

1.0 INTRODUCTION

1.1 SUMMARY OF TEST PROGRAM

DTE Energy - St. Clair Power Plant contracted Montrose Air Quality Services, LLC (Montrose) to perform a compliance emissions test program on the Unit 7 (EUBOILER7) at the DTE Energy - St. Clair Power Plant facility located in East China, Michigan. The tests were conducted to satisfy the emissions testing requirements as required by 40 CFR Part 63, Subpart UUUUU.

The specific objectives were to:

- Verify the hydrogen chloride (HCl) emissions from the Exhaust Stack serving EUBOILER7
- Conduct the test program with a focus on safety

Montrose performed the tests to measure the emission parameters listed in Table 1-1

**TABLE 1-1
 SUMMARY OF TEST PROGRAM**

Test Date(s)	Unit ID/ Source Name	Activity/ Parameters	Test Methods	No. of Runs	Duration (Minutes)
12/29/2020	EUBOILER7	O ₂ , CO ₂	EPA 3A	3	2-13
12/29/2020	EUBOILER7	Moisture	EPA 4	3	60
12/29/2020	EUBOILER7	HCl	EPA 26	3	60

To simplify this report, a list of Units and Abbreviations is included in Appendix D.1. Throughout this report, chemical nomenclature, acronyms, and reporting units are not defined. Please refer to the list for specific details.

This report presents the test results and supporting data, descriptions of the testing procedures, descriptions of the facility and sampling locations, and a summary of the quality assurance procedures used by Montrose. The average emission test results are summarized and compared to their respective permit limits in Table 1-2. Detailed results for individual test runs can be found in Section 4.0. All supporting data can be found in the appendices.

The testing was conducted by the Montrose personnel listed in Table 1-3.

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**TABLE 1-2
SUMMARY OF AVERAGE COMPLIANCE RESULTS -
EUBOILER7
DECEMBER 29, 2020**

Parameter/Units	Average Results	Emission Limits
Hydrochloric Acid (HCl) lb/MMBtu	0.0005	0.002

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1.2 KEY PERSONNEL

A list of project participants is included below:

Facility Information

Source Location: DTE Energy
DTE Energy - St. Clair Power Plant
4505 King Road
East China, MI 48054

Project Contact: Kailyn Johnson
Role: Technical Supervisor - Field Services
Company: DTE Energy
Telephone: 517-881-8275
Email: Kailyn.gerzich@dteenergy.com

Thomas Snyder
Environmental Specialist
DTE Energy
313-897-0899
Thomas.snyder@dteenergy.com

Agency Information

Regulatory Agency: EGLE
Agency Contact: Karen Kajiya-Mills
Telephone: 517-335-3122
Email: kajiya-millsk@michigan.gov

Jeff Komiski
313-456-4683
komiskij@michigan.gov

Testing Company Information

Testing Firm: Montrose Air Quality Services, LLC
Contact: Matthew Young
Title: District Manager
Telephone: 248-547-8070
Email: myoung@montrose-env.com

Laboratory Information

Laboratory: Enthalpy Analytical, LLC
City, State: Durham, NC 27713
Method: EPA Method 26

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Test personnel and observers are summarized in Table 1-3.

**TABLE 1-3
TEST PERSONNEL AND OBSERVERS**

Name	Affiliation	Role/Responsibility
Matthew Young	Montrose	District Manager, QI
Benjamin Durham	Montrose	Field Technician
Shane Rabideau	Montrose	Field Technician
Kailyn Johnson	DTE Energy	Observer/Client Liaison/Test Coordinator

2.0 PLANT AND SAMPLING LOCATION DESCRIPTIONS

2.1 PROCESS DESCRIPTION, OPERATION, AND CONTROL EQUIPMENT

DTE Energy owns and operates the St. Clair Power Plant in East China, Michigan. Energy is produced by a coal fired boiler (EUBOILER7) which was in operation during this testing event.

2.2 FLUE GAS SAMPLING LOCATION

Information regarding the sampling location is presented in Table 2-1.

