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**EMISSION TEST REPORT**

**AIR QUALITY DIVISION**

Report Title: AIR EMISSION TEST REPORT FOR PAINT FORMULATION AND MIXING OPERATIONS

Report Date: January 8, 2018

Test Date(s): November 20-21, 2017

<b>Facility Information</b>	
Name:	Axalta Coating Systems, LLC
Street Address:	400 Groesbeck Highway
City, County:	Mount Clemens, Macomb

<b>Facility Permit Information</b>	
Operating Permit:	MI-ROP-A3569-2017
Emission Unit IDs:	FG-RESIN-CATHODIC, FG-THERMOX-MIXTANKS

<b>Testing Contractor</b>	
Company:	Derenzo Environmental Services
Mailing Address:	39395 Schoolcraft Rd. Livonia, MI 48150
Phone:	(734) 464-3880
Project No.:	1706015



AIR EMISSION TEST REPORT  
FOR  
PAINT FORMULATION AND MIXING OPERATIONS

AXALTA COATING SYSTEMS, LLC  
MOUNT CLEMENS, MACOMB COUNTY, MICHIGAN

**1.0 INTRODUCTION**

Axalta Coating Systems, LLC (Axalta) operates a coating formulation facility located in Mount Clemens, Macomb County, Michigan. The facility has been issued Renewable Operating Permit (ROP) MI-ROP-A3569-2017 by the Michigan Department of Environmental Quality-Air Quality Division (MDEQ-AQD).

Conditions of the operating permit require Axalta to perform emissions testing for FG-RESIN-CATHODIC and FG-THERMOX-MIXTANKS:

*The permittee shall verify Toluene Diisocyanate emission rate from FG-RESIN-CATHODIC, by testing, at owner's expense... within 180 days of issuance of this Renewable Operating Permit.*

*Permittee shall verify the destruction efficiency of the thermal oxidizer, by testing, at owner's expense... within 180 days of issuance of this Renewable Operating Permit.*

Emission testing was performed November 20-21, 2017 by Derenzo Environmental Services (DES) representatives Tyler Wilson and Blake Beddow. The project was coordinated by Ms. Molly Dwinnells, Environmental Coordinator for Axalta. Mr. Mark Dziadosz and Ms. Gina Hines of the MDEQ-AQD were on-site to observe portions of the compliance testing.

The exhaust gas sampling and analysis was performed using procedures specified in the Test Plan dated September 29, 2017 that was submitted to the MDEQ-AQD for review and approval.

Appendix A provides a copy of the MDEQ-AQD test plan approval letter.

Questions regarding this emission test report should be directed to:

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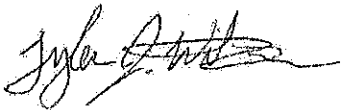
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**Report Certification**

This test report was prepared by Derenzo Environmental Services based on field sampling data collected by DES. Facility process data were collected and provided by Axalta employees or representatives. This test report has been reviewed by Axalta representatives and approved for submittal to the MDEQ.

I certify that the testing was conducted in accordance with the specified test methods and submitted test plan unless otherwise specified in this report. I believe the information provided in this report and its attachments are true, accurate, and complete.

Report Prepared By:



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Tyler J. Wilson  
Livonia Office Supervisor  
Derenzo Environmental Services

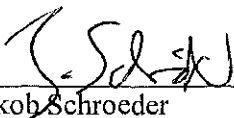


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Robert L. Harvey, P.E.  
General Manager  
Derenzo Environmental Services

I certify that the facility and emission units were operated at maximum routine operating conditions for the test event. Based on information and belief formed after reasonable inquiry, the statements and information in this report are true, accurate and complete.

Responsible Official Certification:



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Jakob Schroeder  
Plant Manager  
Axalta Coating Systems, LLC

**2.0 SUMMARY OF RESULTS**

The MACT condenser system (MACT) exhaust was tested using procedures in USEPA CTM-036 to measure 2,4 toluene Diisocyanate (TDI) and 2,6 TDI emission rates for comparison to the total TDI emission limit (0.002 lb/hr) specified in the facility's ROP.

