COMPLIANCE TEST REPORT

for

PARTICULATE MATTER (PM)

EU-BOILER_9A

Trenton Channel Power Plant
Trenton, Michigan

March 16, 2021

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EXECUTIVE SUMMARY

DTE Energy's Environmental Management and Safety (EM&S), Ecology, Monitoring, and Remediation Group, performed Particulate Matter (PM) emissions testing at the DTE Electric Trenton Channel Power Plant, located in Trenton, Michigan. The fieldwork performed on March 16, 2021 was conducted to satisfy requirements of the Michigan Permit to Install No. 139-19.

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

PM Emissions Test Results
Trenton Channel Power Plant – EU-BOILER_9A
Trenton, Michigan
March 16, 2021

EU-BOILER_9A	Load (MW)	Load (steamload, klb/hr)	Particulate (lb/1000 lb @ 50% ea)
PM	394	2,583	0.023
Permit Limit			**0.15**

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1.0 INTRODUCTION

DTE Energy's Environmental Management and Safety (EM&S), Ecology, Monitoring, and Remediation Group, performed Particulate Matter (PM) emissions testing at the DTE Electric Trenton Channel Power Plant, located in Trenton, Michigan. The fieldwork performed on March 16, 2021 was conducted to satisfy requirements of the Michigan Permit to Install No. 139-19.

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 5.

The fieldwork was performed in accordance with EPA Reference Methods and EM&S's Intent to Test[1], Test Plan Submittal. The following EM&S Field Services personnel participated in the testing program: Mr. Jason Logan, Environmental Specialist, Mr. Mark Westerberg, Senior Environmental Specialist, and Mr. Ken St. Amant, Senior Environmental Technician. Mr. Logan was the project leader. Mr. Austin Sash, Environmental Engineer, with EM&S, provided process coordination for the testing program. Mr. Jonathan Lamb with the Air Quality Division of the Michigan Department of Environmental Quality (EGLE) was on site to observe portions of the emissions testing.

2.0 SOURCE DESCRIPTION

The Trenton Channel Power Plant (TCPP), located at 4695 W. Jefferson, Trenton, Michigan, employs the use of one (1) coal-fired boiler, denoted as EU-BOILER_9A in Permit to Install 139-19 (Unit 9A). Unit 9A is a Combustion Engineering Boiler, nominally rated at 520 net megawatts (NMW). However, the current full load capacity of Unit 9 is reduced to 460 NMW due to current operations.

Particulate emissions from Unit 9A are controlled via American Standard electrostatic precipitators. Unit 9A is equipped with a Dry Sorbent Injection (DSI) and Activated Carbon Injection (ACI) air quality control system. The DSI system is used to control acid gas, PM, PM10, PM2.5, and NOx emissions from each unit. Trona is received at the plant where inline mills further refine the Trona. The ACI system is used to control Mercury emissions from each unit.

Testing occurred while Unit 9 operated at "maximum routine operating conditions" in accordance with Michigan Air Pollution Control Rule 336.2003(3).

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[1] EGLE, Test Plan, Submitted March 4, 2020. (Attached-Appendix A)

[2] EGLE, Approval Letter, Received April 8, 2020. (Attached-Appendix A)

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A schematic representation of the Unit 9 sampling location is presented in Figure 1.

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 5	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 9 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.

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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) PTFE sampling line (collecting gas sample from the meter rig exhaust)
(2) Universal® gas conditioner with particulate filter
(3) PTFE connecting line
(4) Servomex O_2/CO_2 gas analyzer
(5) Appropriate USEPA Protocol 1 calibration gases
(6) 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. Upscale and downscale calibrations were performed at the conclusion of each test period to determine instrument drift.

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 5 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.

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

3.4 PARTICULATE MATTER (USEPA METHOD 5)

3.4.1 Filterable Particulate Sampling Method

USEPA Method 5, "Determination of Particulate Matter Emissions from Stationary Sources" was used to measure the filterable particulate emissions (see Figure 2 for a schematic of the sampling train). Three, 60-minute sample runs were conducted.

The Method 5 sampling system (Figure 2) consisted of the following:

(1) PTFE coated 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 250 ± 25 °F)
(4) Set of 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 filters used in the sampling were initially weighed to a constant weight as described in the Method 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 then placed in a desiccator for a minimum of 24 hours prior to their initial final weight. Final weights were taken at 6 hour or greater intervals until two weights agreed 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

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used to recover and analyze the field samples. Field data sheets for the Method 5 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 5 (see Appendix D for equipment calibrations).

3.4.3 Data Reduction

Particulate data collected during the emissions testing was calculated and reported as pounds per 1000 pounds, wet, at 50% excess air (lbs/1000 $lb_{(w)}$ @ 50% EA).

