BTEC Inc.

VOC Destruction Efficiency Emissions Test Report

Test Date: March 18, 2015

Prepared for:

Ford Motor Company

Flat Rock, Michigan

Flat Rock Assembly Plant
1 International Drive
Flat Rock, MI 48134

Project No. 14-4635.00
April 6, 2015

BT Environmental Consulting, Inc.
4949 Fernlee Avenue
Royal Oak, Michigan 48073
(248) 548-8070

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION

RENEWABLE OPERATING PERMIT
REPORT CERTIFICATION

Authorized by 1994 P.A. 451, as amended. Failure to provide this information may result in civil and/or criminal penalties.

Reports submitted pursuant to R 336.1213 (Rule 213), subrules (3)(c) and/or (4)(c), of Michigan's Renewable Operating (RO) Permit program must be certified by a responsible official. Additional information regarding the reports and documentation listed below must be kept on file for at least 5 years, as described in General Condition No. 22 in the RO Permit and be made available to the Department of Environmental Quality, Air Quality Division upon request.

Source Name: Flat Rock Assembly Plant — County: Wayne

Source Address: 1 International Drive — City: Flat Rock

AQD Source ID (SRN): N0929 — RO Permit No.: MI-ROP-N0929-2011a — RO Permit Section No.: 1

Please check the appropriate box(es):

☐ **Annual Compliance Certification (General Condition No. 28 and No. 29 of the RO Permit)**

Reporting period (provide inclusive dates): From _____ To _____

☐ 1. During the entire reporting period, this source was in compliance with **ALL** terms and conditions contained in the RO Permit, each term and condition of which is identified and included by this reference. The method(s) used to determine compliance is/are the method(s) specified in the RO Permit.

☐ 2. During the entire reporting period this source was in compliance with all terms and conditions contained in the RO Permit, each term and condition of which is identified and included by this reference, **EXCEPT** for the deviations identified on the enclosed deviation report(s). The method used to determine compliance for each term and condition is the method specified in the RO Permit, unless otherwise indicated and described on the enclosed deviation report(s).

☐ **Semi-Annual (or More Frequent) Report Certification (General Condition No. 23 of the RO Permit)**

Reporting period (provide inclusive dates): From _____ To _____

☐ 1. During the entire reporting period, **ALL** monitoring and associated recordkeeping requirements in the RO Permit were met and no deviations from these requirements or any other terms or conditions occurred.

☐ 2. During the entire reporting period, all monitoring and associated recordkeeping requirements in the RO Permit were met and no deviations from these requirements or any other terms or conditions occurred, **EXCEPT** for the deviations identified on the enclosed deviation report(s).

☒ **Other Report Certification**

Reporting period (provide inclusive dates): From _____ To _____

Additional monitoring reports or other applicable documents required by the RO Permit are attached as described:

Air Emissions Test Report Submission for Destruction Efficency Testing from March 2015

I certify that, based on information and belief formed after reasonable inquiry, the statements and information in this report and the supporting enclosures are true, accurate and complete.

Timothy Young	Plant Manager	734-782-7482
Name of Responsible Official (print or type)	Title	Phone Number

Signature of Responsible Official — Date: 4.9.15

* Photocopy this form as needed.

EQP 5736 (Rev 9/01)

BTEC Inc.

EXECUTIVE SUMMARY

BT Environmental Consulting, Inc. (BTEC) was retained by Ford Motor Company (Ford) to evaluate volatile organic compound (VOC) destruction efficiency (DE) and outlet concentration (in parts per million (ppm) as propane) on three (3) regenerative catalytic oxidizers (RCOs) and a single thermal oxidizer (RTO) at the Flat Rock Assembly Plant (FRAP) located in Flat Rock, Michigan. Sampling and analysis for this emission test program was conducted on March 18, 2015. Prior to this emissions test program, BTEC completed outlet verification testing on March 17, 2015. Results from this outlet verification testing have been enclosed in Appendix F.

Testing consisted of triplicate 60-minute test runs for VOC at each source. The emissions test program is required by Michigan Department of Environmental Quality Air Quality Division Permit No. MI-ROP-N0929-2011a. The permit states, "... satisfactory operation of the three regenerative catalytic oxidizers and the one regenerative thermal oxidizer includes maintaining a minimum VOC destruction efficiency of 95 percent or an average control system outlet VOC concentration of less than or equal to 5 ppm as propane."

The results of the emission test program are summarized by Table 2. Detailed emissions test results are summarized by Table 3.

Table E-1
Control System Outlet

Test Parameter	Results
Destruction Efficiency	**95%**
THC Concentration[1] (-methane)(ppmv, wet, corrected as per USEPA 7E)	**4**

[1] Flow-Weighted average across all three test runs

1. Introduction

BT Environmental Consulting, Inc. (BTEC) was retained by Ford Motor Company (Ford) to evaluate volatile organic compound (VOC) destruction efficiency (DE) and outlet concentration (in parts per million (ppm) as propane) on three (3) regenerative catalytic oxidizers (RCOs) and a single thermal oxidizer (RTO) at the Flat Rock Assembly Plant (FRAP) located in Flat Rock, Michigan. Sampling and analysis for this emission test program was conducted on March 18, 2015 after verification testing performed on March 17, 2015 yielded acceptable results. The purpose of this report is to document the results of the test program.

The Air Quality Division (AQD) of Michigan's Department of Environmental Quality has published a guidance document entitled "Format for Submittal of Source Emission Test Plans and Reports" (December 2013, see Appendix A). The following is a summary of the emissions test program and results in the format outlined by the AQD document.