The MACT exhaust was sampled using a pre-determined isokinetic sampling rate with equipment and sampling media to meet the criteria specified in USEPA CTM-036. Three (3) 72-minute test periods were performed while the MACT condenser system was running at normal routine operating rates.

The calculated MACT exhaust total TDI emission rate three-test average was 0.00004 and is less than the TDI emission limit (0.002 lb/hr) specified in the facility's ROP. The MACT exhaust TDI emission test results (three-test average) are summarized in Table 2.1.

Table 2.1 Summary of MACT TDI emission test results

Control System	MACT Exhaust Flowrate (scfm)	Exhaust Gas Sample Volume (L)	Average Total TDI Catch (µg)	Average Total TDI Emissions (lb/hr)
MACT Condenser	127	259	23.2	0.00004
<i>Permit Limit</i>				<i>0.002</i>

VOC destruction efficiency (DE) was determined for the thermal oxidizer (TOX). The TOX inlet and exhaust gas streams were monitored simultaneously with total hydrocarbon (THC) instrumental analyzers to determine the VOC mass flowrate entering and exiting the emission control system.

Three (3) one-hour test periods were performed with the TOX combustion chamber temperature ranging from 1,520-1,535°F, which resulted in a minimum observed chamber temperature of 1,520°F, and an average chamber temperature of 1,527°F. No VOC was detected in the TOX exhaust gas. Therefore, the TOX VOC DE was 100% for each of the three (3) test periods and is greater than the minimum destruction efficiency required by the facility's ROP (95% minimum). The VOC DE test results (three-test average) are summarized in Table 2.2.

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Table 2.2 Summary of TOX VOC destruction efficiency test results

Control System	TOX Temp. Average (°F)	Min. TOX Chamber Temp. (°F)	TOX Outlet Concentration (ppm THC)	Average DE (% wt)
Thermal Oxidizer <i>Permit Requirement</i>	1,527	1,520	0.0	100% >95.0%

**3.0 SOURCE DESCRIPTION**

**3.1 Processes**

MI-ROP-A3569-2017 requires emissions testing for flexible groups FG-RESIN-CATHODIC and FG-THERMOX-MIXTANKS. FG-RESIN-CATHODIC consists of emission units EU-RESIN-REACT-1, EU-RESIN-REACT-5, EU-RESIN-REACT-7, and EU-RESIN-REACT-8. FG-THERMOX-MIXTANKS consists of 29 final product mix tanks denoted as EU-THERMOX-MIXTANKS(1-29).

**3.2 Type of Raw Materials Used**

FG-RESIN-CATHODIC is an epoxy/urethane resin manufacturing unit. Raw materials for the emission units within FG-RESIN-CATHODIC include reactants that are heated to polymerization then combined and cooled to form resins. The resins are then stored in tanks.

FG-THERMOX-MIXTANKS consists of 29 product mix tanks containing either solvent-based or water-based paint products.

**3.3 Emission Control System Description**

FG-RESIN-CATHODIC is equipped with a MACT condenser system that controls VOCs from the resin reactors. VOC/HAPs are vented from the process vessels and are collected in a common vent header. The emissions are transported to a pre-condenser which condenses and removes water vapor and a portion of the solvents. The emissions then proceed to two condensers (in parallel) to remove VOC/HAP emissions. The condensers alternate in operation such that one of the condensers is in a defrost cycle while the other is in operation. The condensers are cooled by a refrigeration unit. The remaining emissions (mainly nitrogen) proceed through an induction fan and are exhausted through a stack (SV-MACT).

The condenser for FG-RESIN-CATHODIC operates at an average temperature of -35 °F. Condensate is collected in one of two 500-gallon portable tanks, with one 500-gallon portable tank on standby. The condenser induction fan has a rated capacity of 125 cfm.

