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COMPLIANCE TEST REPORT

for

CARBON MONOXIDE EMISSIONS

UNIT 1

Belle River Power Plant
China Township, Michigan

August 21-23, 2013

Prepared By
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EXECUTIVE SUMMARY

DTE Energy's Environmental Management and Resources (EM&R) Field Services Group performed carbon monoxide emissions testing on the exhaust of Unit 1 at the DTE-Electric, Belle River Power Plant, located in Belle River, Michigan. The fieldwork, performed on August 21-23, 2013, satisfies requirements of the Michigan Department of Environmental Quality (MDEQ) Permit to Install (PTI) No. 164-08. Testing was performed for carbon monoxide (CO) at two loads (high & mid loads) as required by permit conditions.

The results of the emissions testing are highlighted below:

CO Emissions Test Results
Belle River Power Plant - Unit 1
August 21-23, 2013

Boiler Operating Condition	Average CO Concentration (ppm)[1]	Average CO Concentration (lb/MMBtu)
High Load (8/21)	2.0	0.0025
Mid Load (8/22-8/23)	0.1	0.0001

[1] Emissions corrected for analyzer drift as per USEPA Method 7E

1.0 INTRODUCTION

DTE Energy's Environmental Management and Resources (EM&R) Field Services Group performed carbon monoxide emissions testing on the exhaust of Unit 1 at the DTE-Electric, Belle River Power Plant, located in East China Township, Michigan. The fieldwork, performed on August 21-23, 2013, satisfies requirements of the Michigan Department of Environmental Quality (MDEQ) Permit to Install (PTI) No. 164-08. Testing was performed for carbon monoxide (CO) at two loads (high & mid loads) as required by permit conditions.

The testing was performed pursuant to Title 40, *Code of Federal Regulations*, Part 60, Appendix A (40 CFR §60 App. A), Methods 3A and 10.

The fieldwork was performed in accordance with EPA Reference Methods and EM&R's Intent to Test[1], which was approved in a letter by Mr. Mark Dziadosz from the Michigan Department of Environmental Quality (MDEQ), dated July 26, 2013[2]. The following EM&R personnel participated in the testing program: Mr. Mark Grigereit Senior Environmental Specialist and Mr. Thom Snyder, Senior Environmental Technician. Mr. Grigereit was the project leader. Mr. David Huxhold, Senior Environmental Engineer at the plant provided process coordination for the testing program. Portions of the testing were observed by Mr. Dziadosz from the MDEQ, Air Quality Division.

2.0 SOURCE DESCRIPTION

The Belle River Power Plant (BRPP) located at 4505 King Road in East China Township, Michigan, employs the use of two (2) Babcock and Wilcox coal-fired boilers (Units 1 & 2) each capable of producing 4,550,000 pounds per hour of steam. Each Unit has a Siemens Power Corporation turbine generator with a nominally rated capability of 635 (Unit 1) and 645 (Unit 2) megawatts (MW). .

A schematic representation of the Boiler exhaust and sampling locations is presented in Figure 1.

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[1] MDEQ, Test Plan, Submitted July 3, 2013. (Attached-Appendix A)

[2] MDEQ, Approval Letter, dated July 26, 2013. (Attached-Appendix A)

3.0 SAMPLING AND ANALYTICAL PROCEDURES

DTE Energy's EM&R Field Services Group obtained emissions measurements in accordance with procedures specified in the USEPA *Standards of Performance for New Stationary Sources* and the approved Intent to Test Plan. The sampling and analytical methods used in the testing program are indicated in the table below:

Sampling Method	Parameter	Analysis
USEPA Method 3A	Oxygen	Instrumental Analyzer Method
USEPA Method 10	Carbon Monoxide	NDIR Instrumental Analyzer Method

3.1 OXYGEN AND CARBON MONOXIDE (USEPA METHODS 3A AND 10)

3.1.1 Sampling Method

Oxygen (O_2) emissions were evaluated using USEPA Method 3A, "Gas Analysis for Oxygen, Oxygen, Excess Air, and Dry Molecular Weight (Instrumental Analyzer Method)".

Carbon monoxide (CO) emissions were evaluated using USEPA Method 10, "Determination of Carbon Monoxide Emissions from Stationary Sources". The CO analyzer utilizes a NDIR detector.