1.a Identification, Location, and Dates of Test

Sampling and analysis for the emission test program was conducted on March 18, 2015 at the FRAP facility located in Flat Rock, Michigan.

1.b Purpose of Testing

The emissions test program is required by Michigan Department of Environmental Quality Air Quality Division Permit No. MI-ROP-N0929-2011a.

1.c Source Description

The FRAP coating operations are controlled by three (3) RCOs (identified as RCO A, RCO B, and RCO C) and one (1) regenerative thermal oxidizer (RTO) as pollution control equipment. All three (3) RCO units share a common inlet duct. The RTO exhaust combines with RCO C exhaust before it is exhausted through the RCO C stack.

1.d Test Program Contact

The contact for the source and test program is:

Mr. Terence Filipiak, QEP, CHMM
Environmental Manager
Flat Rock Assembly Plant
1 International Dr.
Flat Rock, Michigan 48134
(734) 782-7797

1.e Testing Personnel

Names and affiliations for personnel who were present during the testing program are summarized by Table 1.

Table 1
Test Personnel

Name and Title	Affiliation	Telephone
Mr. Terence Filipiak, Environmental Manager	Flat Rock Assembly Plant 1 International Dr. Flat Rock, MI 48134	(734) 782-7797
Ms. Julia Guernsey Environmental Engineer	Ford Motor Company Fairlane Plaza North, Suite 800 290 Town Center Drive Dearborn, MI 48126	(313) 845-0362
Ms. Susan Hicks Senior Environmental Engineer	Ford Motor Company Fairlane Plaza North, Suite 800 290 Town Center Drive Dearborn, MI 48126	(313) 594-3185
Mr. Barry Boulianne Senior Project Manager	BTEC 4949 Fernlee Avenue Royal Oak, MI 48073	(248) 548-8070
Mr. Todd Wessel Senior Project Manager	BTEC 4949 Fernlee Avenue Royal Oak, MI 48073	(248) 548-8070
Mr. Matt Young Project Manager	BTEC 4949 Fernlee Avenue Royal Oak, MI 48073	(248) 548-8070
Mr. Ken Lievense Project Manager	BTEC 4949 Fernlee Avenue Royal Oak, MI 48073	(248) 548-8070
Mr. Paul Molenda Environmental Technician	BTEC 4949 Fernlee Avenue Royal Oak, MI 48073	(248) 548-8070
Mr. Paul Draper Environmental Technician	BTEC 4949 Fernlee Avenue Royal Oak, MI 48073	(248) 548-8070
Mr. Steve Smith Environmental Technician	BTEC 4949 Fernlee Avenue Royal Oak, MI 48073	(248) 548-8070
Mr. Paul Diven Environmental Technician	BTEC 4949 Fernlee Avenue Royal Oak, MI 48073	(248) 548-8070
Mr. Thomas Maza Air Quality Division	MDEQ	(313) 456-4709

2. Summary of Results

Sections 2.a through 2.c summarize the results of the emissions compliance test program.

2.a Operating Data

Operational data collected during the testing includes the number of vehicles produced during each test run and operating temperatures for each RCO and the RTO at varying points during each test run. See Appendix E for this information.

2.b Applicable Permit

The applicable permit for this emissions test program is Permit No. MI-ROP-N0929-2011a.

2.c Results

The overall results of the emission test program are summarized by Table 2 (see Section 5.a).

3. Source Description

Sections 3.a through 3.e provide a detailed description of the process.

3.a Process Description

FRAP is an automotive assembly plant located in Flat Rock, Michigan. 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 then are 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 3-Wet paint booth, the vehicle is painted with primer, a color basecoat and a protective clearcoat layer using automatic bells on robot spray applicators. The vehicle then passes through an oven to cure the 3-Wet applications. The 3-Wet booths allow for paint application of one layer after the other without an intermediate drying stage.

The vehicle paint process includes the e-coat priming, guidecoat surface priming, base/clearcoat 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 that is part of this test program.

3.b Process Flow Sheet or Diagram

Each RCO and the RTO controls VOC emissions from the corresponding equipment by oxidizing organics present in the exhaust gas at elevated temperatures.

3.c Raw and Finished Materials

The raw materials include various automotive coatings that are used in the following emission units: EGECOAT, EGGUIDECOAT/EGTOPCOAT, and EGCOAT. They include body sealing agents, electro deposition primer, surface primers, top/base coat color paints, and a clear protective final coating.

3.d Process Capacity

FRAP operates under a process limitation of 4.8 pounds of VOC per unit.

3.e Process Instrumentation

The only process operating parameters relevant to the emissions test program are RCO and RTO operating temperatures.

4. Sampling and Analytical Procedures

Sections 4.a through 4.d provide a summary of the sampling and analytical procedures used to verify the DE and outlet concentration of each RCO.

4.a Sampling Train and Field Procedures

Measurement of exhaust gas velocity, molecular weight, and moisture content was conducted using the following reference test methods codified at Title 40, Part 60, Appendix A of the Code of Federal Regulations (40 CFR 60, Appendix A):

- Method 1 - *"Location of the Sampling Site and Sampling Points"*
- Method 2 - *"Determination of Stack Gas Velocity and Volumetric Flowrate"*
- Method 3 - *"Determination of Molecular Weight of Dry Stack Gas"(Fyrite)*
- Method 4 - *"Determination of Moisture Content in Stack Gases"*

Stack gas velocity traverses were conducted in accordance with the procedures outlined in Method 1 and Method 2. S-type pitot tubes with thermocouple assemblies, calibrated in accordance with Method 2, Section 4.1.1, were used to measure exhaust gas velocity pressures (using a manometer) and temperatures during testing. The s-type pitot tube dimensions outlined in Sections 2-6 through 2-8 were within specified limits, therefore, a baseline pitot tube coefficient of 0.84 (dimensionless) was assigned.

