non-methane/methane analyzer) for the concentrators and as THC only for the RTO. The Concentrator Removal Efficiency (RE) was based on Non-Methane portion. As outlined in Method 25A, the measurement location was taken at the centroid of each source.

The compliance test consisted of three 60-minute tests on each of the RTO and Zeolite Concentrators at the preferred temperature as predetermined by DACM. 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 directly into the analyzer. The calibration error check was performed to confirm that the analyzer response is within $\pm 5\%$ 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 were 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 a 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 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.

3.1.1.3 *Sampling for Nitrogen Oxides, Oxygen and Carbon Dioxide*

Oxides of Nitrogen (NO_x), oxygen and carbon dioxide concentrations were determined utilizing RWDI's continuous emissions monitoring (CEM) system at the RTO and Concentrator outlets. 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 is 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 a 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 will deliver 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.

Before entering the analyzers, the gas sample passed directly into a refrigerated condenser, which cooled 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 O₂, CO₂, and NO_x analyzers (as applicable). Each of these analyzers measured the respective gas concentrations on a dry volumetric basis.

3.1.1.4 Gas Dilution (Method 205)

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 **Appendix I**. A multi-point EPA Method 205 check was executed in the field prior to testing to ensure accurate gas-mixtures. The gas dilution system consisting of calibrated orifices or mass flow controllers and dilutes a high-level calibration gas to within ±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". Before testing, the gas divider dilutions were measured to evaluate that the responses are within ±2% of predicted values. In addition, a certified mid-level calibration gas within ±10% of one of the tested dilution gases were introduced into an analyzer to ensure the response of the gas calibration is within ±2% of gas divider dilution concentration.

3.1.1.5 Sampling for Particulate Matter (PM, PM₁₀ and PM_{2.5})

Particulate matter (PM/PM₁₀/PM_{2.5}) was sampled following procedures outlined in U.S. EPA Method 5 and Method 202 (Condensable Particulate Matter) for the RTO outlet only for this program.

As stated in Method 202, the impinger portion was recovered and included as PM since the filtration temperature exceeded 85°F. Method 202 was followed for recovery of condensable. In addition, nitrogen purges were not completed post sample to remove sulphates for any of the sampling. Sulfur dioxide exposure is not expected to be an issue at this source location.



4 PROCESS DATA

During the emissions testing, plant process data was monitored and collected by DACM personnel to ensure representative operation of the facility. The following information was collected:

1. Production rate for each process (EUECOAT, EUPRIMER, and EUTOPCOAT);
2. RTO combustion chamber operating temperature during each test; and
3. Desorption gas inlet temperature for Zeolite Concentrators during each test.

Process data is provided in **Appendix J**.

5 RESULTS

All calibration information for the equipment used for this study is included in **Appendix I**. The following tables summarize the testing results, and more detailed tables can be found in **Appendix C, D, and E** for RTO PM results, RTO Destruction Efficiency results, and the Concentrators RE results, respectively.

Table 5.1: RTO - Destruction Efficiency

Parameter	Concentration & Emission Rate			
	Run 1	Run 2	Run 4	Average
THC Inlet- Booth (as propane)	638.5 ppmv 75.5 lb/hr	674.1 ppmv 80.7 lb/hr	583.8 ppmv 69.7 lb/hr	632.1 ppmv 75.3 lb/hr
THC Inlet- Oven (as propane)	56.7 ppmv 22.8 lb/hr	64.8 ppmv 26.3 lb/hr	94.7 ppmv 38.0 lb/hr	72.0 ppmv 29.0 lb/hr
THC Inlet (Combined Emission Rate; Booth + Oven) (as propane)	98.3 lb/hr	107.0 lb/hr	107.7 lb/hr	104.3 lb/hr
THC Outlet (as propane)	8.18 ppmv 4.28 lb/hr	8.45 ppmv 4.43 lb/hr	6.65 ppmv 3.60 lb/hr	7.76 ppmv 4.10 lb/hr
Destruction Efficiency	95.6 %	95.9 %	96.7 %	96.1 %
Residence Time (seconds)	1.27	1.27	1.21	1.25
RTO Combustion Chamber Temperature (°F)	1,453	1,447	1,453	1,451

Note: Destruction Efficiency (%) calculated using emission rate; Run 3 can be found in the detailed tables of the report, but is not included in the average due to a lack of production

Destruction Efficiency was calculated by dividing the calculated mass emission rate (in lbs/hr) of the outlet in Total Hydrocarbon (THC) by the combined inlet emission rate (Booth plus Oven, in lbs/hr) for THC.