Vapors from the 29 emission units in FG-THERMOX-MIXTANKS are manifold together and vented through a common header to a TOX for VOC control. The TOX is rated at 300 scfm with a 95% destruction efficiency. The TOX is required to be operated at a minimum combustion temperature of 1,450 °F with a minimum 1,500 °F average over a three hour period.

### **3.4 Process Operating Conditions During the Compliance Testing**

All processes operated normally during the MACT and TOX emission test periods and processed materials at typical production rates.

TDI emissions testing for the MACT was performed while the MACT condenser system was operated at normal routine operating parameters.

VOC DE for the TOX emission control system was tested while the TOX combustion chamber temperature ranged from 1,520-1,535°F, with an average combustion chamber temperature of 1,527°F. The combustion chamber temperature was monitored and periodically recorded manually throughout each test based on the digital display on the TOX control panel. The TOX system fan operated near maximum capacity during all test periods.

Appendix B provides TOX temperature and operating records for the three (3) one-hour test periods, and MACT operating records for the three (3) 72-minute test periods.

**4.0 POLLUTANTS MEASURED**

The following table presents test methods that were used to measure the specified pollutant emissions and exhaust parameters.

<b>Parameter / Analyte</b>	<b>Sampling Methodology</b>	<b>Analytical Methodology</b>
Velocity traverses	USEPA Method 1	Selection of sample and velocity traverse locations by physical stack measurements
Volumetric flow rate	USEPA Method 2	Measurement of velocity head using a Type-S Pitot tube and inclined manometer
Oxygen and Carbon dioxide	USEPA Method 3/3A	Fyrite gas scrubber analyzers / IR & Paramagnetic instrumental analyzers
Moisture	USEPA Method 4	Wet bulb / dry bulb temperature measurements and gravimetric weight gain in chilled impingers
Volatile organic compounds	USEPA Method 25A	VOC concentration in the TOX inlet and exhaust were measured as THC using a flame ionization analyzer (FIA) and reported relative to a propane standard.
Toluene diisocyanate	USEPA CTM-036	TDI analysis by high performance liquid chromatography

In addition to the measurement methods specified in the table above USEPA Method 205; *Verification of Dilution Systems for Field Instrument Calibrations*, was used to verify linearity of the calibration gas dilution system

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## 5.0 DETAILED SAMPLING AND ANALYTICAL PROCEDURES

A description of the sampling and analytical procedures is provided in the Test Plan dated September 29, 2017, which was approved by the MDEQ-AQD. This section provides a summary of those procedures.

### 5.1 **FG-RESIN-CATHODIC TDI Emissions**

The TDI sampling for FG-RESIN-CATHODIC was performed in the stack/vent SV-MACT after the condenser. Three (3) 72-minute test periods were performed. The test period duration was selected to meet the minimum sample volume in the test method.

#### 5.1.1 Exhaust Gas Velocity and Flowrate (USEPA Methods 1 and 2)

Prior to commencing the emission test period, stack gas sampling locations (i.e., pollutant concentration and velocity pressure measurement locations) were determined in accordance with USEPA Method 1.

The stack gas velocity and volumetric flowrate were measured using USEPA Method 2 prior to beginning the first test period. Gas velocity (pressure) measurements were conducted at each traverse point of the stack with an S-type Pitot tube and red-oil manometer. Temperature measurements were conducted at each traverse point using a K-type thermocouple and a calibrated digital thermometer. Once the molecular weight and moisture content of the stack gas was obtained, the stack volumetric flowrate was determined.

#### 5.1.2 Diluent Gas Content (USEPA Methods 3 and 4)

Condenser exhaust gas was expected to be primarily nitrogen. Diluent CO<sub>2</sub> and O<sub>2</sub> content of the exhaust gas stream was expected to be low and was measured using Fyrite® combustion gas analyzers in accordance with Method 3.

Reactant off gas is directed through a -35°F condenser to remove water vapor and solvents. Since the samples were taken at a location where the effluent gas was over 32°F, moisture content was determined using the Method 4 wet bulb/dry bulb approximation technique.