Cyclonic flow checks were performed at each sampling location. The existence of cyclonic flow is determined by measuring the flow angle at each sample point. The flow angle is the angle between the direction of flow and the axis of the stack. If the average of the absolute values of the flow angles is greater than 20 degrees, cyclonic flow exists. The average of the absolute values of the flow angles was less than 20 degrees at each sampling location.

Molecular weight determinations were evaluated according to USEPA Method 3, "Gas Analysis for the Determination of Dry Molecular Weight." The equipment used for this evaluation consisted of a one-way squeeze bulb with connecting tubing and a set of Fyrite® combustion gas analyzers. Carbon dioxide and oxygen content were analyzed using the Fyrite® procedure.

Exhaust gas moisture content was evaluated using Method 4. Exhaust gas was extracted as part of the moisture sampling and passed through (i) two impingers, each with 100 ml deionized water, (ii) an empty impinger, and (iii) an impinger filled with silica gel. Exhaust gas moisture content is then determined gravimetrically. Moisture evaluations consisted of a single 30-minute sample run at each location.

Measurement of exhaust gas VOC and methane concentrations was conducted using the following reference test methods codified at 40 CFR 60, Appendix A:

- Method 25A- *"Determination of Total Gaseous Organic Concentration Using a Flame Ionization Analyzer"*

VOC concentrations were measured using the procedures found in 40 CFR 60, Appendix A, Method 25A, "Determination of Total Gaseous Organic Concentration Using a Flame Ionization Analyzer."

The RCO outlet and RTO outlet VOC concentrations were measured using a JUM 109A Methane/Non-Methane Analyzer. For each sampling location, a sample of the gas stream was drawn through a stainless-steel probe with an in-line glass fiber filter to remove any particulate and a heated Teflon® sample line to prevent the condensation of any moisture from the sample before it enters the analyzer. Data was recorded at 4-second intervals on a Laptop PC equipped with data acquisition software.

The J.U.M. Model 109A utilizes two flame ionization detectors (FID) to determine the average concentration (ppm) for THC (as propane) and the average concentration for methane. Upon entry, the gas stream is split by the analyzer. One FID ionizes all of the hydrocarbons in the gas stream sample into carbon, which is then detected as a concentration of total hydrocarbons. Using an analog signal, specifically voltage, the concentration of THC is then sent to a data acquisition system (DAS), where 4-second interval data points are recorded to produce an average based on the overall duration of the test. This average is then used to determine the average concentration for THC reported as the calibration gas, propane, in equivalent units.

The analyzer's response factor is obtained by introducing a methane calibration gas to the calibrated J.U.M. 109A. The response of the analyzer's THC FID to the methane calibration gas, in ppm, as propane, is divided by the methane analyzer's response to the methane calibration gas, in ppm as methane.

The RCO inlet and the RTO inlet and outlet locations were measured using a VIG Model 20 THC analyzer. The VIG THC hydrocarbon analyzer channels a fraction of the gas sample through a capillary tube that directs the sample to the flame ionization detector (FID), where the hydrocarbons present in the sample are ionized into carbon. The carbon concentration is then determined by the detector in parts per million (ppm). This concentration is transmitted to the data acquisition system (DAS) at 4-second intervals in the form of an analog signal, specifically voltage, to produce data that can be averaged over the duration of the testing program. This data is then used to determine the average ppm for total hydrocarbons (THC) using the equivalent units of propane (calibration gas).

For analyzer calibrations, calibration gases were mixed to desired concentrations using an Environics Series 4040 Computerized Gas Dilution System. The Series 4040 consists of a single chassis with four mass flow controllers. The mass flow controllers are factory-calibrated using a primary flow standard traceable to the United States National Institute of Standards and Technology (NIST). Each flow controller utilizes an 11-point calibration table with linear interpolation, to increase accuracy and reduce flow controller nonlinearity. A field quality assurance check of the system was performed pursuant to Method 205 by setting the diluted concentration to a value identical to a Protocol 1 calibration gas and then verifying that the analyzer response is the same with the diluted gas as with the Protocol 1 gas.

A drawing of the Method 25A sampling train used for the testing program is presented as Figure 5. Protocol 1 gas certification sheets for the calibration gases used for this testing program are presented in Appendix C.

4.b Recovery and Analytical Procedures

Because all measurements were conducted using on-line analyzers, no samples were recovered during the test program.

4.c Sampling Ports

A diagram of the stacks showing sampling ports in relation to upstream and downstream disturbances are included as Figures 1-4.

4.d Traverse Points

A diagram of the stacks showing sampling ports in relation to upstream and downstream disturbances are included as Figures 1-4.

5. Test Results and Discussion

Sections 5.a through 5.j provide a summary of the test results.

5.a Results Tabulation

The results of the emission test program are summarized by Table 2. Detailed emissions test results are summarized by Table 3.

Table 2
Control System Outlet

Test Parameter	Results
Destruction Efficiency	**95%**
THC Concentration[1] (-methane)(ppmv, wet, corrected as per USEPA 7E)	**4**

[1] Flow-Weighted average across all three test runs

5.b Sampling Procedure Variations

At the end of run two on RCO A, the 25A calibration drift check failed with -3.06% drift. Run two was omitted from the average and a fourth test run was done. Runs 1, 3, and 4 passed drift calibration checks and were averaged for a final result.

