COMPLIANCE TEST REPORT

for

PARTICULATE MATTER (PM)

UNIT 3

River Rouge Power Plant
River Rouge, Michigan

October 6, 2016

Prepared By
Environmental Management & Resources
Environmental Field Services Group
DTE Corporate Services, LLC
7940 Livernois H-136
Detroit, MI 48210

DTE Energy®

DEQ

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION

RECEIVED
OCT 27 2016
AIR QUALITY DIV.

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: DTE Electric Company - River Rouge Power Plant County: Wayne

Source Address: 1 Belanger Park Drive City: River Rouge

AQD Source ID (SRN): B2810 RO Permit No.: MI-ROP-B2810-2012 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 10/6/2016 To 10/6/2019

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

ROP Emissions Test Report, EU-BOILER3 PM

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.

Nader Rajabian	Plant Manager	(313) 297-8218
Name of Responsible Official (print or type)	Title	Phone Number
N. Rajabian		10/26/2016
Signature of Responsible Official		Date

* Photocopy this form as needed.

EQP 5736 (Rev 9/01)

DTE Energy®

EXECUTIVE SUMMARY

DTE Energy's Environmental Management and Resources (EM&R), Field Services Group, performed Particulate Matter (PM) emissions testing at the DTE Electric River Rouge Power Plant, located in River Rouge, Michigan. The fieldwork, performed on October 6, 2016 was conducted to satisfy requirements of the Michigan Renewable Operating Permit #B2810-2012. Emission tests were performed on Unit 3 for Filterable Particulate Matter (PM).

A summary of results of the emissions testing are highlighted below:

PM Emissions Test Results
River Rouge Power Plant – Unit 3
River Rouge, Michigan
October 6, 2016

Unit 3	Load (K#/hr)	Particulate (lb/1000 lb @ 50% ea)
PM	1,679	0.003
Permit Limit		**0.175**

DTE Energy®

1.0 INTRODUCTION

DTE Energy's Environmental Management and Resources (EM&R), Field Services Group, performed Particulate Matter (PM) emissions testing at the DTE Electric River Rouge Power Plant, located in River Rouge, Michigan. The fieldwork, performed on October 6, 2016 was conducted to satisfy requirements of the Michigan Renewable Operating Permit #B2810-2012. Emission tests were performed on Unit 3 for Filterable Particulate Matter (PM).

Testing was performed pursuant to Title 40, *Code of Federal Regulations*, Part 60, Appendix A (40 CFR §60 App. A), Methods 1,2, 3A, 4 and 5B.

The fieldwork was performed in accordance with EPA Reference Methods and EM&R's Intent to Test[1], Test Plan Submittal. The following EM&R Field Services personnel participated in the testing program: Mr. Mark Grigereit, Principal Engineer, Mr. Thomas Snyder, Environmental Specialist, and Mr. Fred Meinecke, Senior Environmental Technician. Mr. Grigereit was the project leader. Ms. Amanda Kosch, Associate Environmental Engineer, with EM&R, provided process coordination for the testing program. Mr. Tom Gasloli with the Air Quality Division of the Michigan Department of Environmental Quality (MDEQ) approved the Test Plan[2].

2.0 SOURCE DESCRIPTION

The River Rouge Power Plant (RRPP), located at 1 Belanger Park Dr. River Rouge, Michigan, employs the use of two (2) coal-fired boilers. Unit 2 is a Combustion Engineering Boiler, nominally rated at 266 gross megawatts (GMW). Unit 3 is a Foster-Wheeler Boiler, nominally rated at 278 GMW. Particulate emissions from Unit 2 & Unit 3 are controlled via Wheelabrator-Fry electrostatic precipitators (ESP). The air pollution control equipment have design collection efficiencies of 99.9%.

During the emissions testing the unit was operated within 10% of its highest achievable load.

A schematic representation of the Unit 3 sampling location is presented in Figure 1.

