FINAL REPORT

DTE GAS COMPANY

MILFORD, MICHIGAN

MILFORD COMPRESSOR STATION: EUTURBINE2 FORMALDEHYDE CONCENTRATION REPORT

RWDI #2402684

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SUBMITTED TO

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EXECUTIVE SUMMARY

RWDI USA LLC (RWDI) has been retained by DTE Energy (DTE) to complete the emission sampling program at the Milford Compressor Station (MCS) located in Milford, Michigan. RWDI completed testing as outlined in the 40 CFR Part 63 Subpart YYYY compliance emissions testing of compressor turbine EUTURBINE2 (Unit 2200) for formaldehyde concentrations.

The testing was completed on December 21st, 2023.

Executive Table i: Results Summary – Formaldehyde Concentration

Source	Unit	Test 1	Test 2	Test 3	Average	Permit Limit
Unit 2200	ppbvd	18.27	17.72	16.81	17.60	NA
	ppbvd @ 15% O2	19.22	18.60	17.67	18.50	91

Testing confirmed that Unit 2200 (EUTURBINE2) was able to meet the 40 CFR Part 63 Subpart YYYY limit of less than 91 ppbv (dry) corrected to 15% O_2.

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5.1 Formaldehyde by USEPA Method 320 and O_2 by USEPA Method 3A

Emissions testing was performed at the outlet of Unit 2200. Pollutant concentrations were determined utilizing RWDI's continuous emissions monitoring system (CEM) which consists of the Max-IR FTIR and oxygen analyzer (measuring on wet basis).

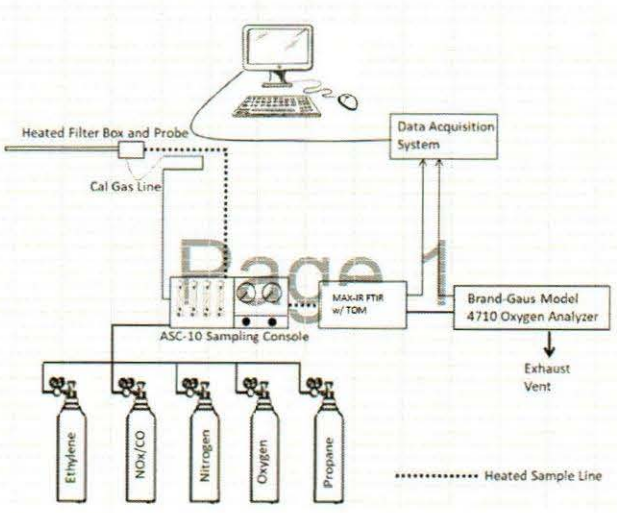
Stack gas concentrations for formaldehyde and H_2O were measured using EPA Reference Method 320 and O_2 was measure using EPA Reference Method 3A.

Oxygen measurements were taken continuously following USEPA Method 3A on the outlet (using a wet oxygen analyzer or equivalent).

Regular performance checks on the CEMS were carried out by zero and span calibration checks on the oxygen analyzer and necessary QA procedures on the FTIR using USEPA Protocol calibration gases. These checks will verify the ongoing precision of the FTIR with time by introducing pollutant-free (zero) air followed by known calibration gas (span) into the FTIR. The response of the monitor to pollutant-free air and the corresponding sensitivity to the span gases was reviewed frequently as an ongoing indication of analyzer performance.

Monitoring was conducted by drawing a sample stream of flue gases through a stainless-steel probe attached to a heated filter and a heated sample line that is attached to the MAX Analytical ASC-10ST sampling console. Lengths of unheated sample line was kept to a minimum and insulated. The ASC-10ST sampling console delivers a continuous sample to the Max-IR FTIR and oxygen analyzer for analysis. The heated filter and line were

Figure 5.2a: MKS 2030 Multigas FTIR/ASC-10ST/Model 4710 Oxygen Analyzer Sampling System Schematic



The ASC-10ST was used to deliver calibration gases (Calibration Transfer Standard (CTS), QA Spike and Nitrogen) to the FTIR in direct (to analyzer) and system (to probe) modes.