A cyclonic flow check was performed on RCO B during Flow 1 and was recorded on the excel spreadsheet but was not recorded on the hand written field sheet. All of the sources tested were determined to not have cyclonic flow.

5.c Process or Control Device Upsets

No upset conditions occurred during testing.

5.d Control Device Maintenance

Prior to this test event, Ford performed the following maintenance on the control devices:

Adjustments to RCO's:

- Confirmed Inlet & Outlet valve damper speeds
- Adjusted Air to Gas ratio of all Combustion Chamber Burners
- Confirmed Inlet & outlet damper air seals had no by-pass leakage

Adjustment to RTO:

- Remove "Transition Valve" from the software program, the valve will remain closed at all times.

Once maintenance activities were complete on control equipment, BTEC performed outlet verification testing on March 17, 2015. The results from the outlet verification testing were acceptable, and therefore, the compliance test program was conducted on March 18, 2015.

5.e Re-test

This emissions test program was not a re-test.

5.f Audit Sample Analyses

No audit samples were collected as part of the test program.

5.g Calibration Sheets

Relevant equipment calibration documents are provided as Appendix C.

5.h Sample Calculations

Sample calculations are provided in Appendix D.

5.i Field Data Sheets

Field documents relevant to the emissions test program are presented in Appendix B.

5.j Laboratory Data

There are no laboratory results for this test program.

Table 3
RTO & RCO VOC Destruction Efficiency and Outlet Concentration Summary
2 Inlet / 4 Outlet
Ford FRAP
Flatrock, MI
March 18, 2015

Parameter	Run 1	Run 2[1]	Run 3	Run 4	Average
Sampling Time	8:00-9:00	10:00-11:00	12:00-13:00	13:40-14:40	
RTO Inlet Flowrate (scfm)	24,652	24,515	24,749	24,930	24,777
RCO Inlet Flowrate (scfm)	318,347	322,784	316,469	312,440	315,752
RCO A Flowrate (scfm)	105,868	109,584	108,503	102,675	105,682
RCO B Flowrate (scfm)	108,372	111,210	102,893	104,997	105,421
RCO C Flowrate (scfm)(includes the RTO exhaust flowrate)	140,900	142,280	142,598	142,736	142,078
RTO Outlet Flowrate (scfm)	30,369	30,860	30,625	30,893	30,629
RTO Inlet THC Concentration (ppmv propane)	167.21	156.26	190.70	232.50	196.80
RTO Inlet THC Concentration (ppmv, corrected as per USEPA 7E)	166.02	153.14	185.63	226.44	192.70
RTO Inlet THC Mass Flowrate (standard lb/hr)	**28.01**	**25.69**	**31.44**	**38.63**	**32.69**
RTO Outlet THC Concentration (ppmv propane)	8.47	8.61	5.69	13.50	9.22
RTO Outlet THC Concentration (ppmv, corrected as per USEPA 7E)	8.01	8.58	5.78	13.21	9.00
RTO Outlet CH4 Concentration (ppmv methane)	-0.06	0.32	-1.50	-0.15	-0.57
RTO Outlet CH4 Concentration (ppmv, corrected as per USEPA 7E) [2]	0.15	0.78	*0.00*	0.00	0.05
RTO Outlet THC Concentration (- methane) (ppmv, corrected as per USEPA 7E)	7.95	8.04	5.78	13.21	8.98
RTO Outlet THC Mass Emission Rate (standard lb/hr)	**1.65**	**1.70**	**1.21**	**2.79**	**1.89**
RCO Inlet THC Concentration (ppmv propane)	71.59	47.24	67.28	70.01	69.63
RCO Inlet VOC Concentration (ppmv, corrected as per USEPA 7E)	71.31	47.16	66.97	69.25	69.18
RCO Inlet THC Mass Flowrate (standard lb/hr)	**155.36**	**104.19**	**145.04**	**148.07**	**149.49**
RCO A Outlet THC Concentration (ppmv propane)	6.61	6.41	6.29	6.57	6.49
RCO A Outlet THC Concentration (ppmv, corrected as per USEPA 7E)	6.65	6.82	5.63	5.58	5.95
RCO A Outlet CH4 Concentration (ppmv methane)	7.59	6.02	5.10	4.92	5.87
RCO A Outlet CH4 Concentration (ppmv, corrected as per USEPA 7E)	7.71	6.09	5.01	4.94	5.89
RCO A Outlet THC Concentration (- methane) (ppmv, corrected as per USEPA 7E)	3.24	4.29	3.28	3.26	3.26
RCO A Outlet THC Mass Emission Rate (standard lb/hr)	**2.35**	**3.22**	**2.44**	**2.29**	**2.36**
RCO B Outlet THC Concentration (ppmv propane)	14.65	11.09	11.63	11.48	12.59
RCO B Outlet THC Concentration (ppmv, corrected as per USEPA 7E)	14.80	11.14	11.64	11.55	12.66
RCO B Outlet CH4 Concentration (ppmv methane)	23.95	19.09	16.68	16.82	19.15
RCO B Outlet CH4 Concentration (ppmv, corrected as per USEPA 7E)	23.62	18.57	16.29	16.32	18.74
RCO B Outlet THC Concentration (- methane) (ppmv, corrected as per USEPA 7E)	4.75	3.30	4.65	4.61	4.67
RCO B Outlet THC Mass Emission Rate (standard lb/hr)	**3.52**	**2.51**	**3.28**	**3.31**	**3.37**
RCO C Outlet THC Concentration (ppmv propane)	11.71	8.26	9.02	9.08	9.94
RCO C Outlet THC Concentration (ppmv, corrected as per USEPA 7E)	11.57	8.07	8.90	9.05	9.84
RCO C Outlet CH4 Concentration (ppmv methane)	17.07	12.61	11.10	11.02	13.06
RCO C Outlet CH4 Concentration (ppmv, corrected as per USEPA 7E)	16.92	12.59	11.22	11.13	13.09
RCO C Outlet THC Concentration (- methane) (ppmv, corrected as per USEPA 7E)	4.31	2.62	4.05	4.25	4.20
RCO C Outlet THC Mass Emission Rate (standard lb/hr)	**4.16**	**2.55**	**3.95**	**4.15**	**4.09**
RCO A, B, and C Flow-weighted THC Concentration (-methane) (ppmv, corrected as per USEPA 7E)	4	3	4	4	4
RCO A, B, and C and RTO Combined DE (%)	95	94	95	95	95