**TABLE 2-1
 SAMPLING LOCATION**

Sampling Location	Stack Inside Diameter (in.)	Distance from Nearest Disturbance		Number of Traverse Points
		Downstream EPA "B" (in./dia.)	Upstream EPA "A" (in./dia.)	
EUBOILER7 Exhaust Stack	192	3,192 / 16.6	3,384 / 17.6	Gaseous: 1

See Appendix A.1 for more information.

2.3 OPERATING CONDITIONS AND PROCESS DATA

Emission tests were performed while the source/units and air pollution control devices were operating at the conditions required by the permit. The unit was tested when operating normally.

Plant personnel were responsible for establishing the test conditions and collecting all applicable unit-operating data. The process data that was provided is presented in Appendix B. Data collected includes the following parameters:

- Dry Sorbent Injection Rates, lb/hr
- Activated Carbon Injection Rates, lb/hr
- Facility CEMS data associated with the 60-minute runs

3.0 SAMPLING AND ANALYTICAL PROCEDURES

3.1 TEST METHODS

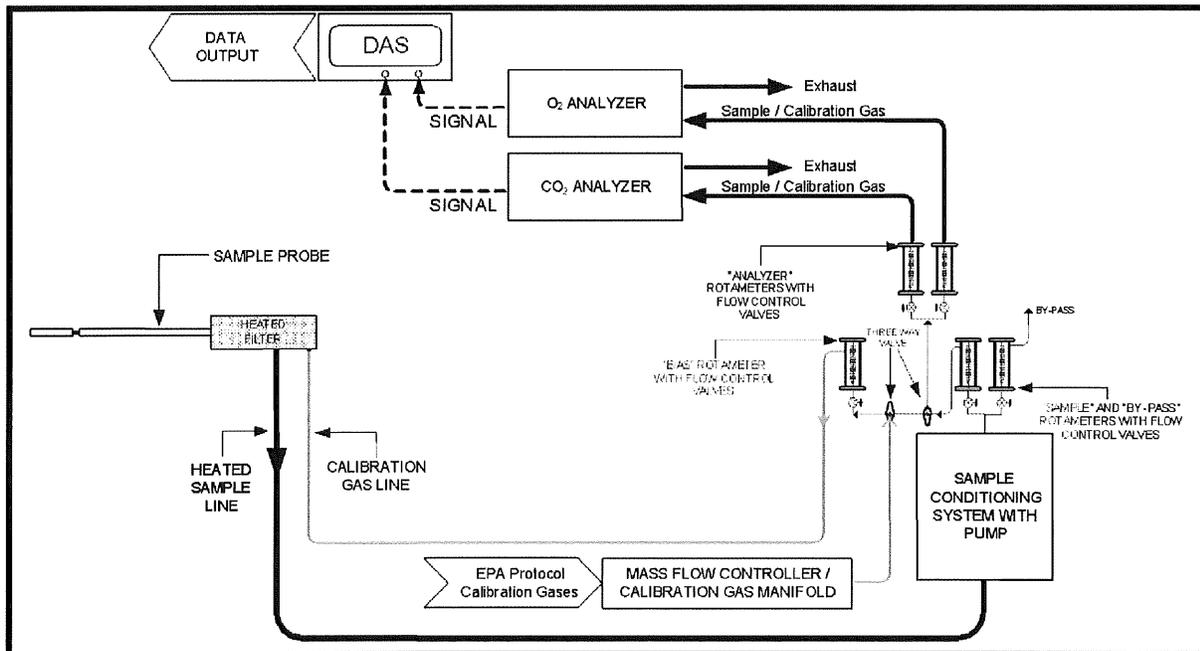
The test methods for this test program were presented previously in Table 1-1. Additional information regarding specific applications or modifications to standard procedures is presented below.

3.1.1 EPA Method 3A, Determination of Oxygen and Carbon Dioxide Concentrations in Emissions from Stationary Sources (Instrumental Analyzer Procedure)

EPA Method 3A is an instrumental test method used to measure the concentration of O₂ and CO₂ in stack gas. The effluent gas is continuously or intermittently sampled and conveyed to analyzers that measure the concentration of O₂ and CO₂. The performance requirements of the method must be met to validate data.

The typical sampling system is detailed in Figure 3-1.