A laptop computer was utilized for operating the Max-IR FTIR and MAX Analytical ASC-10ST sampling console and logging the multi-gas FTIR data. Data was logged as one-minute averages for the actual test period (FTIR PRN files and Spectra). All concentration data was determined using the Max-IR software. A typical Max-IR and ASC-10 ST configuration is depicted in **Figure 5.2b.**

For oxygen measurement only, prior to testing, a 3-point analyzer calibration error check was conducted using USEPA protocol gases. The calibration error check was performed by introducing zero, mid and high-level calibration gases directly into the analyzer. The calibration error check was performed to confirm that the analyzer response is within ±2% of the certified calibration gas introduced. Prior to each test run, a system-bias test was performed where known concentrations of calibration gases were introduced at the probe tip to measure if the analyzers response was within ±5% of the introduced calibration gas concentrations. At the conclusion of each test run a system-bias check was performed to evaluate the percent drift from pre and post-test system bias checks. The system bias checks were used to confirm that the analyzer did not drift greater than ±3% throughout a test run. The analyzer will measure the respective gas concentrations on a wet volumetric basis which was converted to a dry volumetric number.

The probe tip was equipped with a heated filter for particulate removal. The end of the probe was connected to a heated Teflon sample line, which will deliver the sample gases from the stack to the FTIR/4710 Oxygen analyzer system. The heated sample line was designed to maintain the gas temperature at approximately 300°F to prevent condensation of stack gas moisture within the line.

Figure 5.2b: Typical MKS 2030 Multigas FTIR and ASC-10ST Configuration

6 NUMBER AND LENGTH OF SAMPLING RUNS

Testing consisted of triplicate 1-hour tests on Unit 2200.

7 STACK INFORMATION

The following section outlines the stack characteristics.

Table 7.1: Summary of the Stack Characteristics

Source	Number of Ports	Points per Traverse	Total Points per Test
Unit 2200	1	1	1

8 TEST RESULTS AND DISCUSSION

8.1 Detailed Results

Detailed results for formaldehyde emissions are provided in **Appendix B**.

Table 8.1: Results Summary – Formaldehyde Concentrations

Source	Unit	Test 1	Test 2	Test 3	Average	Permit Limit
Unit 2200	ppbvd	18.27	17.72	16.81	17.60	NA
	ppbvd @ 15% O2	19.22	18.60	17.67	18.50	91

8.2 Discussion of Results

The detailed results of individual tests can be found in **Appendices B** and all field notes can be found in **Appendix C.**

Testing confirmed that Unit 2200 (EUTURBINE2) was able to meet the 40 CFR Part 63 Subpart YYYY limit of less than 91 ppbv (dry) corrected to 15% O_2.

8.3 Variations in Testing Procedures

There was no variation in testing procedures.

8.4 Process Upset Conditions During Testing

There were no upsets in the process during testing.

8.5 Maintenance Performed in Last Three Months

All maintenance in the last three months has been routine.

8.6 Re-Test

This was not a retest.

8.7 Audit Samples

This test did not require any audit samples.

8.8 Process Data

Process data can be found in **Appendix A**.

8.9 Calibration Data

Calibration can be found in **Appendix D**.

8.10 Example Calculations

Example calculations can be found in **Appendix E**.

8.11 Laboratory Data

There was no laboratory data affiliated with this testing.

8.12 Source Testing Plan and EGLE Correspondence

Copy of the correspondence received from the Source Testing Plan from EGLE and the Source Testing Plan submitted can be found in **Appendix F**.

TABLES

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Sampling Method
U.S. EPA [1] Method 3A
U.S. EPA [1] Method 320

Table 1: Summary of Sampling Parameters and Methodology

Source Location	No. of Tests	Sampling Parameter	Sampling Method
Unit 2200	3	Oxygen	U.S. EPA [1] Method 3A
		Formaldehyde, Moisture	U.S. EPA [1] Method 320

Notes:

[1] U.S. EPA - United States Environmental Protection Agency

Table 2: Sampling Summary and Sample Log

Capacity and Test #	Sampling Date	Start Time	End Time
Test #1	21-Dec-23	8:40 AM	9:39 AM
Test #2	21-Dec-23	10:08 AM	11:07 AM
Test #3	21-Dec-23	11:37 AM	12:36 PM