1: not included in average due to low production and a excessive analyzer drift
2: RTO Outlet CH_4 concentration for Run 3 was negative after applying drift correction. Value has been changed to zero for calculations.

scfm: standard cubic feet per minute
ppmv: parts per million on a volume to volume basis
lb/hr: pounds per hour
THC: total hydrocarbons
MW: molecular weight
24.14: molar volume of air at standard conditions (70°F, 29.92" Hg)
35.31: ft3 per m3
453600: mg per lb

	RCO Response Factors			
RCO A	2.26	2.41	2.13	2.13
RCO B	2.35	2.37	2.33	2.35
RCO C	2.33	2.31	2.31	2.32

RTO Response Factor	2.33

Equations

lb/hr = ppmv * MW/24.14 * 1/35.31 * 1/453,600 * scfm* 60

Flow-weighted concentration = $(F_A{*}C_A + F_B{*}C_B + F_C{*}C_C - F_{KTO}{*}C_{KTO}) / (F_A + F_B + F_C - F_{KTO})$, where F = flowrate (scfm) and C = THC concentration (-methane) (ppmv, corrected as per USEPA 7E)

RTO A, B and C Combined DE = [RCO Inlet pph - (RCO A outlet pph + RCOB outlet pph + (RCO C outlet pph - RTO outlet pph))]/RCO Inlet pph

RTO Inlet VOC Correction				
Co	0.47	1.67	5.35	6.48
Cma	300	300	300	300
Cm	301.77	304.51	304.90	305.92

RCO A Outlet VOC Correction				
Co	0.16	0.34	0.66	0.89
Cma	29.9	29.9	29.9	29.9
Cm	29.17	26.97	30.58	31.33

RCO A Outlet CH4 Correction				
Co	0.04	-0.01	-0.04	-0.13
Cma	29.9	29.9	29.9	29.9
Cm	29.33	29.59	30.63	30.46

RTO Outlet CH4 Correction				
Co	-0.21	-0.47	-0.35	-0.16
Cma	30	30	30	30
Cm	29.66	29.86	30.27	30.34

RCO B Outlet VOC Correction				
Co	0.25	0.27	0.18	0.14
Cma	29.9	29.9	29.9	29.9
Cm	29.34	29.32	29.59	29.50

RCO B Outlet CH4 Correction				
Co	0.19	0.21	0.15	0.14
Cma	29.9	29.9	29.9	29.9
Cm	30.27	30.61	30.50	30.71

RCO C Outlet VOC Correction				
Co	0.28	0.41	0.45	0.34
Cma	29.9	29.9	29.9	29.9
Cm	29.82	29.49	29.23	29.22

RCO C Outlet CH4 Correction				
Co	0.20	0.19	0.16	0.12
Cma	29.9	29.9	29.9	29.9
Cm	30.01	29.69	29.32	29.42

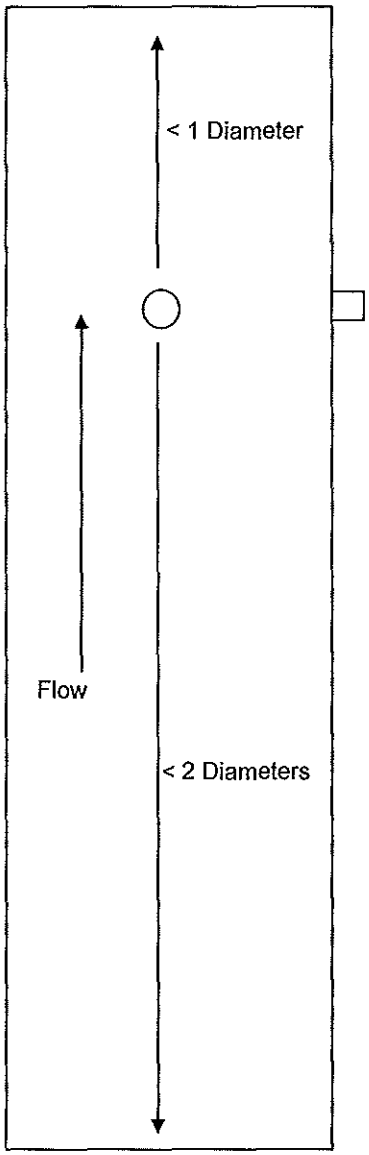
RCO Intlet VOC Correction				
Co	0.13	-0.26	-0.54	-0.19
Cma	50.7	50.7	50.7	50.7
Cm	50.94	50.80	50.81	51.21