**FIGURE 3-1
EPA METHODS 3A (O₂/CO₂) SAMPLING TRAIN**



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3.1.2 EPA Method 4, Determination of Moisture Content in Stack Gas

EPA Method 4 is a manual, non-isokinetic method used to measure the moisture content of gas streams. Gas is sampled at a constant sampling rate through a probe and impinger train. Moisture is removed using a series of pre-weighed impingers containing methodology-specific liquids and silica gel immersed in an ice water bath. The impingers are weighed after each run to determine the percent moisture.

The typical sampling system is detailed in Figure 3-2.

3.1.3 EPA Method 19, Determination of Sulfur Dioxide Removal Efficiency and Particulate Matter, Sulfur Dioxide, and Nitrogen Oxide Emission Rates

EPA Method 19 is a manual method used to determine (a) PM, SO₂, and NO_x emission rates; (b) sulfur removal efficiencies of fuel pretreatment and SO₂ control devices; and (c) overall reduction of potential SO₂ emissions. This method provides data reduction procedures, but does not include any sample collection or analysis procedures.

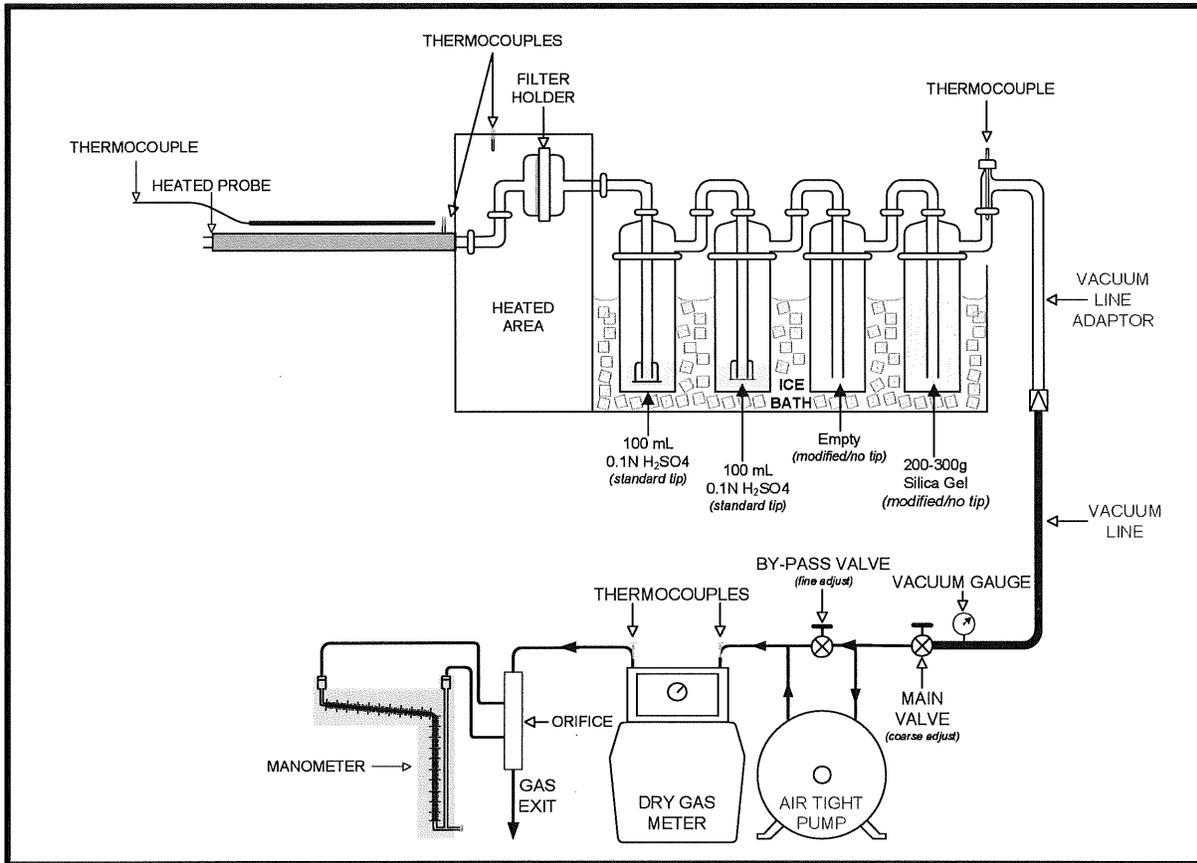
EPA Method 19 is used to calculate mass emission rates in units of lb/MMBtu. EPA Method 19, Table 19-2 contains a list of assigned fuel factors for different types of fuels, which can be used for these calculations.

