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COMPLIANCE TEST REPORT

for

QUARTERLY HYDROGEN CHLORIDE (HCL) EMISSIONS

EU-BOILER3-SC

(SRN: B2796)

2nd Quarter 2021

St Clair Power Plant
China Twp, Michigan

June 11, 2021

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EXECUTIVE SUMMARY

DTE Energy's Environmental Management and Safety (EM&S) Ecology, Monitoring, and Remediation Group performed 2nd Quarter – 2021 Hydrogen Chloride (HCl) emissions testing on the exhaust of EU-BOILER3-SC at the St Clair Power Plant, located in China Township, Michigan. Testing is required by 40 CFR Part 63, Subpart UUUUU (Mercury and Air Toxics Standards - MATS) to document quarterly HCl stack emissions. Testing was conducted on June 11, 2021.

A summary of the emission test results is shown below:

Emissions Testing Summary
St Clair Power Plant
EU-BOILER3-SC

Source	Date	Load (GMW)	HCl (lbs/MmBtu)[1]
EU-BOILER3-SC	6-11-21	125	0.0003

(1) MATS Limit 0.0020 lbs/MMBtu

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1.0 INTRODUCTION

DTE Energy's Environmental Management and Safety (EM&S) Ecology, Monitoring, and Remediation Group performed 2nd Quarter – 2021 Hydrogen Chloride (HCl) emissions testing on the exhaust of EU-BOILER3-SC at the St Clair Power Plant, located in China Township, Michigan. 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 11, 2021.

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. Mark Dziadosz from the Michigan Department of Environmental Quality (MDEQ), dated January 20, 2017[2]. The following DTE Energy personnel participated in the testing program: Mr. Jason Logan, Environmental Specialist, and Mr. Mark Westerberg, Senior Environmental Specialist. Mr. Logan was the project leader. Mr. Dominic Vendittelli, Environmental Engineer 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 four (4) coal-fired boilers (Units 2-3, 6, and 7). Units 2-3 each have Babcock and Wilcox boilers capable of producing 1,070,000 pounds per hour of steam. Units 2 and 3 are equipped with Allis Chalmers turbine generators each with a nominally rated capability of 170 megawatts (MW). Full load capability for Units 2-3, 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 2-3 consists of Wheelebrator Frye electrostatic precipitators on each unit that have design collection efficiencies of 99.6%. Each exhaust stack is 599 feet tall with an internal diameter of 13.3 feet. The air pollution control equipment on Unit 6 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

[1] Test Plan, Submitted October 2, 2020. (Attached-Appendix A)

[2] Approval Letter, dated January 30, 2017. (Attached-Appendix A)

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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 EU-BOILER3-SC while operating at maximum normal operating load and representative of site specific normal operating conditions per 40 CFR part 63.10007.

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 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 MOISTURE DETERMINATION (USEPA METHOD 4)

3.1.1 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 as a component of the HCl sampling train.

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3.2 HYDROGEN CHLORIDE (USEPA Method 26A)

3.2.1 HCl Sampling Method

USEPA Method 26A, "Determination of Hydrogen Halide and Halogen Emissions" 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. 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 248 °F > T > 273 °F)
(2) Heated 3" glass filter holder with a PTFE filter (maintained at a temperature of 248 °F > T > 273 °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.

After completion of each run, a leak test was conducted. All the impingers were measured for moisture gain. The contents of impingers 1 and 2 were collected in a designated sample container. Impingers 1 and 2, the back half of the filter holder, the Z-fitting connecting the filter holder to the first impinger, and the U-tube between the first and second impingers were then rinsed with DI water and collected in the same sample container. Each 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.

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 Enthalpy Analytical. 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.

3.2.2 Quality Control and Assurance

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

3.2.3 Data Reduction

HCl emissions data collected during the testing were calculated and reported as parts per million (ppm) and pounds per million Btu (lb/MMBtu). CO_2 data from the Unit CEMS was used in conjunction with Method 19 to calculate emissions in lb/MMbtu for comparison to the emission limits.

Analysis of the Method 26A samples and blanks were conducted by Enthalpy Analytical. All analyses 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.

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), CO_2 (%), NOx (ppm), SO_2 (ppm), 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.

HCl emissions testing was performed at normal operating load and representative of site specific normal operating conditions according to 40 CFR part 63.10007.