#### 5.1.3 Determination of TDI Concentration (USEPA CTM-036)

Toluene diisocyanate (TDI) emission rates from FG-RESIN-CATHODIC exhaust were determined in accordance to USEPA Conditional Test Method 036 (CTM-036).

The sampling probe was constructed using a length of 3/8-inch PTFE tubing sleeved into a steel sample probe and gooseneck nozzle. The sample nozzle opening was 0.25 inches based on the tubing inner diameter. The end of the tubing was directly connected to a glass filter holder that contained an 82.6 mm glass fiber filter (Gelman Sciences No. 61664 or equivalent) that had been soaked in a 1-(2-pyridyl)piperazine (1,2-PP) and acetone solution and allowed to completely dry.



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The outlet of the filter holder was connected to an Apex Instruments Model XC-60 sampling console and pump.

The sample rate was selected to match the average stack gas velocity measured during the pre-test velocity traverse and the sampling period was calculated to result in a sample volume of at least 250 liters (L) of air as specified in CTM-036. The condenser exhaust has a relatively low exhaust rate (368 feet per minute). The selected sampling rate was 3.57 L/min resulting in a sample period of 72-minutes per test to achieve a minimum sample volume of 250 L.

A Bios Defender DryCal DC-Lite primary flow calibrator was used to verify the sample flow meter (or to develop a calibration curve) for the Apex Instruments Model XC-60 sampling console.

At the conclusion of the test period, the probe and filter holder assembly were transferred to a protected area and recovered as follows:

Container 1: The filter was removed and placed in a tinted vial. 5.0 mL of a 90:10 (v/v) solution of Acetonitrile/Dimethyl Sulfoxide (DMSO) was added to the filter vial.

Container 2: The sample probe was rinsed with acetone and added to a second vial with one treated filter added.

Container 3: The inside of the front glass filter housing was wiped with a 1,2-PP treated filter that had been moistened with 90:10 (v/v) solution of Acetonitrile/DMSO. The filter was placed in a third sample vial with 5.0 mL of 90:10 (v/v) solution of Acetonitrile/DMSO added.

A set of sample containers (Containers 1-3) were generated for each test period.

Method Blanks: Approximately 5.0 mL of 90:10 (v/v) solution of Acetonitrile/DMSO solution was transferred to a sample vial and sealed as a reagent blank. An unexposed filter was transferred to a sample vial and 5.0 mL of 90:10 (v/v) solution of Acetonitrile/DMSO was added and sealed as a filter blank. The laboratory provided the 1,2-PP reagent blank.

All filters and reagents were prepared and provided by Enthalpy Analytical (Durham, NC). Enthalpy Analytical was also contracted for analysis of TDI. A photograph of the probe and filter setup from CTM-036 used for this test event is provided in Attachment 2.

### 5.1.4 TDI Emission Rate

The measured TDI concentration for each test period ( $\mu\text{g}$  TDI per Liter of sample volume) was multiplied by the measured exhaust rate (scfm) to calculate TDI mass emission rate (lb/hr).

## **5.2 FG-THERMOX-MIXTANKS VOC TOX Destruction Efficiency**

The VOC destruction efficiency testing for FG-THERMOX-MIXTANKS consisted of three (3) 60-minute test periods.

### **5.2.1 Exhaust Gas Velocity and Flowrate (USEPA Methods 1 and 2)**

Prior to commencing the emission performance test field measurements, stack gas sampling locations (i.e., pollutant concentration and velocity pressure measurement locations) were determined in accordance with USEPA Method 1.

The TOX inlet gas sampling was performed after the common vent header but before the TOX inlet connection. The TOX exhaust gas sampling was performed in the TOX exhaust stack.