3.1.4 EPA Method 26, Determination of Hydrogen Halide and Halogen Emissions from Stationary Sources Non-Isokinetic Method

An integrated sample is extracted from the source and passed through a prepurged heated probe and filter into dilute sulfuric acid and dilute sodium hydroxide solutions which collect the gaseous hydrogen halides and halogens, respectively. The filter collects particulate matter including halide salts but is not routinely recovered and analyzed. The hydrogen halides are solubilized in the acidic solution and form chloride (Cl⁻), bromide (Br⁻), and fluoride (F⁻) ions. The halogens have a very low solubility in the acidic solution and pass through to the alkaline solution where they are hydrolyzed to form a proton (H⁺), the halide ion, and the hypohalous acid (HClO or HBrO). Sodium thiosulfate is added in excess to the alkaline solution to assure reaction with hypohalous acid to form a second halide ion such that 2 halide ions are formed for each molecule of halogen gas. The halide ions in the separate solutions are measured by ion chromatography (IC).

The typical sampling system is detailed in Figure 3-2.

FIGURE 3-2
US EPA METHOD 26 MODIFIED SAMPLING TRAIN



3.2 PROCESS TEST METHODS

Process samples of coal were taken by DTE Energy personal and analyzed for Proximate and Ultimate fuel analysis.

4.0 TEST DISCUSSION AND RESULTS

4.1 FIELD TEST DEVIATIONS AND EXCEPTIONS

US EPA Method 26A sampling was performed as a single point sample per US EPA Method 26 procedures. This deviation was submitted to and approved by EGLE.

4.2 PRESENTATION OF RESULTS

The average results are compared to the permit limits in Table 1-2. The results of individual compliance test runs performed are presented in Table 4-1. Emissions are reported in units consistent with those in the applicable regulations or requirements. Additional information is included in the appendices as presented in the Table of Contents.

**TABLE 4-1
 HCl EMISSIONS RESULTS -
 EUBOILER7**

Run Number	1	2	3	Average
Date	12/29/2020	12/29/2020	12/29/2020	--
Time	8:13-9:13	9:32-10:32	10:49-11:49	--
Process Data				
F-factor, dscf/MMBtu	9,888	9,888	9,888	9,888
Flue Gas Parameters				
O ₂ , % volume dry	11.39	11.56	11.94	11.63
CO ₂ , % volume dry	8.60	8.45	8.16	8.40
flue gas temperature, °F	240.6	242.5	240.4	241.2
moisture content, % volume	7.36	7.22	7.06	7.21
Hydrochloric Acid (HCl)				
ppmvd	0.227	0.226	0.248	0.234
lb/MMBtu	0.00047	0.00047	0.00054	0.00049

5.0 INTERNAL QA/QC ACTIVITIES

5.1 QA/QC AUDITS

The meter box and sampling trains used during sampling performed within the requirements of their respective methods. All post-test leak checks, minimum metered volumes, minimum sample durations, and percent isokinetics met the applicable QA/QC criteria.

EPA Method 3A calibration audits were all within the measurement system performance specifications for the calibration drift checks, system calibration bias checks, and calibration error checks.

5.2 QA/QC DISCUSSION

All QA/QC criteria were met during this test program.

5.3 QUALITY STATEMENT

Montrose is qualified to conduct this test program and has established a quality management system that led to accreditation with ASTM Standard D7036-04 (Standard Practice for Competence of Air Emission Testing Bodies). Montrose participates in annual functional assessments for conformance with D7036-04 which are conducted by the American Association for Laboratory Accreditation (A2LA). All testing performed by Montrose is supervised on site by at least one Qualified Individual (QI) as defined in D7036-04 Section 8.3.2. Data quality objectives for estimating measurement uncertainty within the documented limits in the test methods are met by using approved test protocols for each project as defined in D7036-04 Sections 7.2.1 and 12.10. Additional quality assurance information is included in the report appendices. The content of this report is modeled after the EPA Emission Measurement Center Guideline Document (GD-043).

