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EMISSIONS TEST REPORT

for

OXIDES OF NITROGEN (NO_X) EMISSIONS

EUCTGHRSG1 & EUCTGHRSG2
PTI 144-17 and 40 CFR Part 60, Subpart KKKK

DTE Dearborn CEP, LLC
Dearborn, Michigan

November 1-2, 2022

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CONTENTS

DTE

RESULTS TABLES

FIGURES

APPENDICES

DTE

EXECUTIVE SUMMARY

DTE Energy's Environmental Management and Safety (EMS) Ecology, Monitoring, and Remediation Group performed emissions testing at the DTE Dearborn CEP, LLC, located in Dearborn, Michigan. The fieldwork, performed between November 1-2, 2022, was conducted to satisfy requirements of the Michigan Department of Environment, Great Lakes, and Energy (EGLE) Permit to Install (PTI) 144-17 and 40 CFR Part 60, Subpart KKKK. Emissions tests were performed on two Solar Titan 130 20501S model natural gas fired CTG with HRSG (EUCTGHRSG1) and (EUCTGHRSG2) for oxides of nitrogen. Each unit was tested with and without duct burners operating.

The results of the emissions testing are highlighted below:

Emissions Test Results
Dearborn CEP, LLC
EUCTGHRSG1-2
November 1-2, 2022

Turbine	[1]Oxides of Nitrogen (ppmvd)	Oxides of Nitrogen (lb/hr)
EUCTGHRSG1	8.3	4.33
EUCTGHRSG2	8.1	4.37
Permit Limit	***12***	***8.84***

Unit	[1]Oxides of Nitrogen (ppmvd)	Oxides of Nitrogen (lb/MMBTU)	Oxides of Nitrogen (lb/hr)
EUCTGHRSG1	13.5	0.05	12.41
EUCTGHRSG2	13.7	0.05	13.16
Permit Limit	***25***	***0.12***	***19.04***

(1) ppmvd = parts per million by volume at 15% O_2 on a dry basis

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1.0 INTRODUCTION

DTE Energy's Environmental Management and Safety (EMS) Ecology, Monitoring, and Remediation Group performed emissions testing at the DTE– Dearborn CEP, LLC, located in Dearborn, Michigan. The fieldwork, performed between November 1-2, 2022, was conducted to satisfy requirements of the Michigan Department of Environment, Great Lakes, and Energy (EGLE) Permit to Install (PTI) 144-17 and 40 CFR Part 60, Subpart KKKK. Emissions tests were performed on two Solar Titan 130 20501S model natural gas fired CTG with HRSG (EUCTGHRSG1) and (EUCTGHRSG2) for oxides of nitrogen. Each unit was tested with and without duct burners operating.

The following DTE personnel participated in the testing program: Mark Westerberg Sr. Environmental Specialist and Fred Meinecke, Environmental Specialist. Mr. Andrew Riley and Mr. Jorge Acevedo with EGLE reviewed the test plan and were on site to observe individual portions of the test program.

2.0 SOURCE DESCRIPTION

DTE Dearborn CEP, LLC is located at 1641 Carroll Shelby Way East, Dearborn, Michigan. The facility is within the Ford R&E Center. The DTE Dearborn facility is a central energy plant with a combined heat and power (CHP) plant and hot/chilled water plant at the Ford R&E Center. The CHP Plant consists of two combustion turbine generators (CTG), each within associated heat recovery steam generator (HRSG) with ancillary duct burners (DB) to produce electricity and steam. The primary purpose of the DBs is to provide additional steam generation during winter months or periods of high steam demand. The steam generated by the plant provides Ford with support to the Research and Engineering operations. Dispatch of the electrical generation is controlled by DTE. All electricity generated by the facility is supplied to the local utility grid. Other parts of the DTE Dearborn facility are the Thermal Energy Storage (TES) tank, chillers, back-up generator, and gas compressors.

Figure 1 presents a schematic of the sampling location for each turbine (Units are similarly designed).

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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*. The sampling and analytical methods used in the testing program are indicated in the table below:

Sampling Method	Parameter	Analysis
USEPA Method 3A	Oxygen/Carbon Dioxide	Instrumental Analyzer Method
USEPA Method 7E	Oxides of Nitrogen	Instrumental Analyzer Method

3.1 OXYGEN AND OXIDES OF NITROGEN (USEPA METHODS 3A and 7E)

3.1.1 Sampling Method

Exhaust Oxygen (O_2) content was evaluated using USEPA Method 3A, "Determination of Oxygen and Carbon Dioxide Concentrations in Emissions from Stationary Sources (Instrumental Analyzer Procedure)". The analyzers utilize paramagnetic sensors.