3.1.2 O2 and CO Sampling Train

DTE Energy Corporate Services' EPA Methods 3A and 10 sampling system consisted of the following components:

(1) A heated multi-point stainless steel sampling probe with heated filter.
(2) A heated Teflon™ sampling line.
(3) A Universal® gas conditioner with particulate filter.
(4) A flexible unheated Teflon™ sampling line.
(5) A Servomax 1400 O_2 gas analyzer and TECO 48i NDIR CO gas analyzer.
(6) USEPA Protocol 1 calibration gases.
(7) Data Acquisition System.

Refer to Figure 2 for a schematic of the O_2 and CO sampling train.

3.1.3 Sampling Train Calibration

The Sampling train was calibrated according to procedures outlined in USEPA Methods 3A & 10. Zero, span, and mid range calibration gases were introduced directly into the CO and O_2 analyzers to determine the instruments linearity. A zero and mid range span gas was then introduced through the entire sampling system to determine sampling system bias for each analyzer. Additional system calibrations were performed at the completion of each test.

3.1.4 Sampling Duration & Frequency

The emissions testing of the boiler at each load condition consisted of triplicate 60-minute samples. Testing was conducted at twelve points per Method 7E (4 ports, 3 points per port) during the first run at high load. Test runs 2 & 3 were performed at a single representative point as the variation in CO emissions, during the first run, were less than 0.5 parts per million as per Method 7E Section 8.1.2. Data collected while the probe was moved between ports (Test 1) has not been included in the concentration averages. Sampling was performed simultaneously for O_2 and CO. Data was recorded as 1-minute averages.

3.1.5 Quality Control and Assurance (O_2 and CO)

All sampling and analytical equipment was calibrated according to the guidelines referenced in Methods 3A and 10. Calibration gases were EPA Protocol 1 gases. The CO analyzer span was 0-14.3 ppm (13.763, 5.51, and zero).

Calibration gas certification sheets are located in Appendix C.

3.1.6 Data Reduction

There is not a CO emission limit stated in the State of Michigan PTI 164-08. Testing was performed to establish emissions concentrations for future reporting. Emissions are reported in parts per million (ppm) and pounds per million BTU (lb/MMBtu).

Emissions calculations (lb/MMBtu) are based on calculations located in USEPA Method 19. Coal samples were collected during the testing and analyzed to determine the F_c factor. Laboratory results from the coal analysis are presented in Appendix E.

4.0 OPERATING PARAMETERS

The test program included the collection of boiler emissions and operating data during each test run. Parameters recorded included CO_2, SO_2, and NO_x emissions, opacity, and stack flow as well as boiler load.

Operational data can be referred to in Appendix E.

5.0 RESULTS

The results from the CO testing on Unit 1 are displayed in Table No. 1. Table No. 1 presents the CO emissions in terms of parts per million (ppm) and pounds per million British thermal unit (lbs/MMBtu) for both the mid and high loads tested. The Oxygen (O_2) in percent (%) is also presented. The ppm emissions were corrected for analyzer drift per USEPA Method 7E procedures.

Example calculations are presented in Appendix D.

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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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TABLE NO. 1
CARBON MONOXIDE (CO) EMISSION TESTING RESULTS
Unit 1 - Belle River Power Plant
August 21-23, 2013

High Load (August 21, 2013)

Test	Time	Load (MW_{gross})	O_2 (% $_{dry}$)	O_2 (% $_{dry}$)[1]	CO Emissions (ppm $_{dry}$)	CO Emissions (ppm $_{dry}$)[1]	CO Emissions (lbs/MBtu)
Run - 1	8:44-9:52	619.2	8.3	8.2	1.9	1.8	0.0022
Run - 2	10:05-11:05	619.6	8.5	8.5	2.3	2.3	0.0028
Run - 3	11:24-12:24	619.7	8.5	8.5	1.9	2.0	0.0025
	Avg:	*619.5*	*8.4*	*8.4*	*2.0*	*2.0*	*0.0025*

(1) Emissions corrected for analyzer drift per USEPA Method 7E

Mid Load (August 22-23, 2013)

