



COMPLIANCE TEST REPORT

for

QUARTERLY HYDROGEN CHLORIDE (HCL) EMISSIONS

EU-BOILER1-BR (UNIT 1)

(SRN: B2796)

2nd Quarter 2023

**Belle River Power Plant
China Township, Michigan**

June 19, 2023

**Prepared By:
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1.0 INTRODUCTION

DTE Energy's Environmental Management & Safety's (EM&S) Ecology, Monitoring, & Remediation group performed 2nd Quarter 2023 Hydrogen Chloride (HCl) emissions testing on the exhaust of Unit 1 at the Belle River Power Plant, located in China Township, Michigan. The testing was required by the 40 CFR Part 63, Subpart UUUUU (Mercury and Air Toxics Standards - MATS) to document quarterly HCl stack emissions. The testing was conducted on June 19, 2023.

Testing was performed pursuant to ASTM Method D6348.

The fieldwork was performed in accordance with EPA Reference Methods and DTE Energy Intent to Test¹, which was approved in a letter by Mr. Andrew Riley from the Michigan Department of Environment, Great Lakes & Energy (EGLE), dated January 30, 2023². The following DTE Energy personnel participated in the testing program: Mr. Thomas Snyder, Senior Environmental Specialist, and Mr. Fred Meinecke, Environmental Specialist. Mr. Snyder was the project leader. Mr. Jason Roggenbuck, Principal Engineer at the plant provided process coordination for the testing program.

2.0 SOURCE DESCRIPTION

The Belle River Power Plant (BRPP) located at 4505 King Road in St Clair, Michigan, employs the use of two (2) Babcock and Wilcox coal-fired boilers (Unit 1 & 2) each capable of producing 4,550,000 pounds per hour of steam. Each Unit has a Siemens Power Corporation boiler generator with a nominally rated capability of 635 (Unit 1) and 645 (Unit 1) gross megawatts (GMW). See Figure 1 for a diagram of the units' sampling locations and stack dimensions.

The air pollution control equipment consists of Wheelabrator Frye cold gas electrostatic precipitators on each unit that have design collection efficiencies greater than 99%. Each exhaust Stack is 665 feet tall with an internal diameter of 25.5 feet. Testing occurred while operating the unit at greater than 80% of normal full load capability while burning coal.

Each boiler 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.

¹ EGLE, Test Plan, Submitted November 28, 2022. (Attached-Appendix A)

² EGLE, Approval Letter, dated January 30, 2023. (Attached-Appendix A)

Testing was performed on Unit 1 while operating at normal load conditions, per Subpart UUUUU.

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* or listed as an approved "Other Test Method". The sampling and analytical methods used in the testing program are indicated in the table below:

| Sampling Method | Parameter | Analysis |
|-------------------|--|-----------------------------|
| ASTM Method D6348 | HCl, CO ₂ , and, Moisture Content | FTIR |
| USEPA Method 19 | Emission Rate Calculations | Stoichiometric Calculations |

3.1 MOISTURE (ASTM D6348)

3.1.1 Sampling Method

Moisture content in the exhaust was evaluated using ASTM D6348, "Measurement of Vapor Phase Organic Emissions by Extractive Fourier Transform Infrared (FTIR)".

3.2 CARBON DIOXIDE (ASTM D6348)

3.2.1 Sampling Method

Carbon dioxide (CO₂) emissions were evaluated using ASTM D6348, "Measurement of Vapor Phase Organic Emissions by Extractive Fourier Transform Infrared (FTIR)".

3.2.2 Sampling Train Calibration

The CO₂ analyzer was calibrated according to procedures outlined in USEPA Methods 3A and 7E. Zero, span, and mid range calibration gases were introduced directly into the analyzer to verify the instruments linearity, prior to sampling, and again at the completion of each test run. The CO₂ emissions were corrected for bias according to USEPA Method 7E.

3.3.4 Data Reduction

Each spectrum was derived from the coaddition of 64 scans, with a new data point generated approximately every one minute. The emissions were recorded in parts per million (ppm) wet volume basis. The CO₂ emissions were recorded in percent (%) wet volume basis. The moisture content was recorded in percent (%).

4.0 OPERATING PARAMETERS

The test program included the collection of boiler load and stack emissions CEMs data during each test run. Parameters recorded included gross Megawatts (GMW) and CEMs data (SO₂, NO_x, CO₂, and opacity). Additionally, dry sorbent injection rates (DSI) and activated carbon injection rates (ACI), in pounds per hour (lb/hr), are reported. Operational Data collected during the testing is presented in Appendix C.

During each day of emissions sampling, a representative coal sample was collected from the unit and analyzed for ultimate and proximate analysis, including % Sulfur, % Ash, and heat content. The results of the coal analysis was used to calculate an Fc value for each day of testing and used in the lb/MMBtu calculations. Results of the fuel analysis can be referred to in Appendix E. HCl emissions testing was performed at maximum normal operating load and representative of site specific normal operating conditions per 40 CFR part 63.10007.

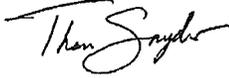
5.0 DISCUSSION OF RESULTS

Table 1 presents the HCl emission testing results from Unit 1. HCl emissions are presented in parts per million on a wet basis (ppm_w) and pounds per million BTU (lbs/MMBtu). During the testing, the HCl emissions averaged 0.25ppm and 0.0006 lb/MMBtu. Unit 1 demonstrated average HCl emissions below the Subpart UUUUU limit of 0.0020 lb/MMBtu.