[1] MDEQ, Test Plan, Submitted May 12, 2015. (Attached-Appendix A)
[2] MDEQ, Approval Letter, Received May 26, 2015. (Attached-Appendix A)

DTE Energy

3.0 SAMPLING AND ANALYTICAL PROCEDURES

DTE Energy obtained emissions measurements in accordance with procedures specified in the USEPA *Standards of Performance for New Stationary Sources.* The sampling and analytical methods used in the testing program are indicated in the table below

Sampling Method	Parameter	Analysis
USEPA Methods 1-2	Exhaust Gas Flow Rates	Field data analysis and reduction
USEPA Method 3A	Oxygen & Carbon Dioxide	Instrumental Analyzer Method
USEPA Method 4	Moisture Content	Field data analysis and reduction
USEPA Method 5B	Particulate Matter	Gravimetric Analysis

3.1 STACK GAS VELOCITY AND FLOWRATES (USEPA METHODS 1-2)

3.1.1 Sampling Method

Stack gas velocity traverses were conducted in accordance with the procedures outlined in USEPA Method 1, "Sample and Velocity Traverses for Stationary Sources," and Method 2, "Determination of Stack Gas Velocity and Volumetric Flowrate." Four (4) sampling ports were utilized on the Unit's exhaust stack, sampling at six (6) points per port for a total of twenty four (24) points. Flow traverses were conducted simultaneously with the particulate sampling.

Cyclonic flow checks were performed on the Unit 3 Stack during the initial flow monitor certification RATAs. Testing at the sampling location demonstrated that no cyclonic flow was present. No changes to the Stack have occurred since the cyclonic flow check was performed.

The EPA Method 2 sampling equipment consisted of a 0-10" incline manometer, S-type Pitot tube (C_p = 0.84) and a Type-K calibrated thermocouple.

3.2 OXYGEN & CARBON DIOXIDE (USEPA METHOD 3A)

3.2.1 Sampling Method

Oxygen (O_2) and carbon dioxide CO_2 emissions were evaluated using USEPA Method 3A, "Gas Analysis for Carbon Dioxide, Oxygen, Excess Air, and Dry Molecular Weight (Instrumental Analyzer Method)". The analyzers utilize paramagnetic sensors. Testing was performed simultaneously with the gaseous emissions testing.

The EPA Method 3A sampling system (Figure 2) consisted of the following:

(1) Tedlar sampling bag (collecting gas sample from the meter rig exhaust) into a Tedlar Bag
(2) MAK® gas conditioner with particulate filter
(3) Servomex 1400 O_2/CO_2 gas analyzer
(4) Appropriate USEPA Protocol 1 calibration gases
(5) Data Acquisition System

3.2.2 Sampling Train Calibration

The O_2 and CO_2 analyzers were calibrated according to procedures outlined in USEPA Methods 3A. Zero, span, and mid range calibration gases were introduced directly into the analyzer to verify the instruments linearity.

3.2.3 Quality Control and Assurance

All sampling and analytical equipment was calibrated according to the guidelines referenced in Methods 3A. Calibration gases were EPA Protocol 1 gases and the concentrations were within the acceptable ranges (40-60% mid range and span) specified in Method 7E. Calibration gas certification sheets are located in Appendix C.

3.3 MOISTURE DETERMINATION (USEPA METHOD 4)

3.3.1 Sampling Method

Determination of the moisture content of the exhaust gas was performed using USEPA Method 4, "Determination of Moisture Content in Stack Gases". The moisture was collected in the Method 5B glass impingers, and the percentage of water was then derived from calculations outlined in USEPA Method 4.

Upon completion of each test, the impinger contents were weighed to determine moisture content of the gas stream using the calculations found in USEPA Method 4. After recording the impinger weights, the solution was discarded.

All sampling and analytical equipment was calibrated according to the guidelines referenced in EPA Method 5B.

3.4 PARTICULATE (USEPA METHOD 5B)

3.4.1 Sampling Method

USEPA Method 5B, "Determination of Nonsulfuric Acid Particulate Matter Emissions from Stationary Sources" was used to measure the filterable (front-half) particulate emissions (see Figure 3 for a schematic of the sampling train). Triplicate, 60-minute test runs were conducted.