TOX inlet gas and outlet gas velocity and volumetric flowrate were measured using USEPA Method 2 prior to each sampling period. Gas velocity (pressure) measurements were conducted at each traverse point of the stack with an S-type Pitot tube and red-oil manometer. Temperature measurements were conducted at each traverse point using a K-type thermocouple and a calibrated digital thermometer. Once the molecular weight and moisture content of the stack gas is obtained, the stack volumetric flowrate were determined.

### **5.2.2 Diluent Gas Content (USEPA Methods 3/3A and 4)**

A slight positive pressure is maintained in the product mix tanks using nitrogen. Therefore, the vent to the oxidizer is primarily nitrogen. Diluent CO<sub>2</sub> and O<sub>2</sub> content of the TOX inlet gas stream was expected to be low and was measured using Fyrite® combustion gas analyzers in accordance with Method 3. Moisture content was determined using the Method 4 wet bulb/dry bulb temperature approximation method.

TOX exhaust gas CO<sub>2</sub> and O<sub>2</sub> content measurements were measured using instrumental analyzers in accordance with Method 3A. Moisture content was determined in accordance with the Method 4 chilled impinger method. The amount of moisture removed from the sample stream was determined gravimetrically by weighing the impinger contents before and after the test period.

### **5.2.3 VOC Concentration Measurements (USEPA Method 25A)**

Total hydrocarbon (THC) concentration in the TOX inlet gas stream was determined using a Thermo Environmental Instruments, Inc. (TEI) Model 51 heated flame ionization analyzer (FIA); THC concentration in the TOX exhaust gas stream was determined using a California Analytical Instruments (CAI) Model 600 heated FIA in accordance with USEPA Method 25A, *Determination of Total Gaseous Organic Concentration Using a Flame Ionization Analyzer*.

The gas was extracted from the sampling locations and delivered to the instruments using an extractive gas sampling system and heated Teflon sampling line that prevents condensation or

contamination of the sample. The TOX inlet and exhaust gas samples were not conditioned (i.e., dried) prior to being introduced to the FIA instruments.

The FIA instruments were calibrated using certified concentrations of propane. The calibration gases were diluted with hydrocarbon free air or nitrogen to obtain intermediate propane concentrations and to demonstrate linearity of the instruments.

**5.2.4 VOC Destruction Efficiency Determination**

TOX VOC destruction efficiency was determined based on the simultaneous sampling of the TOX inlet and exhaust gas streams. THC concentration for the TOX inlet duct and exhaust stack were measured by flame ionization analyzers (FIA) according to USEPA Method 25A as described in this section.

Air velocity measurements were performed prior to each one-hour test period using USEPA Method 2. Gas properties were determined pursuant to USEPA Methods 3, 3A, and 4.

Destruction efficiency for each test period was calculated using the following equation:

$$DE_{VOC} = 1 - [(Q_{out} \times C_{THC,out}) / (Q_{in} \times C_{THC,in})] \times 100\%$$

- Where:  $DE_{VOC}$  = VOC destruction efficiency (% wt)
- $Q_{out}$  = Volumetric flowrate, TOX exhaust stack (scfm)
- $C_{THC,out}$  = Concentration THC measured at TOX exhaust stack (ppmv propane)
- $Q_{in}$  = Volumetric flowrate, TOX inlet stack (scfm)
- $C_{THC,in}$  = Concentration THC measured at TOX inlet stack (ppmv propane)

**6.0 DIMENSIONS OF SAMPLING LOCATIONS**

The following table presents information for each process sampling location. Measurements were verified prior to performing the compliance testing.

Sampling Location	Stack diameter (in.)	Downstream Flow		Upstream Flow		Discharge orientation
		Diameters (B) (in.)	(diameters)	Distance (A) (in.)	(diameters)	
Condenser Exhaust	8.0	>500	>62.5	>100	>12.5	Vertical
TOX Inlet	3.5	38	10.9	12	3.4	Vertical
TOX Exhaust	18.0	145	8.1	36	2.0	Vertical

Appendix C provides sampling location diagrams and sampling train diagrams.