The auxiliary test data presented in the results table for each test includes the unit load in gross megawatts (GMW), DSI injection rate (lb/hr), ACI injection rate (lb/hr), and CO₂ concentration (%_{wet}).

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 TABLES



TABLE NO. 1
HYDROGEN CHLORIDE EMISSIONS TESTING RESULTS
Belle River Power Plant - Unit 1
June 19, 2023

| Test | Test Date | Test Time (EST Time) | Unit Load (GMW) | DSI Injection Rate (lb/hr) | ACI Injection Rate (lb/hr) | CO ₂ Concentration (% _{wet, corrected}) | HCl Concentration (ppmv _{wet}) | HCl Emissions (lbs/MMBtu) ⁽¹⁾⁽²⁾ |
|-----------------|-----------|-------------------------|-----------------------|----------------------------------|----------------------------------|--|--|--|
| HCl-1 | 19-Jun-23 | 9:40-10:40 | 641 | 24 | 124 | 9.8 | 0.22 | 0.0005 |
| HCl-2 | | 10:52-11:52 | 641 | 0 | 124 | 9.7 | 0.30 | 0.0007 |
| HCl-3 | | 12:07-13:07 | <u>640</u> | <u>0</u> | <u>124</u> | <u>9.7</u> | <u>0.24</u> | <u>0.0006</u> |
| Average: | | | 641 | 8 | 124 | 9.7 | 0.25 | 0.0006 |

(1) Corrected to (%R)

(2) MATS Limit = 0.0020 lb/MMBtu

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FIGURES

Figure 1 – Sampling Location
Belle River Power Plant – Unit 1
June 19, 2023

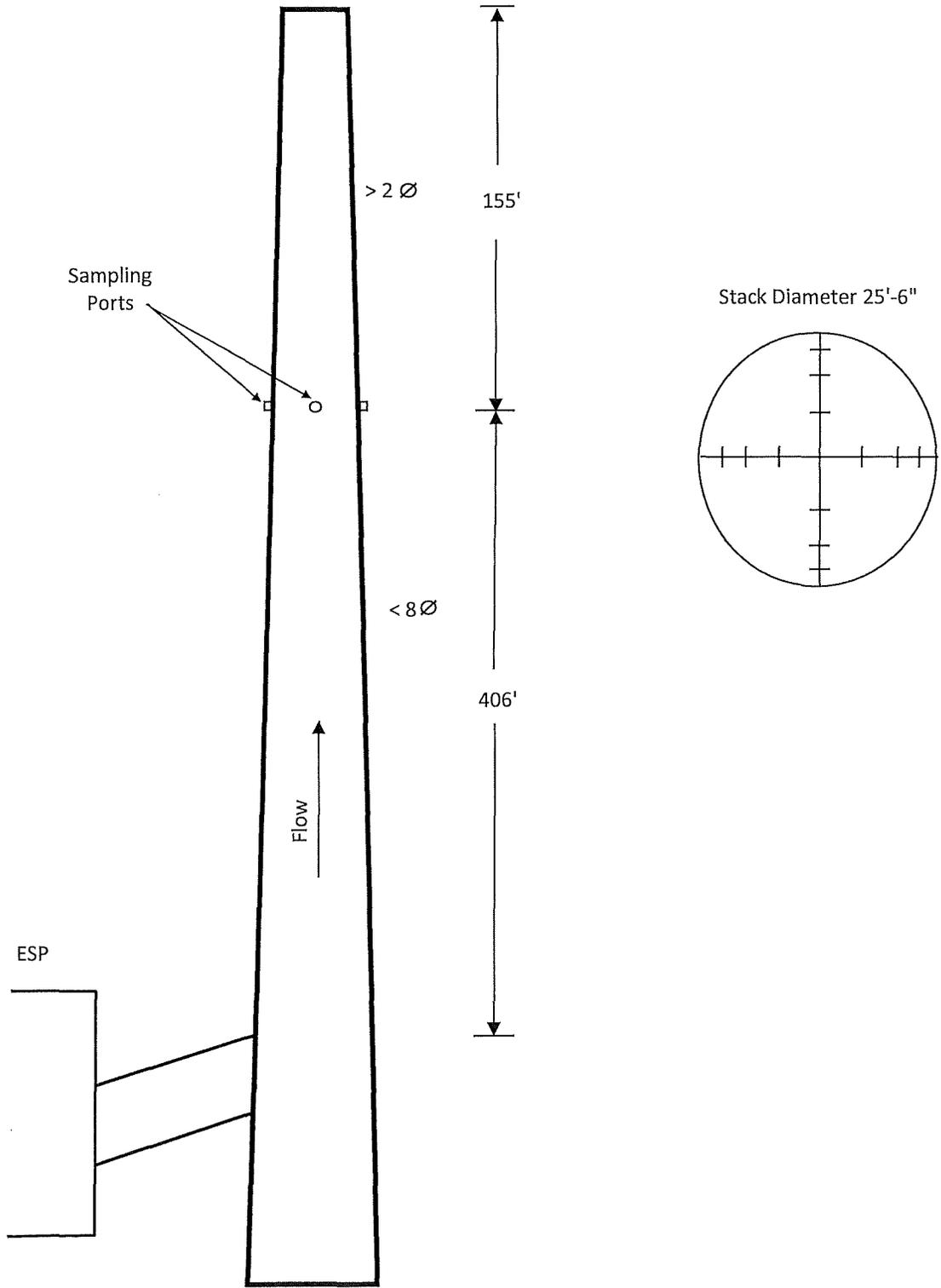


Figure 2 – ASTM D6348
Belle River Power Plant
June 19, 2023