Oxides of Nitrogen (NO_x) emissions were evaluated using USEPA Method 7E, "Determination of Oxides of Nitrogen Emissions from Stationary Sources". The NO_x analyzer utilizes a chemiluminescent detector.

All gas samples were measured on a dry basis (i.e. sample was conditioned prior to introduction into the pollutant analyzers).

3.1.2 O_2 and NO_x Sampling Train

The EPA Methods 3A and 7E sampling system (Figure 2) consisted of the following components:

(1) Stainless steel sampling probe
(2) Heated Teflon™ sampling line
(3) MAK® gas conditioner with particulate filter
(4) Flexible unheated Teflon™ sampling line
(5) Instrumental gas analyzer bank
(6) Appropriate USEPA Protocol 1 Calibration Gases
(7) Data Acquisition System

3.1.3 Sampling Train Calibration

The O_2 and NO_X instruments were calibrated according to procedures outlined in USEPA Methods 3A and 7E. Zero, span, and mid-range calibration gases were introduced directly into each analyzer to determine the instruments linearity. A zero and mid-range span gas was then introduced through the entire sampling system to determine sampling system bias for each analyzer. Additional system calibrations were performed at the completion of each test.

3.1.4 Sampling Duration & Frequency

NO_X emissions testing consisted of triplicate 20-minute samples. Stratification testing was performed during previous emissions testing. No modifications where made to the ductwork and stacks and the static pressure checks verified that the null angle was at 90. EGLE agreed that the previous stratification checks were sufficient. The exhausts were not stratified on either source for each condition. Data was recorded at 10-second intervals.

3.1.5 Quality Control and Assurance

All sampling and analytical equipment was calibrated according to the guidelines referenced in Methods 3A and 7E. Calibration gases were EPA Protocol 1 gases. Calibration gas concentrations were within the acceptable ranges specified in Method 7E.

Prior to testing, DTE performed converter efficiency testing by directly challenging the NO_x analyzer with a nitrogen dioxide (NO_2) calibration gas of 15.42 ppm. Results from the converter efficiency test demonstrated that the analyzer met the requirements of Method 7E[(Eq. 1)] (Greater than 90%).

Eq. 1 $$Eff_{NO2} = \frac{13.98}{15.42} = 91\%$$

Field calibration data sheets and gas certification sheets are in Appendix C.

3.1.6 Data Reduction

The O2 (%) and NO_X (ppmvd) readings were recorded at 10-second intervals and averaged to 1-minute increments. NO_X and CO emissions were reported in parts per million corrected to 15% O_2 (ppm @ 15% O_2), pounds per million British thermal units (lb/MMBtu), and pounds per hour (lb/hr) for comparison to the permitted emission limits. Emission were calculated using USEPA Method 19.

Raw CEM data is presented in Appendix B.

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4.0 OPERATING PARAMETERS

The test program included the collection of turbine operating data during each test run. Parameters recorded included mass fuel flow rate (lb/hr), heat input (MMBtu/hr), electrical generation (kW), compressor discharge pressure (PSIG), turbine exhaust temperature (F) and steam flow from HRSG (KPPH). The units were operating at or above 95% of maximum fuel flow for the ambient conditions on the testing days

Operational data, explanation of maximum fuel flow, and results of the fuel analysis can be found in Appendix E.

5.0 RESULTS

The results of the Oxides of nitrogen emission testing conducted on EUCTGHRSG1-2 are presented in Table Nos. 1-2. The results of the NO_x emissions testing are presented in parts per million at 15% oxygen (ppm @ 15% O_2), pounds per million BTU (lb/MMBTU), and lb/hr. EUCTGHRSG1 demonstrated compliance with permitted emission rates.

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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."