## **7.0 FIELD QA/QC PROCEDURES**

### **7.1 Exhaust Gas Velocity Measurements**

The absence of cyclonic flow was verified at all traverse locations. Prior to performing the initial velocity traverse, and periodically throughout the test program, the S-type Pitot tube and manometer lines were leak-checked at the test site. This check was made by blowing into the impact opening of the Pitot tube until 3 or more inches of water are recorded on the manometer, then capping the impact opening and holding it closed for 15 seconds to ensure that it is leak free. The static pressure side of the Pitot tube was leak-checked using the same procedure.

### **7.2 Instrument Calibration and System Bias Checks**

Since USEPA Method 3A was used to measure CO<sub>2</sub> and O<sub>2</sub> at the TOX exhaust, at the beginning of each day of the testing program, initial three-point instrument calibrations were performed for the CO<sub>2</sub> and O<sub>2</sub> analyzers by injecting calibration gas directly into the inlet sample port for each instrument. System bias checks were performed prior to and at the conclusion of each sampling period by introducing the upscale calibration gas and zero gas into the sampling system (at the base of the stainless steel sampling probe prior to the particulate filter and Teflon® heated sample line) and verifying the instrument response against the initial instrument calibration readings.

At the beginning of each test day, appropriate high-range, mid-range, and low-range span gases followed by a zero gas were introduced to the VOC analyzers, in series at a tee connection, which is installed between the sample probe and the particulate filter, through a spring-loaded check valve. After each one-hour test period, mid-range and zero gases were re-introduced in series at the tee connection in the sampling system to check against the method's performance specifications for calibration drift and zero drift error.

The instruments were calibrated with USEPA Protocol 1 certified concentrations of CO<sub>2</sub> and O<sub>2</sub>, in nitrogen and zeroed using hydrocarbon free nitrogen. The VOC instrument was calibrated with USEPA Protocol 1 certified concentrations of propane in air (or nitrogen) and zeroed using hydrocarbon-free air (or nitrogen). A STEC Model SGD-710C 10-step gas divider was used to obtain intermediate calibration gas concentrations as needed.

### **7.3 Verification of gas dilution calibration equipment**

A STEC Model SGD-710C 10-step gas divider was used to obtain appropriate calibration span gases. The gas divider has been NIST certified within the previous 12 months with a primary flow standard in accordance with Method 205. The field evaluation procedures presented in Section 3.2 of Method 205 was followed prior to use of the gas divider.

#### **7.4 Sampling System Response Time Determination**

The response time of the sampling system was determined prior to the commencement of the tests by introducing upscale gas and zero gas, in series, into the sampling system using a tee connection at the base of the sample probe. The elapsed time for the analyzer to display a reading of 95% of the expected concentration was determined using a stopwatch. The test periods began once the instrument sampling probe had been in place for at least twice the system response time.

#### **7.5 Isokinetic Sampling Equipment QA/QC**

Isokinetic sampling rate was determined based on the exhaust flowrate measurements and procedures in USEPA CTM-036. This test method does not specify a pre or post sample train leak check, however leak checks were performed with the test equipment. Reagent blanks were collected and analyzed as required by each respective test method. The reagents and filters were prepared and provided by Enthalpy Analytical.

Appendix D provides quality assurance and calibration records for the sampling equipment used during the test periods, including gas divider and instrumental analyzer calibration records, calibration gas certificates, Pitot tube inspection sheets, and meter box calibrations.

### **8.0 LABORATORY QA/QC PROCEDURES**

All laboratory analyses were conducted according to the appropriate QA/QC procedures of the associated USEPA methodology and were included on the final laboratory report.

Appendix H provides a copy of the TDI laboratory report.

### **9.0 TEST RESULTS AND DISCUSSION**

#### **9.1 MACT TDI Emission Test Results**

Table 9.1 presents measured gas conditions and TDI emission results for the MACT.