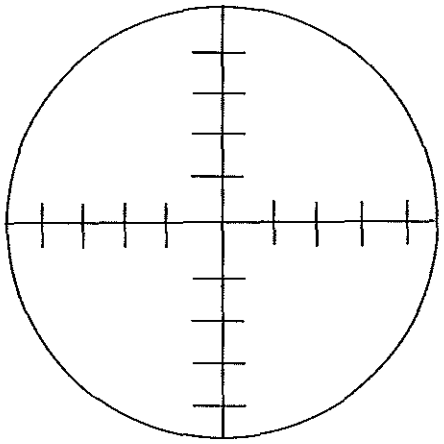
RTO Outlet VOC Correction				
Co	0.58	0.29	-0.23	0.08
Cma	30	30	30	30
Cm	30.13	30.08	30.49	30.55

Figures

BTEC Inc.

diameter = 107.25 inches





Not to Scale

Points	Distance "
1	3.4
2	11.3
3	20.8
4	34.6
5	72.6
6	86.4
7	96.0
8	103.8

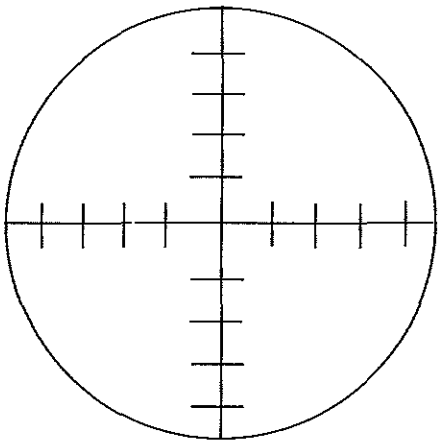
Figure No. 1

Site: RCO Exhaust (A, B and C) Ford Flat Rock Assembly Plant Flat Rock, Michigan	Sampling Date: March 18, 2015	BT Environmental Consulting, Inc. 4949 Fernlee Avenue Royal Oak, Michigan

BTEC Inc.

Stack Diameter: 168 inches

Points	Distance "
8	5.4
7	17.6
6	32.6
5	54.3
4	113.7
3	135.4
2	150.4
1	162.6



Not to Scale

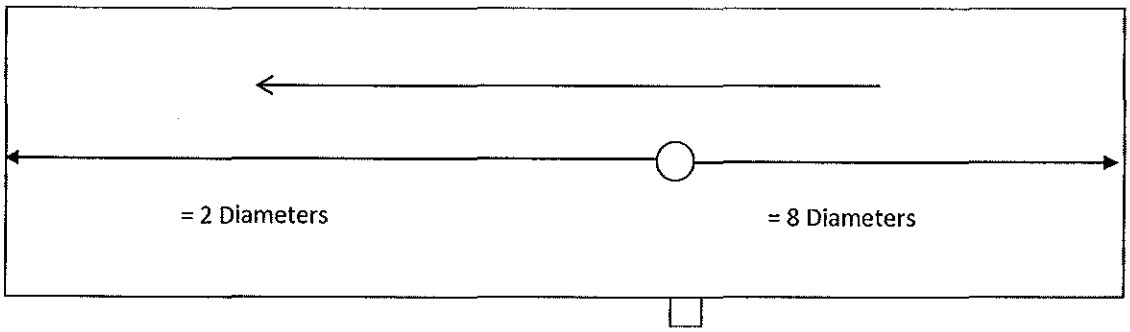


Figure No. 2

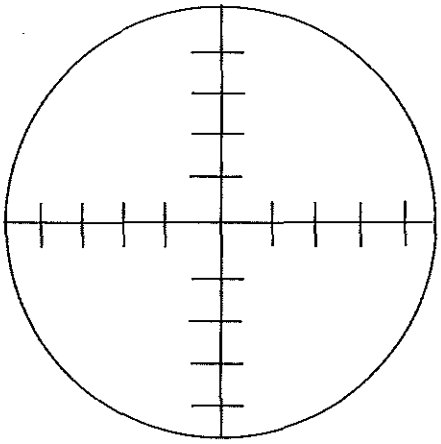
Site: **RCO Inlet** **Ford Flat Rock Assembly Plant** **Flat Rock, Michigan**	**Sampling Date:** **March 18, 2015**

BT Environmental Consulting, Inc.
4949 Fernlee Avenue
Royal Oak, Michigan

BTEC Inc.

Stack Diameter: 49.5 inches

Points	Distance "
8	1.6
7	5.2
6	9.6
5	16.0
4	33.5
3	39.9
2	44.3
1	47.9



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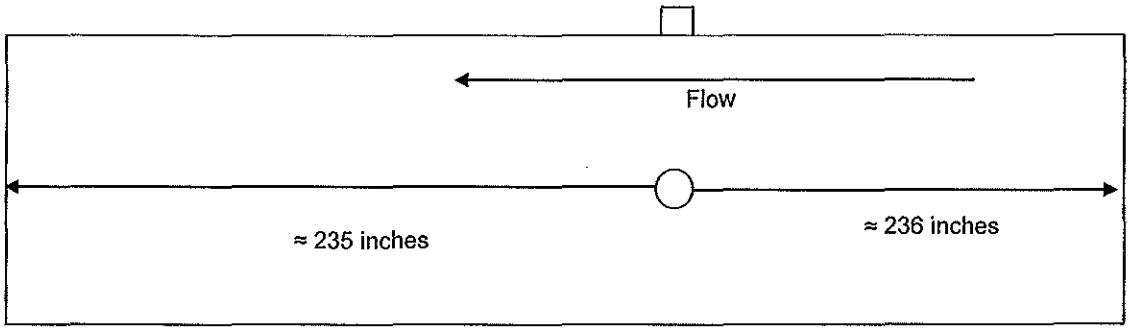