Table 3 - Summary of Formaldehyde Concentration - Unit 2200

DTE Milford

Facility: DTE Milford
City: Milford, MI
Source: Unit 2200
Date: 12/21/2023

	Symbol	Units	Test 1	Test 2	Test 3	Average
Formaldehyde Concentration	CH_2O	ppbvw	17.24	16.72	15.87	16.61
Formaldehyde Concentration	CH_2O	ppbvd	18.27	17.72	16.81	17.60
Formaldehyde Concentration (15% O_2)	CH_2O	ppbvd @ 15% O_2	19.22	18.60	17.67	18.50
Oxygen Concentration	O_2	$\%_{wet}$	14.43	14.42	14.41	14.42
Oxygen Concentration	O_2	$\%_{dry}$	15.29	15.28	15.29	15.29
Moisture Content	H_2O	%	5.64	5.65	5.69	5.66

FIGURES

Figure 1 – Stack Diagram
DTE Milford Compressor Station – EUTURBINE2
December, 2023

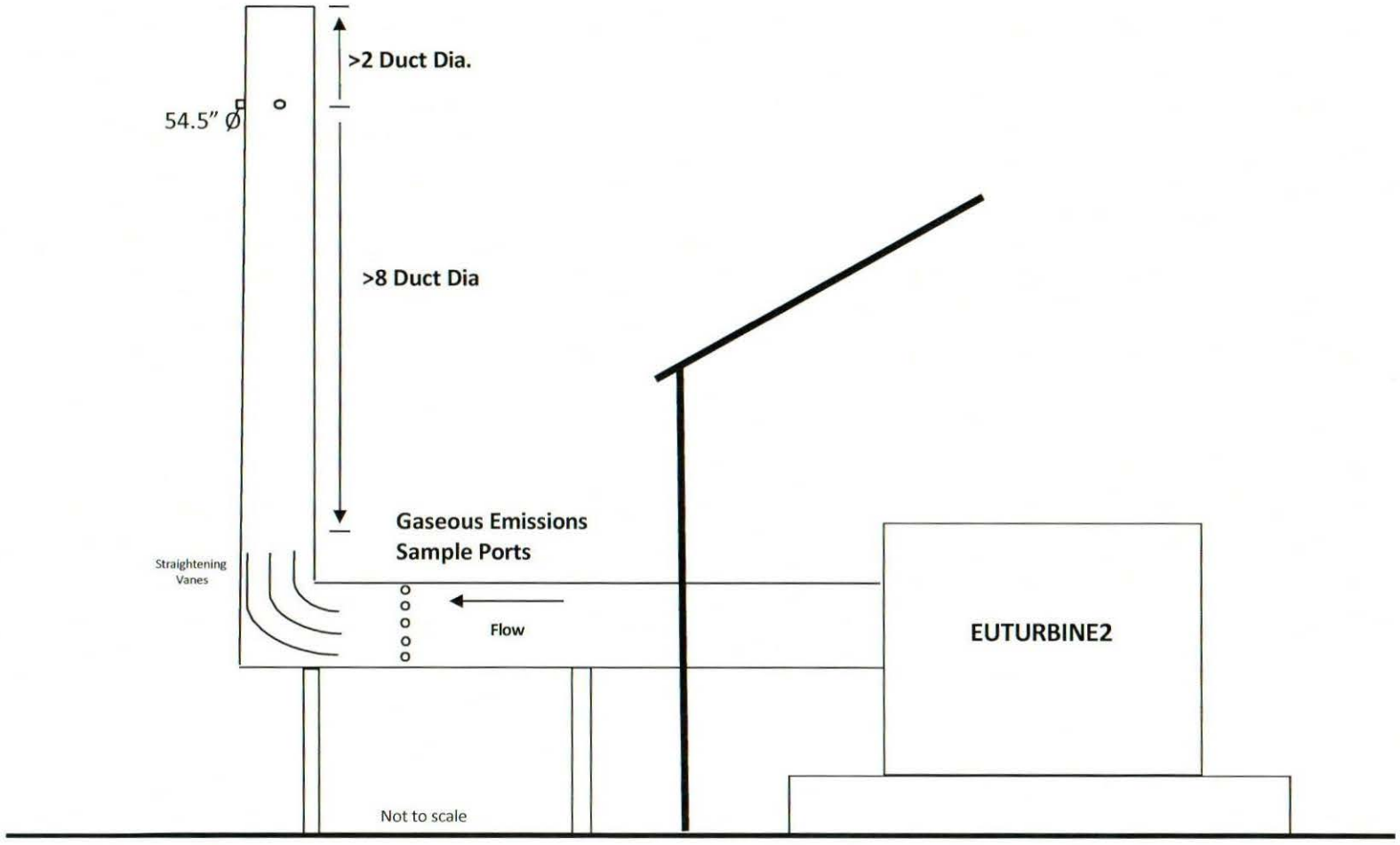

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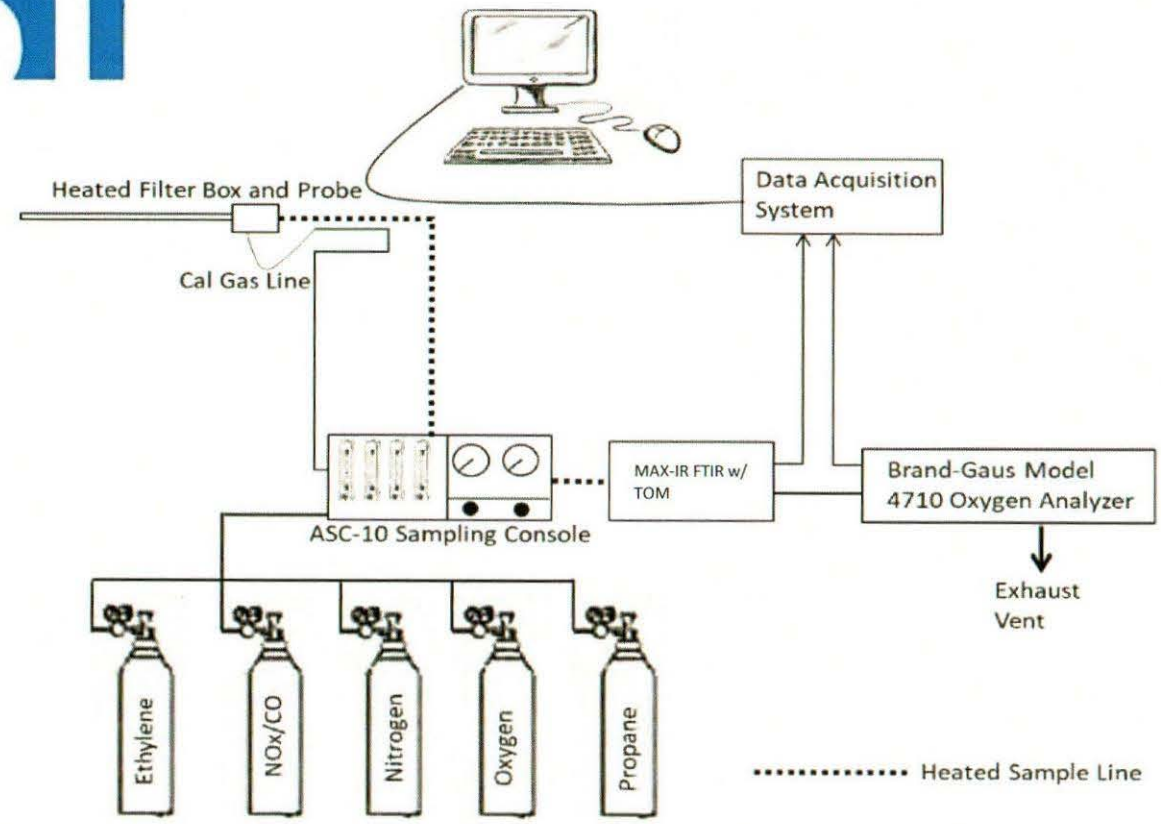
Figure No. 2: US EPA Method 320/3A Schematic



USEPA Method 320

DTE Milford

Unit 2200

Milford, Michigan

Dearborn, Michigan

Project No. 2402684

Date: December 21st, 2023