The PM emission calculations are based on calculations located in USEPA Method 5. Example calculations are presented in Appendix F.

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 (Megawatts) 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. Operational data and results of the fuel analysis are in Appendix E.

5.0 DISCUSSION OF RESULTS

The results of the Unit 9 PM testing are presented in Table 1. PM emissions are presented in 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 9 is in compliance with Michigan Permit to Install No. 139-19.

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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."

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RESULTS TABLE

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Table No. 1
PARTICULATE EMISSION TESTING SUMMARY
Trenton Channel Power Plant - BOILER_9A
March 16, 2021
Trenton, MI

Test	Test Date	Test Time[2]	Unit Load (GMW)	Unit Steam Load (klb/hr)	ACI Injection Rate (lb/hr)	DSI Injection Rate (lb/hr)	Stack Temperature (°F)	Stack Velocity (ft/min)	Exhaust Gas Flowrates			PM Emissions		
									(ACFM)	(SCFM)	(DSCFM)	(grains/dscf)	(lbs/hr)	(lbs/1000lbs @ 50% EA)[1]
PM-1	**16-Mar-21**	7:33-8:36	394	2,579	301	1,001	269	6,702	1,596,808	1,128,572	1,003,382	0.010	83.7	0.017
PM-2	**16-Mar-21**	8:54-9:59	394	2,569	275	928	271	6,737	1,604,959	1,135,450	1,024,530	0.019	163.6	0.032
PM-3	**16-Mar-21**	10:14-11:17	395	2,601	297	685	274	6,729	1,603,006	1,125,810	1,000,378	0.011	94.2	0.019
	Average:		*394*	*2,583*	*291*	*871*	*271*	*6,723*	*1,601,591*	*1,129,944*	*1,009,430*	*0.013*	*113.8*	*0.023*

(1) Permit Limit = 0.15 lbs/1000 lbs @ 50% excess air

(2) Time in EDT

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FIGURES

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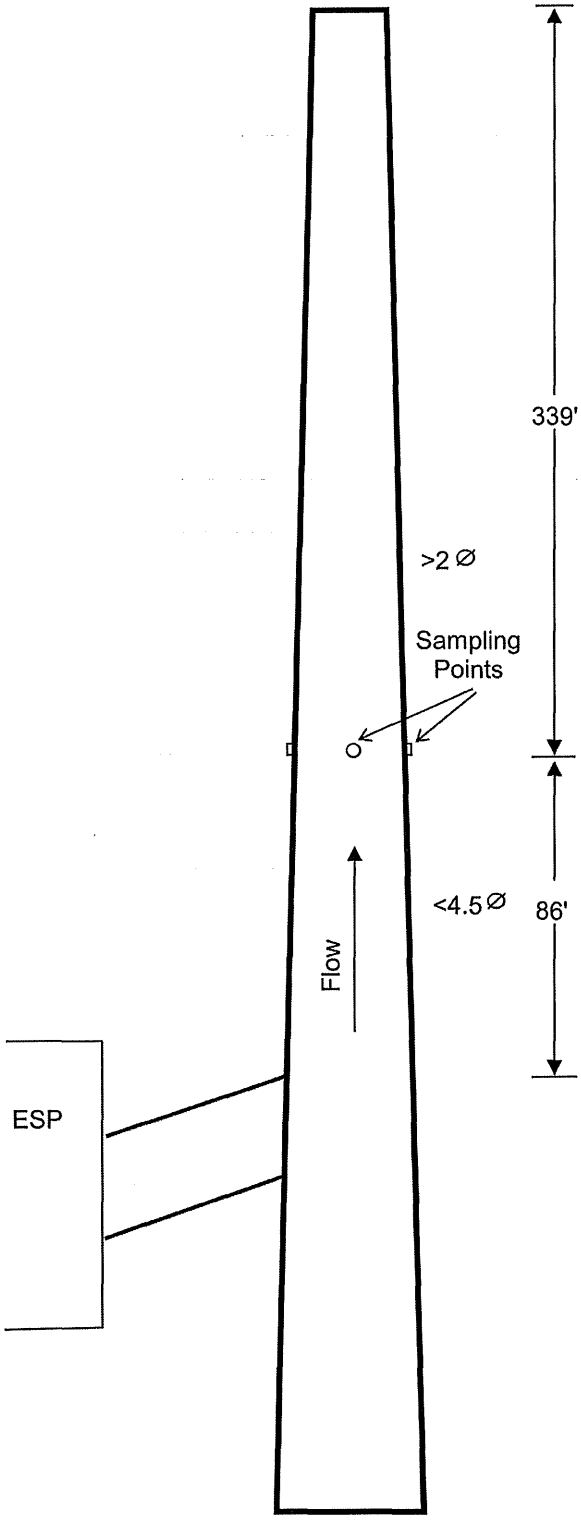
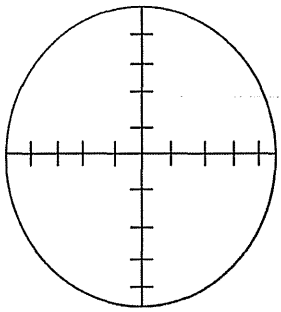
Figure 1 – Sampling Location
Trenton Channel Power Plant – Unit 9