The MACT TDI emission testing was performed on November 21, 2017. A small amount of 2,4-TDI and 2,6-TDI was detected in each sample, however, the quantity was less than the method's LOQ (limit of quantification). The calculated total TDI emission rate for each test period was 0.00004 lb/hr (4E-05 lb/hr) or less and is significantly less than the permit limit of 0.002 lb/hr.

Field data and calculations for each test period are presented in Appendix F.

#### **9.2 TOX VOC Destruction Efficiency Test Results**

Table 9.2 presents measured gas conditions and VOC DE results for the TOX.

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The TOX DE testing was performed on November 20, 2017. The TOX inlet is primarily nitrogen from the tank blanketing system at a relatively low flowrate (20-50 scfm). The TOX outlet gas flowrate is considerably larger due to the direct fired burner. However, there was no measurable VOC (THC) in the TOX exhaust and the VOC DE was 100% for all three (3) test periods. The lowest observed operating temperature during any of the one-hour test periods was 1,520°F.

Raw instrument data is presented in Appendix E. Recorded data (flowrate and instrument response) and calculations for each test period are presented in Appendix G.

### **9.3 Variations from Normal Sampling Procedures or Operating Conditions**

The testing was performed in accordance with the Test Plan dated September 29, 2017 and the MDEQ-AQD test plan approval letter. During the testing program the processes were operated at normal operating conditions, at or near maximum capacity and satisfied the parameters specified in the MDEQ-AQD test plan approval letter.

Table 9.1 Measured gas conditions and TDI emission test results for the MACT

Test No.	1	2	3	Avg
Date	11/21/17	11/21/17	11/21/17	
Test Times	09:35-10:53	14:00-15:13	17:04-18:17	
<b>MACT Exhaust Gas Stream</b>				
Temperature (°F)	82	78	64	75
Moisture Content (%)	1.4	1.4	1.4	1.4
Flowrate (scfm)	127	127	127	127
<b>Sample Train Volume</b>				
Sample Volume (L)	259	261	258	259
Sample Volume (scf)	9.16	9.21	9.10	9.15
<b>MACT Exhaust TDI Catch</b>				
2,4 TDI (µg)	11.7	11.3	5.62	9.54
2,6 TDI (µg)	12.4	15.3	13.4	13.7
Total TDI (µg)	24.1	26.6	19.0	23.2
<b>Calculated TDI Emissions</b>				
2,4 TDI (lb/hr)	0.00002	0.00002	0.00001	0.00001
2,6 TDI (lb/hr)	0.00002	0.00003	0.00002	0.00002
Total TDI (lb/hr)	0.00004	0.00005	0.00004	0.00004
<i>Permit Limit (lb/hr)</i>				<i>0.002</i>

Table 9.2 Measured gas conditions and VOC DE test results for the TOX

Test No.	1	2	3	Avg
Date	11/20/17	11/20/17	11/20/17	
Test Times	14:22-15:22	16:19-17:19	18:20-19:20	
<b>TOX Operating Temperatures</b>				
RTO Temperature Average (°F)	1,530	1,525	1,527	1,527
Lowest Recorded Temperature (°F)	1,523	1,520	1,524	--
<b>TOX Inlet Gas Stream</b>				
Temperature (°F)	96	94	110	100
Flowrate (scfm)	22	23	53	49
Average THC Conc. (ppmv C <sub>3</sub> )	1,155	16,151	9,949	9,085
Calculated VOC Mass Flow (lb/hr)	0.18	2.55	3.61	2.11
<b>TOX Exhaust Gas Stream</b>				
Temperature (°F)	1,300	1,100	893	1,098
Flowrate (scfm)	326	567	457	450
Average THC Conc. (ppmv C <sub>3</sub> )	0.00	0.00	0.00	0.00
Calculated VOC Mass Flow (lb/hr)	0.00	0.00	0.00	0.00
<b>Calculated Destruction Efficiency</b>				
$1 - [\text{VOC}_{\text{out}} / \text{VOC}_{\text{in}}] \times 100\%$	100%	100%	100%	100%
<i>Permit Requirement</i>				>95%