EUBOILER7 PROCESS AND SAMPLING LOCATION SCHEMATIC

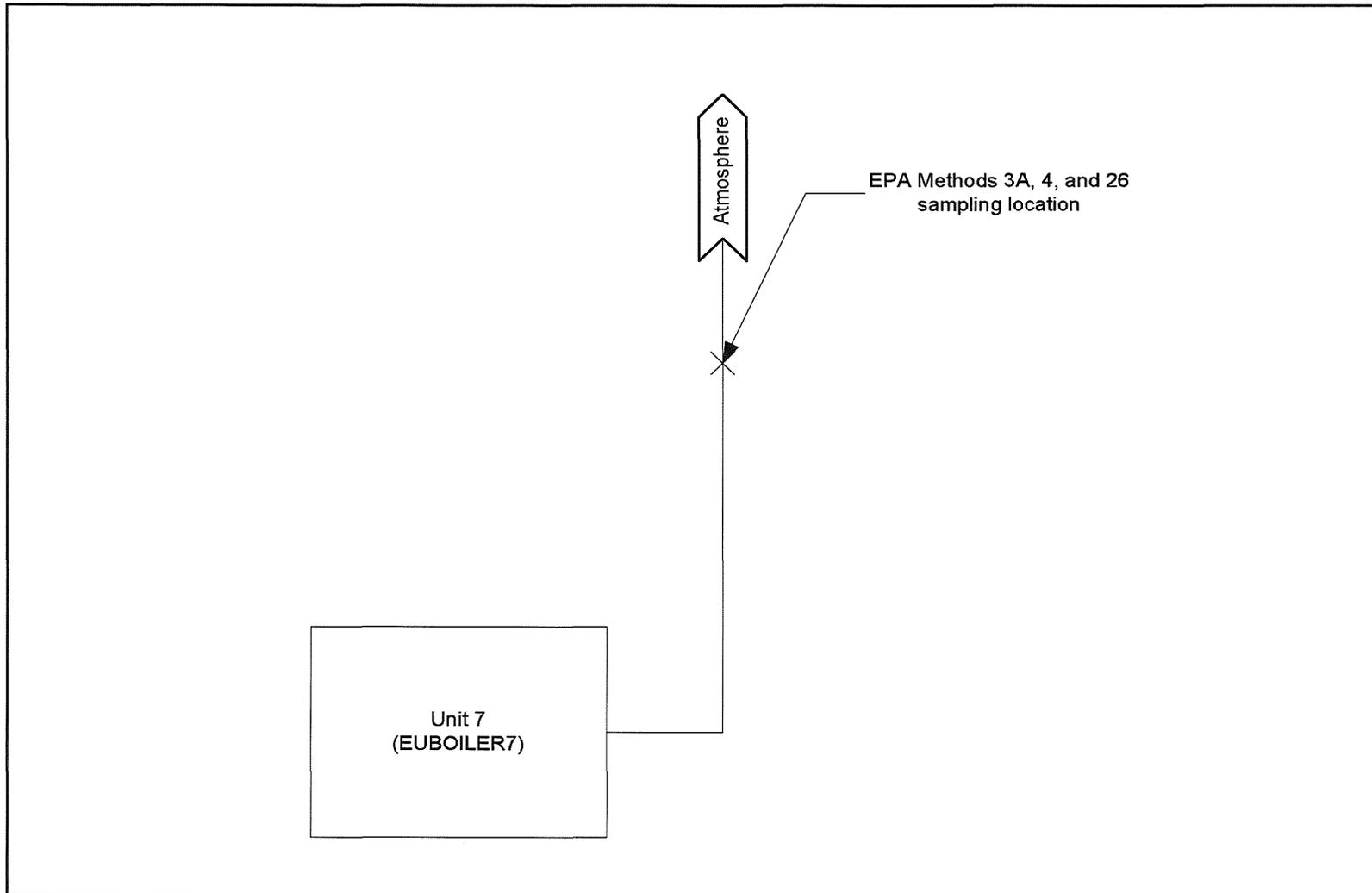


Figure 3 – Sampling Location
St. Clair Power Plant – EU-BOILER7-SC
2020

