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COMPLIANCE TEST REPORT

for

QUARTERLY HYDROGEN CHLORIDE (HCL) EMISSIONS

UNIT 3

(SRN: B2796)

3rd Quarter 2017

RECEIVED
SEP 07 2017
AIR QUALITY DIVISION

St. Clair Power Plant
East China, Michigan

July 10, 2017

Prepared By:
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EXECUTIVE SUMMARY

DTE Energy's Environmental Management and Resources (EM&R) Field Services Group performed 3rd Quarter – 2017 Hydrogen Chloride (HCl) emissions testing on the exhaust of Unit 3 at the St. Clair Power Plant, located in East China, 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 July 10, 2017.

A summary of the emission test results are shown below:

Emissions Testing Summary
St. Clair Power Plant
Unit 3

Source	Date	Load (GMW)	HCl (lbs/MmBtu)[1]
Unit 3	8-10-17	112.4	<0.0002

(1) MATS Limit 0.002 lbs/MMBtu

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1.0 INTRODUCTION

DTE Energy's Environmental Management and Resources (EM&R) Field Services Group performed 3rd Quarter – 2017 Hydrogen Chloride (HCl) emissions testing on the exhaust of Unit 3 at the St. Clair Power Plant, located in East China, 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 July 10, 2017.

Testing was performed pursuant to USEPA Method 26A (Modified).

The fieldwork was performed in accordance with EPA Reference Methods and DTE Energy Intent to Test[1], which was approved in a letter by Mr. Tom Gasloli from the Michigan Department of Environmental Quality (MDEQ), dated January 13, 2017[2]. Emissions testing was performed utilizing Method 26A (modified as a single point sample) due equipment availability limitations which did not allow for FTIR analysis. The following DTE Energy personnel participated in the testing program: Mr. Mark Grigereit, Principal Engineer and Mr. Thom Snyder, Environmental Specialist. Mr. Grigereit was the project leader. Mr. Joe Neruda, Senior Environmental Specialist at the plant provided process coordination for the testing program.

2.0 SOURCE DESCRIPTION

The St Clair Power Plant (SCPP) located at 4901 Pointe Drive in East China, Michigan, employs the use of six (6) coal-fired boilers (Units 1-4, 6, and 7). Units 1-4 each have Babcock and Wilcox boilers capable of producing 1,070,000 pounds per hour of steam. Units 1 and 4 are equipped with General Electric turbine generators each with a nominally rated capability of 167 megawatts (MW). Units 2 and 3 have Allis Chalmers turbine generators each with a nominally rated capability of 170 MW. Full load capability for Units 1-4, while firing coal only, are 135 MW and 150 MW while over-firing with oil.

Units 6 and 7 have Combustion Engineering boilers capable of producing 2,100,000 and 3,580,000 pounds of steam per hour respectively. The turbine generators on each unit were manufactured by Westinghouse and have a nominally rated capability of 325 and 500 megawatts respectively. Full load capability for Units 6 and 7 while firing coal only is approximately 315 MW and 470 MW respectively.

The air pollution control equipment on Units 1-4 consists of Wheelebrator Frye electrostatic precipitators on each unit that have design collection efficiencies of 99.6%.

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[1] MDEQ, Test Plan, Submitted January 5, 2017. (Attached-Appendix A)

[2] MDEQ, Approval Letter, dated January 13, 2017. (Attached-Appendix A)

Each exhaust stack is 599 feet tall with an internal diameter of 13.3 feet. The air pollution control equipment on Unit 3 consists of Research Corporation electrostatic precipitators that have design collection efficiencies of 99.6%. The exhaust stack is 425 feet tall with an internal diameter of 19.0 feet. The air pollution control equipment on Unit 7 consists of an American Standard electrostatic precipitator that has design collection efficiency of 99.6%. The exhaust stack is 600 feet tall with an internal diameter of 16.0 feet

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.

Testing was performed on Unit 3 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
USEPA Method 3A	Oxygen & CO_2	Instrumental Analyzer Method
USEPA Method 4	Moisture Content	Field data analysis and reduction
USEPA Method 26a	Hydrogen Chloride	Ion Chromatography
USEPA Method 19	Emission Rate Calculations	Stoichiometric Calculations

3.1 OXYGEN AND CARBON DIOXIDE (USEPA Method 3A)

3.1.1 Sampling Method

Stack gas 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 O_2 / CO_2 analyzers utilize paramagnetic sensors.