The Method 5B modular isokinetic stack sampling system (Figure 3) consisted of the following:

(1) Stainless-steel button-hook nozzle
(2) Heated glass-lined probe
(3) Heated 3" glass filter holder with a quartz filter (maintained at a temperature of 320 ± 25 °F)
(4) Set of four impingers for the collection of condensate for moisture determination
(5) Length of sample line
(6) Environmental Supply® control case equipped with a pump, dry gas meter, and calibrated orifice.

The quartz filters used in the sampling were initially weighed to a constant weight as described in Method 5B to obtain the initial tare weight.

After completion of the final leak test for each test run, the filter was recovered, and the probe, nozzle and the front half of the filter holder assembly were brushed and rinsed with acetone. The acetone rinses were collected in a pre-cleaned sample container. The container was labeled with the test number, test location, test date, and the level of liquid marked on the outside of the container. Immediately after recovery, the sample containers were placed in a cooler for storage.

At the laboratory the acetone rinses were transferred to clean pre-weighed beakers, and evaporated to dryness at ambient temperature and pressure. The beakers and filters were desiccated for 24 hours and weighed to a constant weight (within 0.5 mg). The data sheets containing the initial and final weights on the filters and beakers can be found in Appendix C.

Collected field blanks consisted of a blank filter and acetone solution blank. The acetone blank was collected from the rinse bottle used in sample recovery. The blank filter and acetone were collected and analyzed following the same procedures used to recover and analyze the field samples.

Field data sheets for the Method 5B sampling can be found in Appendix B.

3.4.2 Quality Control and Assurance

All sampling and analytical equipment was calibrated according to the guidelines referenced in EPA Method 5B. All Method 1-4, and 5B calibration data can be found in Appendix C.

3.4.3 Data Reduction

The Filterable PM emissions calculations are based on calculations located in USEPA Method 5B and can be found in Appendix F. The PM emissions data collected during the testing was calculated and reported as pounds per 1000 pounds @ 50% excess air (lbs/1000 lbs @ 50% EA).

4.0 OPERATING PARAMETERS

The test program included the collection of boiler load, precipitator, and stack emissions data during each test run. Parameters recorded included boiler load (K#/hr steam) and CEMs data (SO_2, NO_x, CO_2, and Opacity).

During the emissions sampling, a representative coal sample was collected from the unit and analyzed for heat content, percent ash, and percent sulfur. No natural gas, coke oven gas, or blast furnace gas was burned during the testing.

Operational data and results of the fuel analysis are located in Appendix E.

5.0 DISCUSSION OF RESULTS

The Results of the Unit 3 PM testing are presented in Table 1. The PM emissions are presented in grains per dry standard cubic foot (gr/DSCF) and pounds per 1000 pounds corrected to 50% excess air (lb/1000 lb Excess air). Auxiliary test data presented for each test includes unit load in gross MegaWatts (GMW), stack temperature in degrees Fahrenheit (°F), stack gas moisture in percent (%), stack gas velocity in feet per minute (ft/min) and stack gas flow rate in actual cubic feet per minute (ACFM), standard cubic feet per minute (SCFM) and dry standard cubic feet per minute (DSCFM).

The results of the PM testing indicate that Unit 3 is in compliance with Michigan Renewable Operating Permit #B2810-2012.

6.0 CERTIFICATION STATEMENT

"I certify that I believe the information provided in this document is true, accurate, and complete. Results of testing are based on the good faith application of sound professional judgment, using techniques, factors, or standards approved by the Local, State, or Federal Governing body, or generally accepted in the trade."