Test	Time	Load (MW_{gross})	O_2 (% $_{dry}$)	O_2 (% $_{dry}$)[1]	CO Emissions (ppm $_{dry}$)	CO Emissions (ppm $_{dry}$)[1]	CO Emissions (lbs/MBtu)
Run - 1	21:04-22:04	380.6	9.9	9.9	0.3	0.1	0.0001
Run - 2	22:22-23:22	380.9	10.0	10.0	0.4	0.1	0.0001
Run - 3	23:40-00:40	380.3	10.2	10.2	0.4	0.0	0.00004
	Avg:	*380.6*	*10.0*	*10.0*	*0.4*	*0.1*	*0.0001*

(1) Emissions corrected for analyzer drift per USEPA Method 7E

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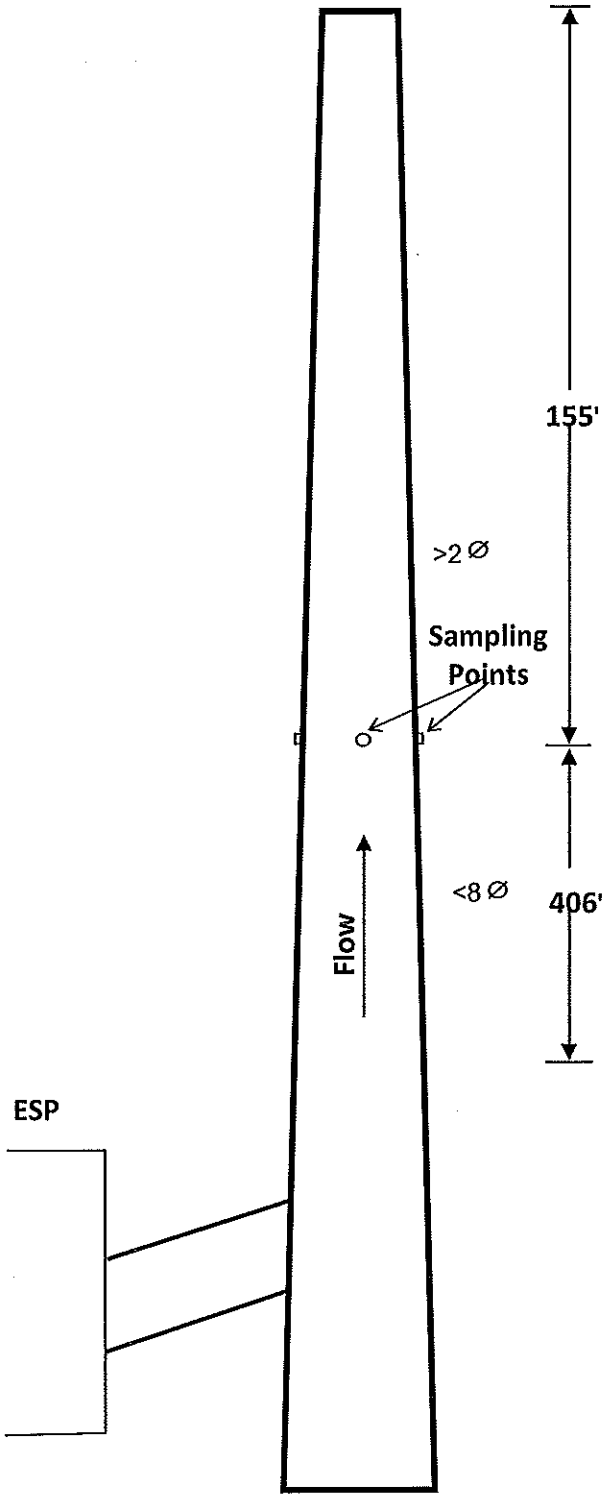
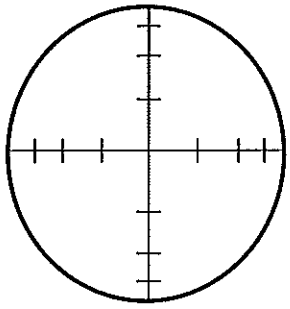
Figure 1 – Sampling Location
Belle River Power Plant - Unit 1
August 21-23, 2013



Stack Diameter 25'-6"



Measurement Points

Points	Distance From Inner Wall
1	13.6
2	44.7
3	90.6

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Figure 2 – EPA Method 3A/10
Belle River Power Plant – Unit 1
August 21-23, 2013