3.1.2 O_2 / CO_2 Sampling Train

The Method 3A sampling system consisted of continuously collecting a gas sample from the stack into a Tedlar bag. The samples were then drawn through a PTFE line into a Universal™ gas conditioner and into a Servomex™ 1400 O_2/CO_2 gas analyzer.

3.1.3 Sampling Train Calibration

The O_2 / CO_2 analyzer was calibrated per procedures outlined in USEPA Method 7E. Zero, span, and mid-range calibration gases were introduced directly into the analyzer to verify the instruments linearity. The O_2/CO_2 concentrations are recorded on the field data sheets.

3.2 MOISTURE DETERMINATION (USEPA Method 4)

3.2.1 Sampling Method

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

3.3 HYDROGEN CHLORIDE (USEPA Method 26A)

3.3.1 HCl Sampling Method

USEPA Method 26A, "Determination of Hydrogen Halide and Halogen Emissions" (Method 26A) was used to measure the Hydrochloric Acid (HCl) emissions (see Figure 2 for a schematic of the sampling train). Method 26A uses impingers containing 0.1N H_2SO_4 to capture the HCl. Triplicate, 60-minute test runs were conducted. The Method 26A sampling was performed as a single point sample per Method 26 procedures.

The Method 26A stack sampling system (Figure 2) consisted of the following:

(1) Heated glass-lined probe (Maintained >250 °F)

(2) Heated 3" glass filter holder with a PTFE filter (maintained at a temperature of >250 °F)
(3) Set of impingers for the collection HCl and condensate for moisture determination (Impingers containing 0.1N H_2SO_4)
(4) Length of sample line
(5) Environmental Supply® control case equipped with a pump, dry gas meter, and calibrated orifice.

All sampling was conducted at a single point per Method 26.

After completion of each run, a leak test was conducted. All the impingers were measured for moisture gain. Impingers 1, 2 and 3 were rinsed with water and their contents and associated rinses were collected in a pre-cleaned sample container. The containers were 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.

Collected field blanks consisted of a 0.1N H_2SO_4 solution blank. 200ml of 0.1N H_2SO_4 was collected and diluted with DI water, from the same bottle used in sample recovery, to the liquid level of the three test runs. The blank was collected and analyzed following the same procedures used to recover and analyze the field samples.

Analysis of the Method 26A samples and blanks were conducted by Maxxaam Analytics. All analysis followed the procedures listed in USEPA Method 26A. A complete laboratory report is in Appendix E.

Field data sheets for the Method 26A sampling are in Appendix B.

3.3.2 Quality Control and Assurance

All sampling and analytical equipment was calibrated per the guidelines referenced in EPA Method 5 and 26A.

3.3.3 Data Reduction

The HCl emissions data collected during the testing were calculated and reported as parts per million (ppm) and pounds per million Btu (lb/MMBtu).

Analysis of the Method 26A samples and blanks were conducted by Maxxaam Analytics. All analysis followed the procedures listed in USEPA Method 26A. A complete laboratory report is in Appendix E.

Field data sheets for the Method 26A sampling are in Appendix B.

3.3.2 Quality Control and Assurance

All sampling and analytical equipment was calibrated per the guidelines referenced in EPA Method 5 and 26A.

3.3.3 Data Reduction

The HCl emissions data collected during the testing were calculated and reported as parts per million (ppm) and pounds per million Btu (lb/MMBtu).

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 (SO_2, NO_x, CO_2, 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.

5.0 DISCUSSION OF RESULTS

Table 1 presents the HCl emission testing results from Unit 3. HCl emissions are presented in parts per million on a wet basis (ppm_w) and pounds per million BTU (lbs/MMBtu). The Unit 3 HCl emissions during the testing demonstrated an average concentration for HCl of <0.11 ppm. The average Unit 3 HCl emissions were below the Subpart UUUUU limit of 0.002 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 CO_2 concentration ($\%_{wet}$).