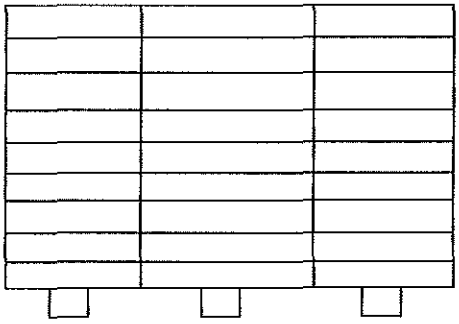
Figure No. 3

Site: **RTO Inlet** **Ford Flat Rock Assembly Plant** **Flat Rock, Michigan**	**Sampling Date:** **March 18, 2015**	**BT Environmental Consulting, Inc.** **4949 Fernlee Avenue** **Royal Oak, Michigan**

BTEC Inc.

Stack dimensions: 42" X 46"

Points	Distance "
1	2.6
2	7.9
3	13.1
4	18.4
5	23.6
6	28.9
7	34.1
8	39.4



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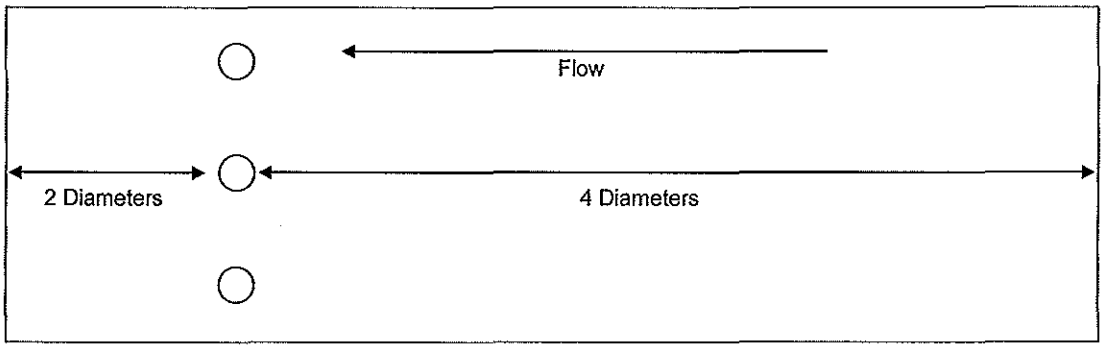

Figure No. 4

Site: **RTO Outlet** **Ford Flat Rock Assembly Plant** **Flat Rock, Michigan**	**Sampling Date:** **March 18, 2015**	**BT Environmental Consulting, Inc.** **4949 Fernlee Avenue** **Royal Oak, Michigan**

BTEC Inc.