Thomas J. Snyder, QSTI

This report prepared by: _____

Thomas J. Snyder, QSTI
Environmental Specialist, Field Services Group
Environmental Management and Resources
DTE Energy Corporate Services, LLC

This report reviewed by: _____

Mark Grigereit, QSTI
Principal Engineer, Field Services Group
Environmental Management and Resources
DTE Energy Corporate Services, LLC

DTE Energy

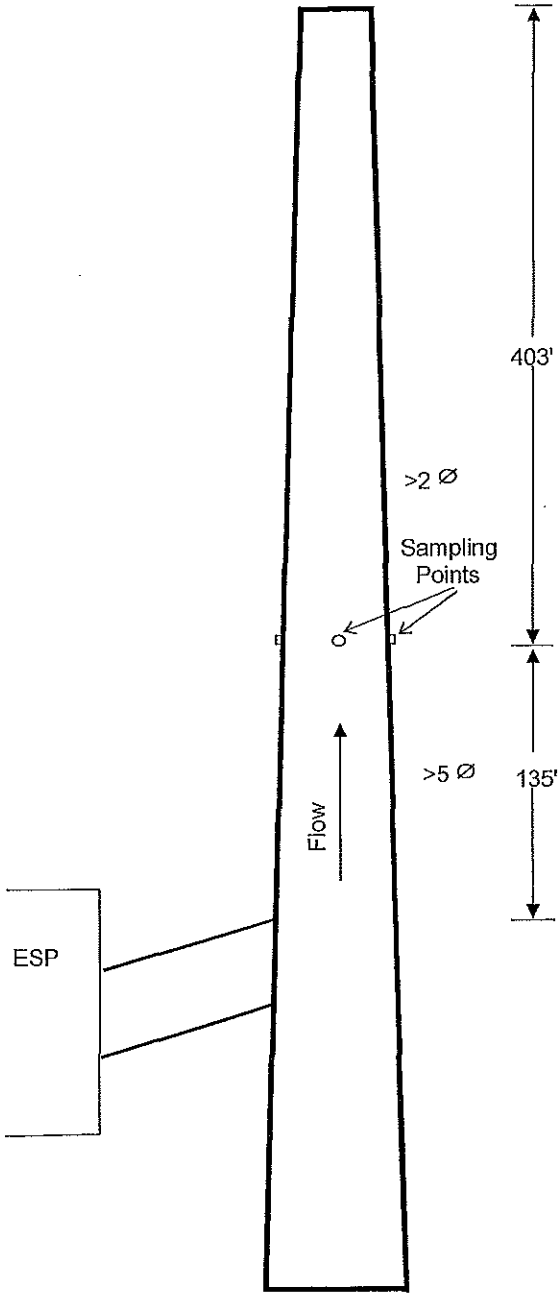
TABLE NO. 1
FILTERABLE PARTICULATE EMISSION TESTING RESULTS
River Rouge Power Plant - Unit 3
October 6, 2016

Test	Test Date	Test Time	Unit Load (K#/hr)	Stack Temperature (°F)	Stack Moisture (%)	Stack Velocity (ft/min)	Exhaust Gas Flowrates			Filterable PM Emissions	
							(ACFM)	(SCFM)	(DSCFM)	(gr/DSCF)	(lbs/1000lbs @ 50% EA)[1]
PM-1	6-Oct-16	7:30-8:39	1681.3	349.7	10.6	2,833	1,228,890	810,778	725,127	0.002	0.004
PM-2		9:02-10:09	1675.2	353.6	10.4	2,918	1,265,644	834,156	747,605	0.002	0.003
PM-3		10:33-11:41	1681.1	352.3	10.6	2,904	1,259,431	828,285	740,728	0.001	0.002
	Average:		*1679.2*	*351.9*	*10.5*	*2,885*	*1,251,322*	*824,406*	*737,820*	*0.002*	*0.003*

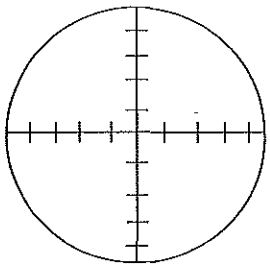
(1) Permit Limit = 0.175 lb/1000 lbs @ 50% EA

DTE Energy

Figure 1 - Sampling Location
River Rouge Power Plant - Unit 3
October 6, 2016



Stack Diameter 282"