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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
HYDROGEN CHLORIDE EMISSIONS TESTING RESULTS
St.Clair Power Plant - Unit 3
July 10, 2017

Test	Test Date	Test Time	Unit Load (GMW)	DSI Injection Rate (lb/hr)	ACI Injection Rate (lb/hr)	CO_2 Concentration (%)	HCl Concentration (ppmv)	HCl Emissions (lbs/MMBtu)[1]
HCl-1	**10-Jul-17**	7:22-8:22	111.8	325	55	8.8	<0.11	<0.0002
HCl-2		8:40-9:40	112.3	318	61	8.6	<0.12	<0.0002
HCl-3		10:00-11:00	113.0	323	54	8.5	<0.11	<0.0002
	Average:		***112.4***	***322***	***57***	***8.6***	***<0.11***	***<0.0002***

(1) MATS Limit = 0.002 lb/MMBtu

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Figure 1 – Sampling Location
St.Clair Power Plant – Unit 1-4
July 10, 2017

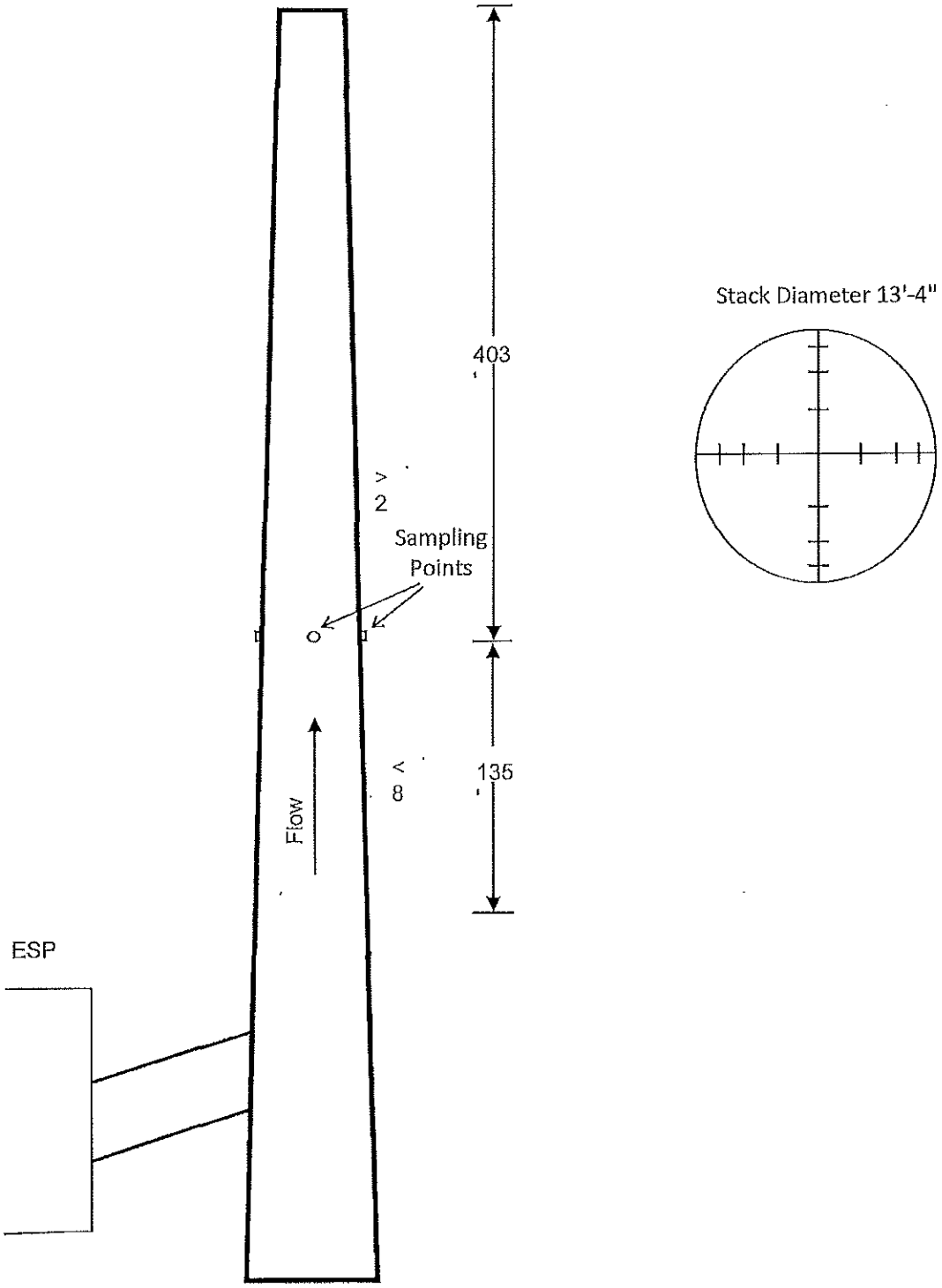

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Figure 2 – USEPA Method 26A (Modified)
St.Clair Power Plant
July 10, 2017