Stack Diameter 221.5"



Velocity Measurement Points

Points	Distance From Inner Wall
1	4.7
2	14.8
3	26.1
4	39.2
5	55.4
6	78.9

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Figure 2 – EPA Method 3A

Trenton Chanel Power Plant – Unit 9

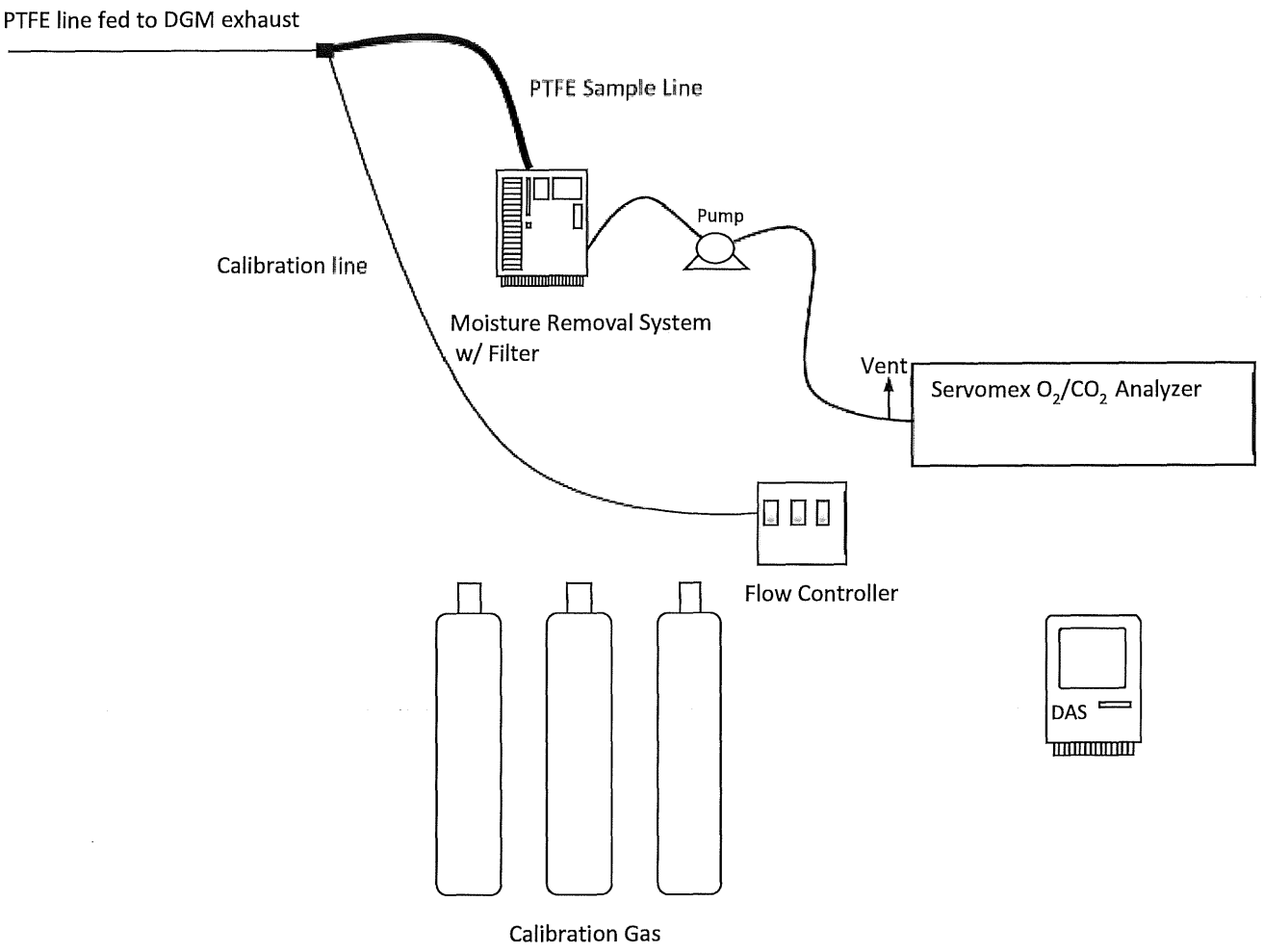

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Figure 3 – EPA Method 5
Trenton Channel Power Plant – Unit 9