5.0 DISCUSSION OF RESULTS

Table 1 presents the HCl emission testing results from EU-BOILER3-SC. HCl emissions are presented in parts per million on a wet basis (ppm_w) and pounds per million BTU (lbs/MMBtu). The EU-BOILER3-SC HCl emissions during the testing demonstrated an average HCl concentration of 0.16 ppmw and 0.0003 lb/MMBtu. The average EU-BOILER3-SC HCl emissions were within 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 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."

Mr. Jason Logan, QSTI

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RESULTS TABLES

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TABLE NO. 1
HYDROGEN CHLORIDE EMISSIONS TESTING RESULTS
St Clair Power Plant - Unit 3
June 11, 2021

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	**11-Jun-21**	6:57-7:57	126	0	47	9.2	0.17	0.0003
HCl-2		8:08-9:08	125	0	49	9.2	0.16	0.0003
HCl-3		9:21-10:21	125	0	48	9.3	0.16	0.0003
	Average:		*125*	*0*	*48*	*9.2*	*0.16*	*0.0003*

(1) MATS Limit = 0.0020 lb/MMBtu

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FIGURES

Figure 1 – Sampling Location
St.Clair Power Plant – Units 2-3

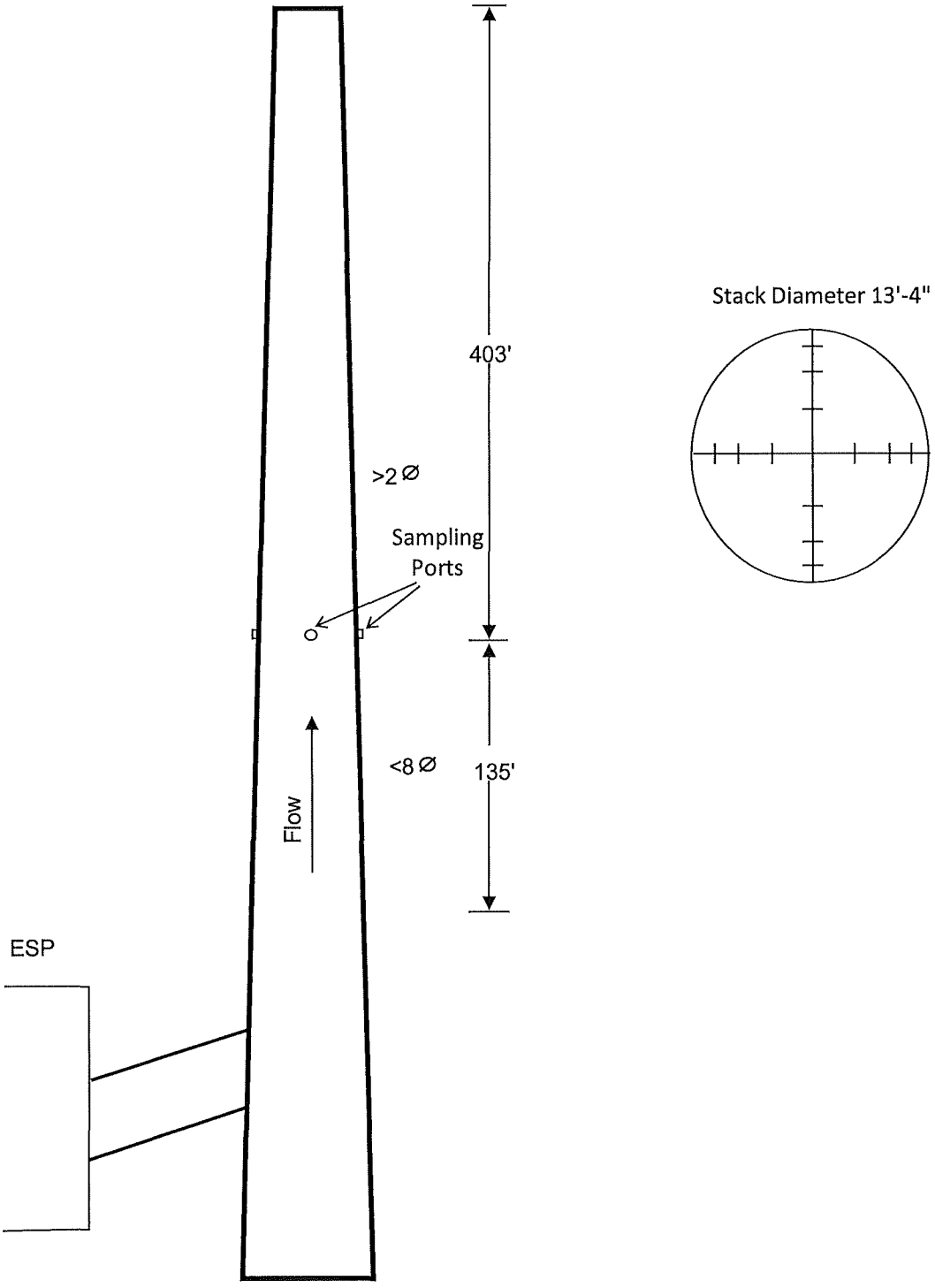

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Figure 2 – Sampling Location
St.Clair Power Plant – Unit 6

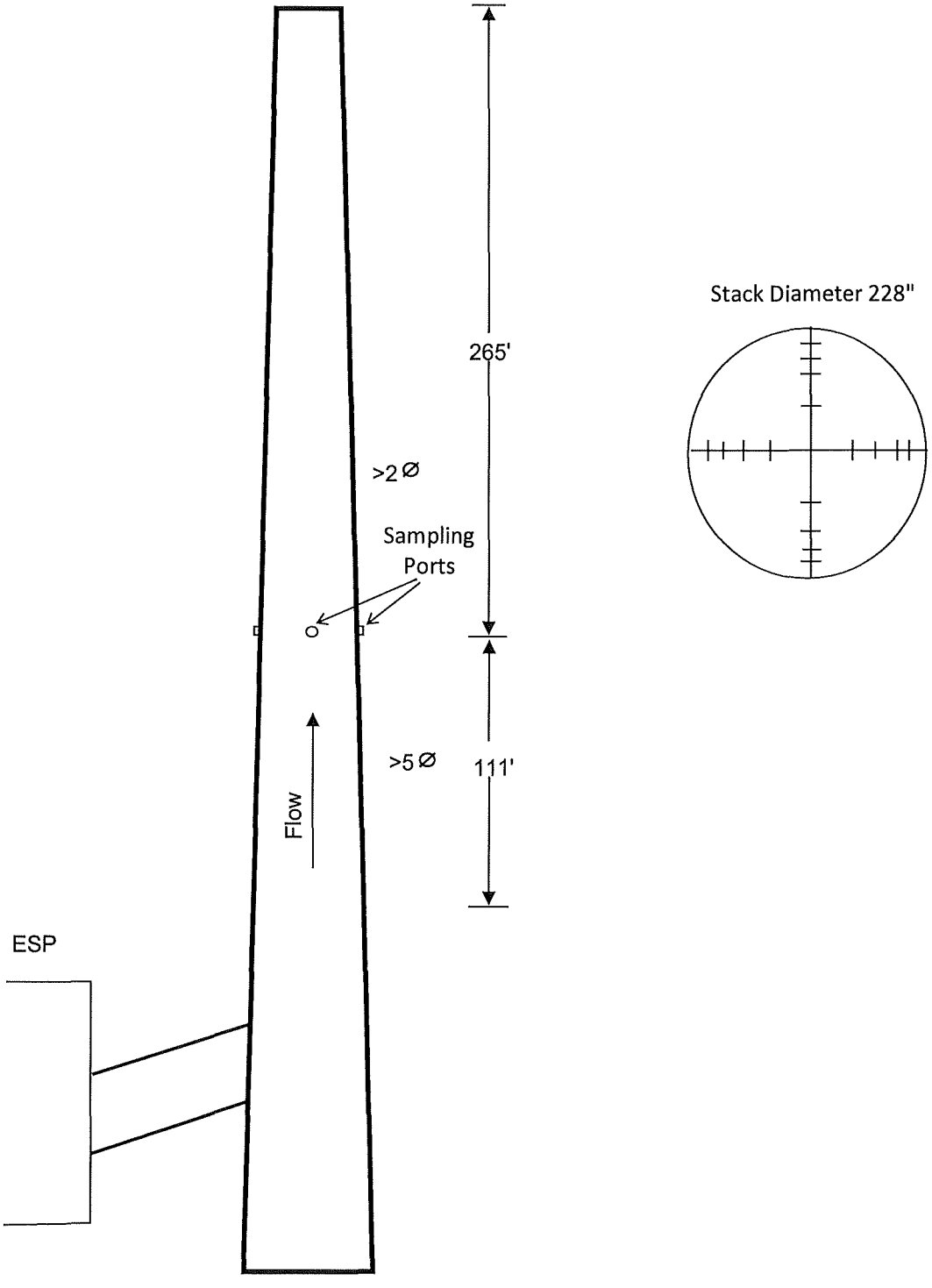

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Figure 3 – Sampling Location
St.Clair Power Plant – Unit 7