Mark R. Grigereit
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RESULTS TABLES

TABLE NO. 1
EMISSIONS TEST RESULTS
DTE Dearborn CEP, LLC
EUCTGHRSG1
November 1, 2022

Date	Test Time	Unit Load (%)		Oxides of Nitrogen (ppm)[1]	(lb/hr)	(lb/MMBtu)
Duct Burner Off						
Run 1	7:53-8:13	86%		8.3	4.21	
Run 2	8:24-8:44	86%		8.2	4.18	
Run 3	8:54-9:14	93%		8.3	4.59	
			Ave:	8.3	4.33	
			Permit Limit:	**12**	**8.84**	
Duct Burner On						
Run 1	10:01-10:21	84%		13.6	11.92	0.05
Run 2	10:32-10:52	89%		13.5	12.68	0.05
Run 3	11:02-11:22	88%		13.6	12.63	0.05
			Ave:	13.5	12.41	0.05
			Permit Limit:	**25**	**19.04**	***0.12***

TABLE NO. 2
EMISSIONS TEST RESULTS
DTE Dearborn CEP, LLC
EUCTGHRSG2
November 2, 2022

Date	Test Time	Unit Load (%)		Oxides of Nitrogen (ppm)[1]	(lb/hr)	(lb/MMBtu)
Duct Burner Off						
Run 1	7:30-7:50	90%		8.1	4.29	
Run 2	8:01-8:21	89%		8.1	4.24	
Run 3	8:33-8:53	97%		8.1	4.58	
			Ave:	8.1	4.37	
			Permit Limit:	**12**	**8.84**	
Duct Burner On						
Run 1	9:46-10:06	86%		13.7	12.44	0.05
Run 2	10:20-10:40	95%		13.8	13.72	0.05
Run 3	10:53-11:13	92%		13.8	13.31	0.05
			Ave:	13.7	13.16	0.05
			Permit Limit:	**25**	**19.04**	***0.12***