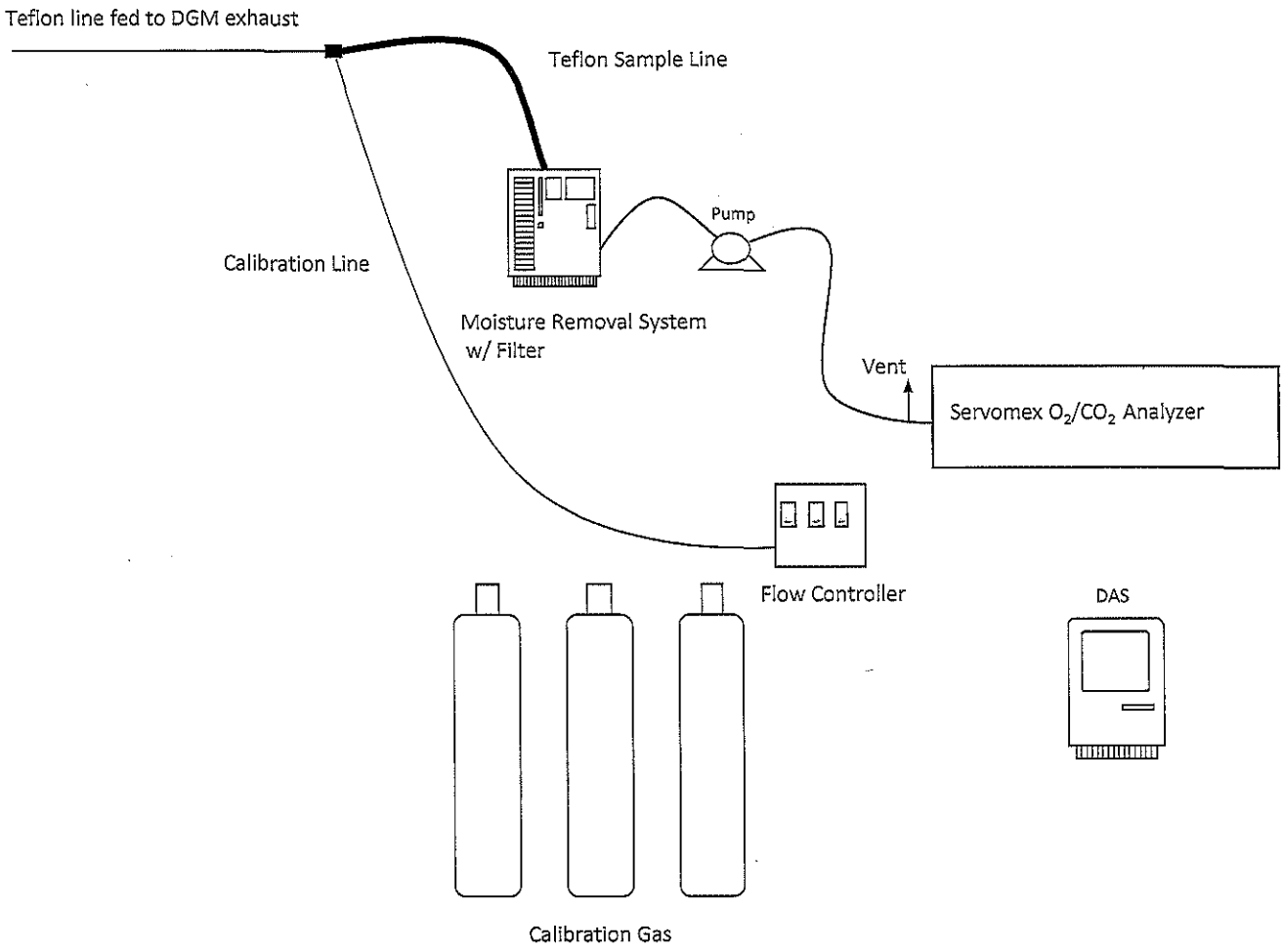


Velocity Measurement Points

Points	Distance From Inner Wall
1	5.92
2	18.89
3	33.28
4	49.91
5	70.50
6	100.39

DTE Energy

Figure 2 - EPA Method 3A
River Rouge Power Plant - Unit 3
October 6, 2016



DTE Energy

Figure 3 - EPA Method 5B
River Rouge Power Plant - Unit 3
October 6, 2016