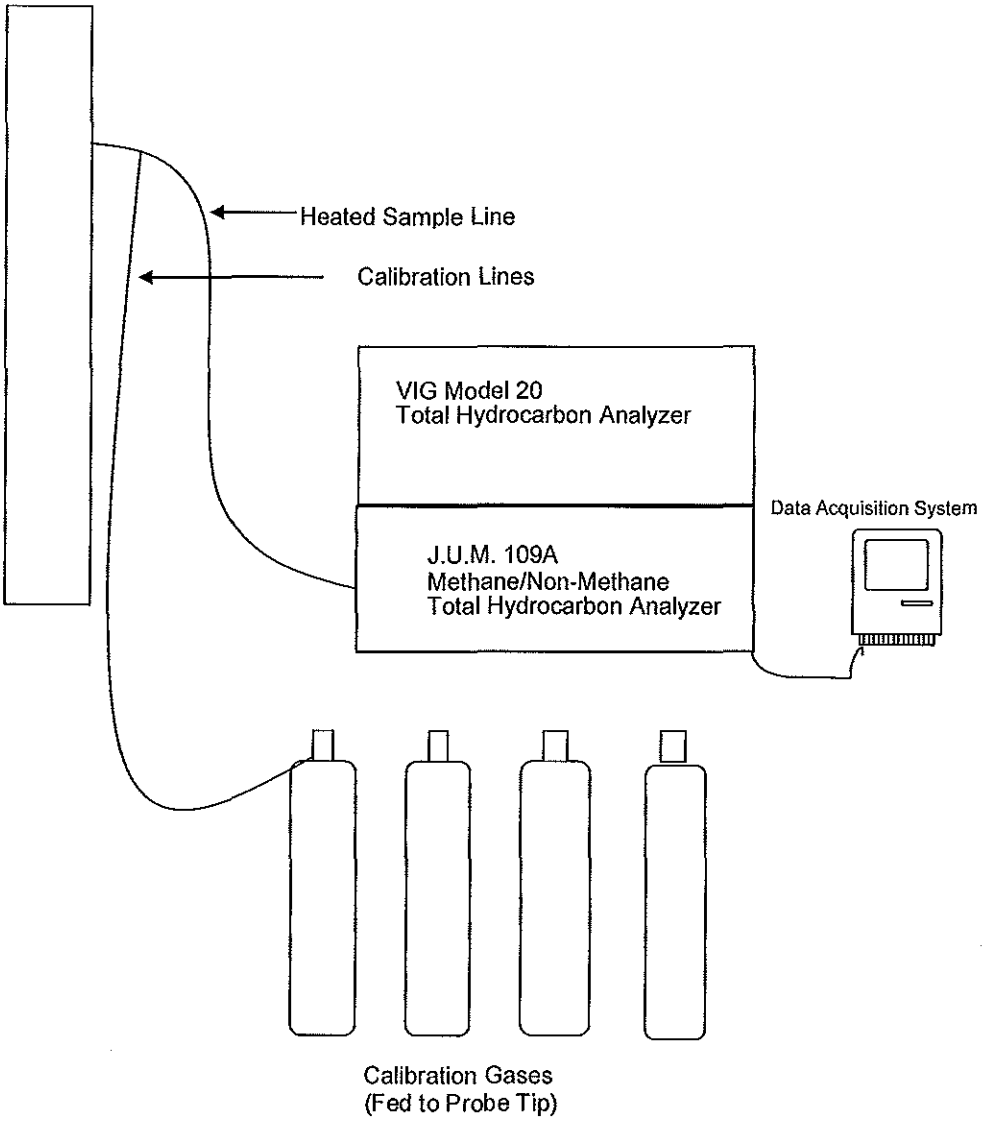

Figure No. 5

Site: **Sampling Date:** **USEPA Method 25A** **March 18, 2015** **Ford Flat Rock Assembly Plant** **Flat Rock, Michigan**	**BT Environmental Consulting, Inc.** **4949 Fernlee Avenue** **Royal Oak, Michigan**

BTEC Inc.

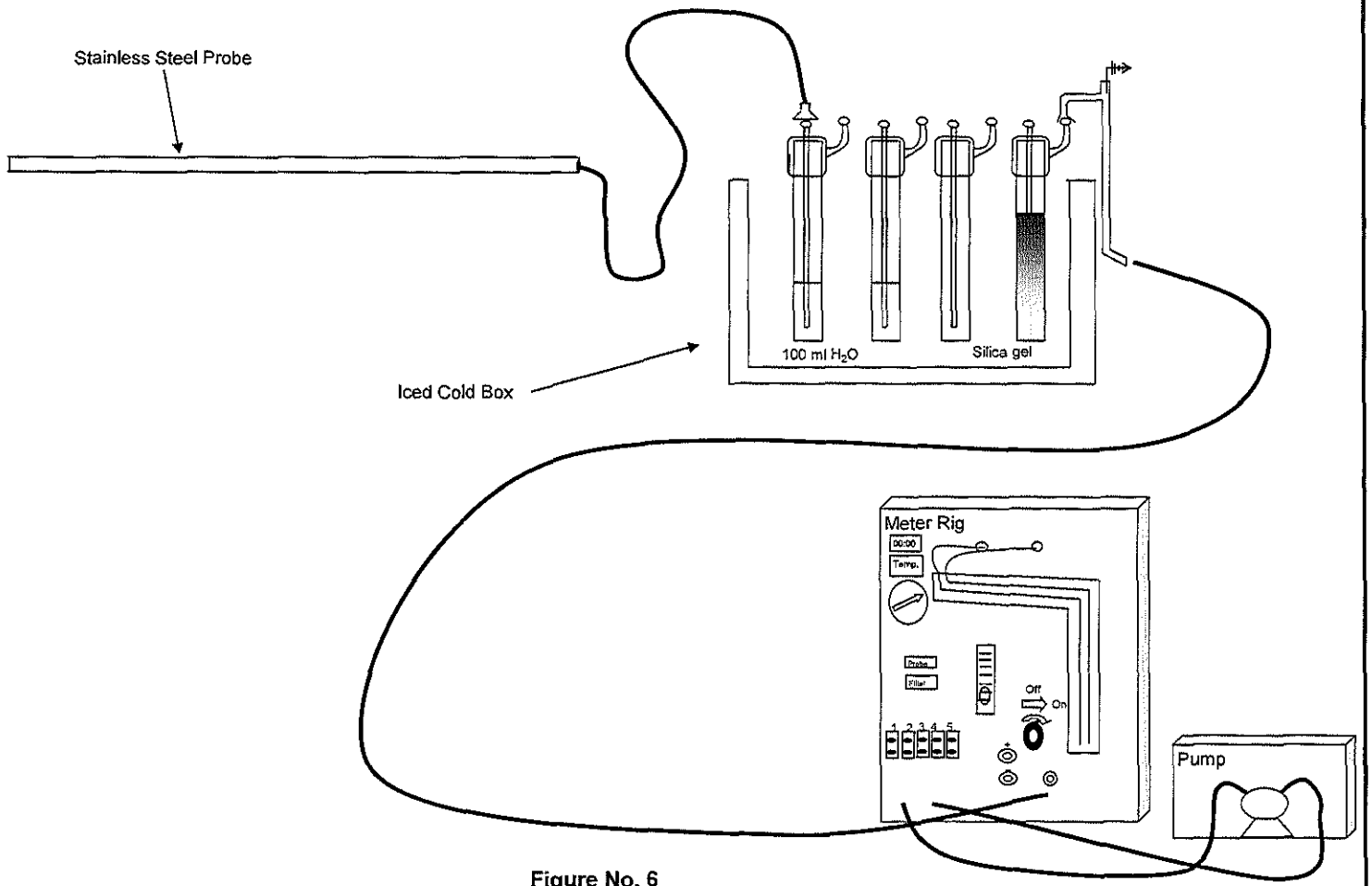

Figure No. 6

Site:	Sampling Date:	
USEPA Method 4 Ford Flat Rock Assembly Plant Flat Rock, Michigan	March 18, 2015	BT Environmental Consulting, Inc. 4949 Fernlee Avenue Royal Oak, Michigan