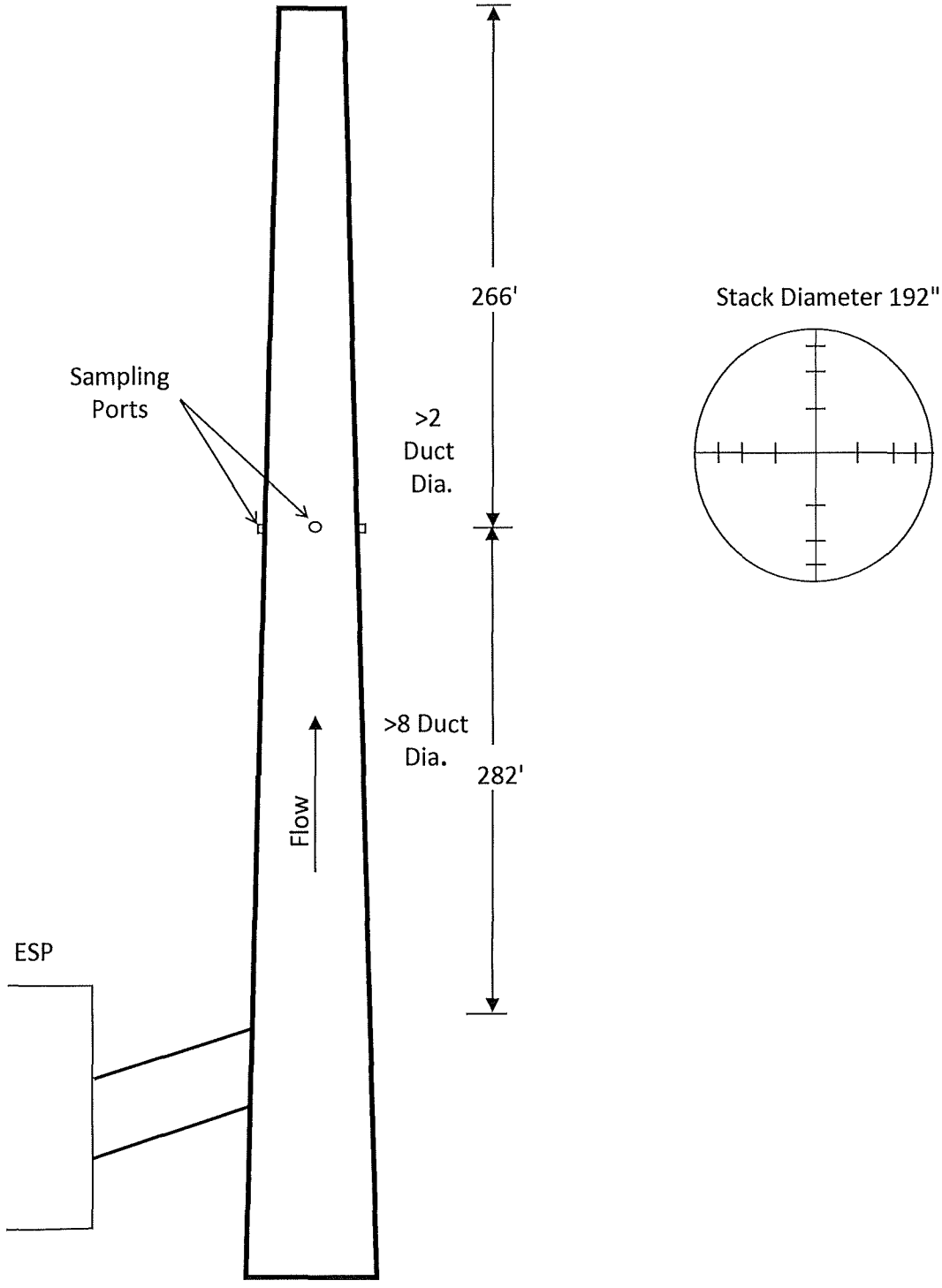

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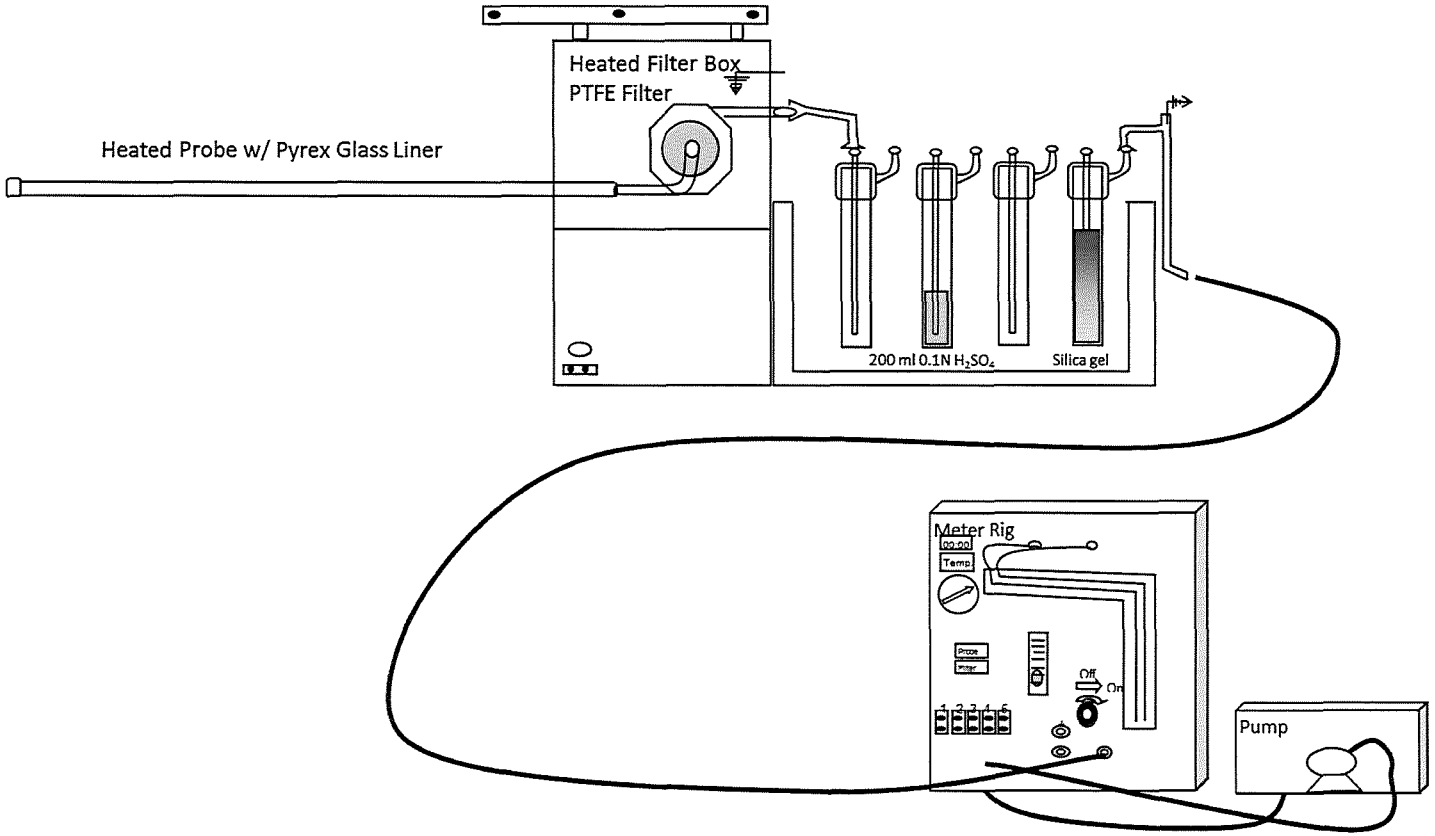
Figure 2 – USEPA Method 26A (Modified)
St.Clair Power Plant



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APPENDIX A

TEST PLAN AND APPROVAL LETTER