Table 5.2: Combined Concentrators - Removal Efficiency

Parameter	Concentration & Emission Rate (ppmv, lb/hr & % Removal)			
	Run 1	Run 2	Run 3	Average
THC Inlet (as propane)	143.12 ppmv	113.09 ppmv	91.80 ppmv	116.00 ppmv
Methane Inlet (as propane)	0.84 ppmv	0.86 ppmv	1.07 ppmv	0.92 ppmv
Non-Methane Inlet (as propane)	142.28 ppmv	112.23 ppmv	90.74 ppmv	115.08 ppmv
THC Outlet (as propane)	7.85 ppmv	6.23 ppmv	5.50 ppmv	6.53 ppmv
Methane Outlet (as propane)	1.07 ppmv	1.03 ppmv	0.97 ppmv	1.02 ppmv
Non-Methane Outlet (as propane)	6.79 ppmv 4.56 lb/hr	5.19 ppmv 3.56 lb/hr	4.52 ppmv 2.99 lb/hr	5.50 ppmv 3.70 lb/hr
Removal Efficiency (NMOC Inlet and Outlet)	95.2 %	95.4 %	95.0 %	95.2 %
Desorb Temperature (°F) Concentrator 1	370	368	371	370
Desorb Temperature (°F) Concentrator 2	369	368	368	369

Removal efficiency was taken as NMOC (THC minus Methane) from the inlet and outlet based on concentration.

Table 5.3: RTO - Average Emission Data - Particulate Testing

Parameter	Concentration & Emission Rate (grains/dscf & lb/hr)			
	Run 1	Run 2	Run 3	Average
RTO Outlet (average Test 1, 2 & 3) ^[1]	0.00136 grains/dscf 0.95 lb/hr	<0.00327 grains/dscf <2.24 lb/hr	< 0.00088 grains/dscf <0.57 lb/hr	< 0.00184 grains/dscf < 1.25 lb/hr
RTO Outlet (average Test 1 & 2)	0.00136 grains/dscf 0.95 lb/hr	N/A ^[1]	< 0.00088 grains/dscf <0.57 lb/hr	< 0.00112 grains/dscf < 0.76 lb/hr

Note: [1] Upon review of the laboratory data, the extractable condensable portion of M202 results from Test 2 seem suspect in comparison to Test 1 and 3. The results from Test 2 are approximately 3 times the values from Test 1 and 3 which are comparable. Therefore, averages of test results are shown for Tests 1 and 2 only, as well as Tests 1, 2, and 3.

Table 5.4: RTO & Combined Concentrators - Average Emission Data - NOx Testing

Parameter	Concentration & Emission Rate (ppmv & lb/hr)			
	Run 1	Run 2	Run 3	Average
RTO Outlet	3.63 ppmv 2.08 lb/hr	4.56 ppmv 2.61 lb/hr	5.13 ppmv 2.81 lb/hr	4.44 ppmv 2.50 lb/hr
Combined Concentrator Outlet	-0.10 ppmv -0.07 lb/hr	0.02 ppmv 0.01 lb/hr	-0.15 ppmv -0.05 lb/hr	-0.10 ppmv -0.04 lb/hr



6 OPERATING CONDITIONS

Operating conditions during the sampling were monitored by FCA personnel. All equipment was operated under normal maximum operating conditions.

Contact was maintained between the operator and the sampling team. A member of the RWDI sampling team contacted the operator before each test, to ensure that the process was at normal maximum operating conditions.

7 CONCLUSIONS

Testing was successfully completed the week of September 6th, 2021, completing the on-site testing on September 10, 2021. All parameters were tested in accordance with USEPA referenced methodologies.