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FIGURES

Figure 1 – Sample Location
DTE Dearborn CEP – EUCTGHRSG1-2
November, 2022

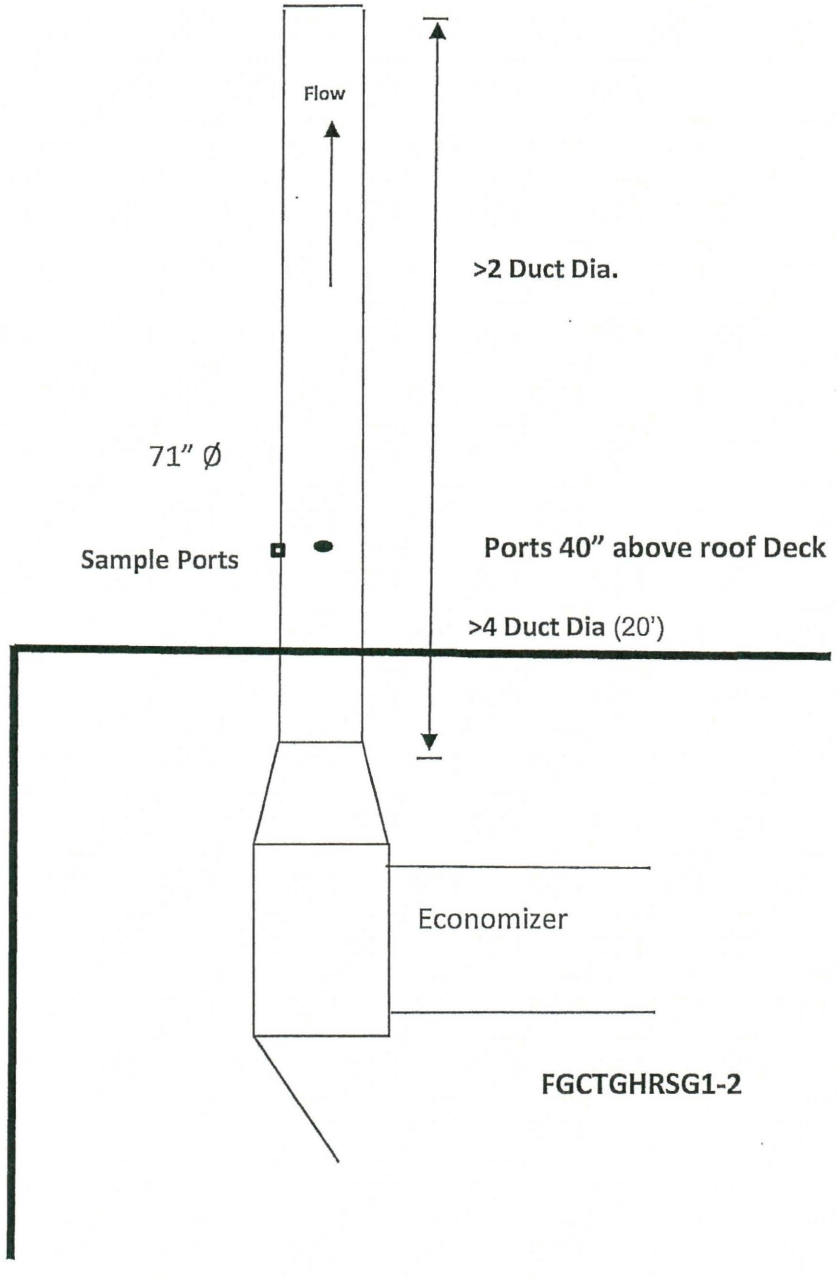

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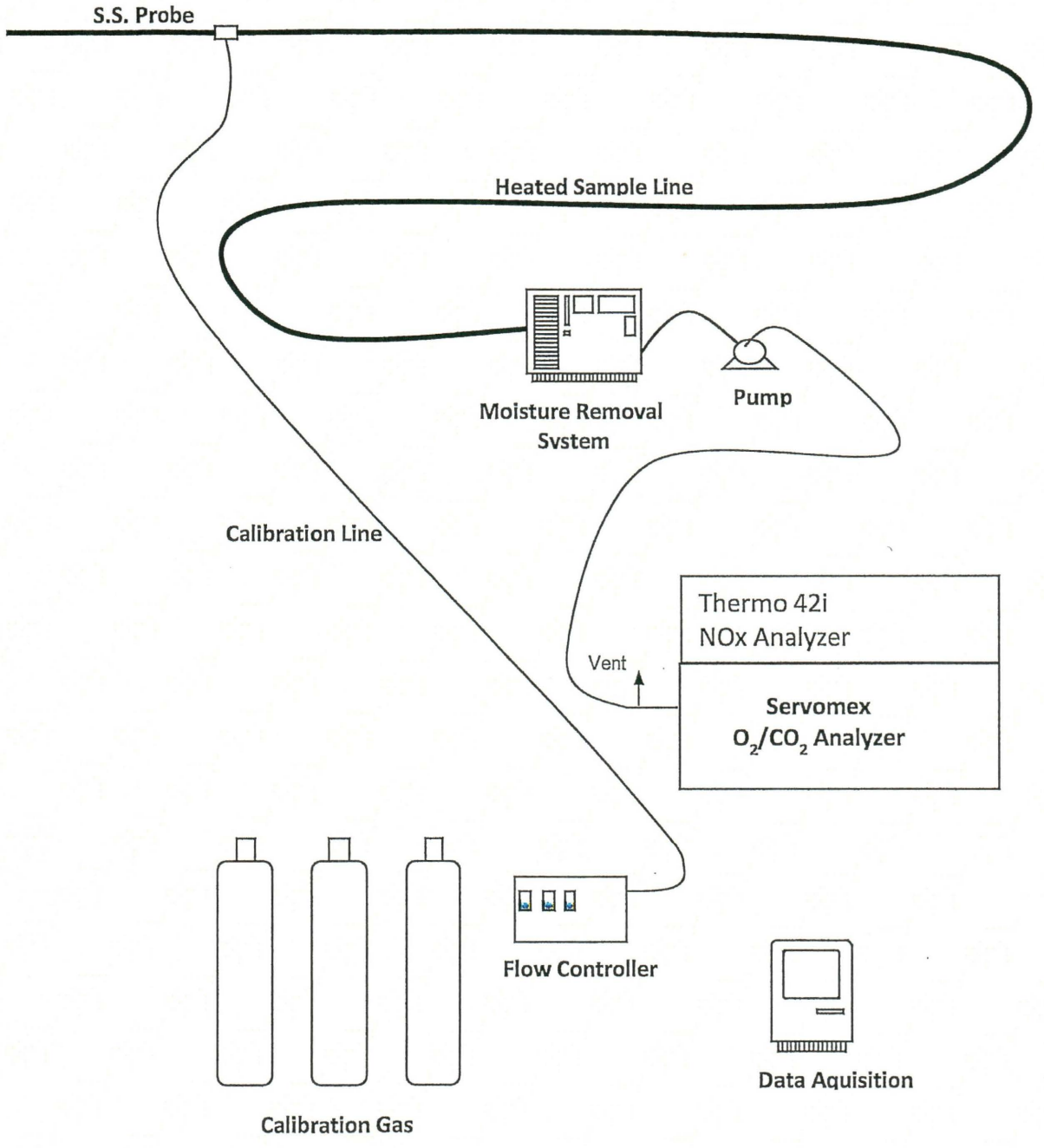
Figure 2 – EPA Methods 3A, 7E
DTE Dearborn CEP – EUCTGHRSG1-2
November, 2022



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APPENDIX A

EGLE TEST PLAN & ACCEPTANCE LETTER