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COMPLIANCE TEST REPORT

No. 191-001

MIDLAND COGENERATION VENTURE MIDLAND MICHIGAN

EU TURBINES 5 & 12
(Units 5 & 12)

Prepared for:

Midland Cogeneration Venture
100 Progress Place
Midland, Michigan 48640

Prepared by:

Coastal Air Consulting, Inc.
1531 Wyngate Dr.
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Completed On:

August 22, 25 & 26, 2022

STATEMENT OF VALIDITY

All testing activities and results represented herein were conducted and obtained in accordance with the approved EPA protocols listed in 40 CFR Parts 60 & 75. The contents have been reviewed and verified to be true and correct.

Stephen C. Webb

Stephen Webb

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President
Coastal Air Consulting, Inc.

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PROJECT STATISTICS

Client: Midland Cogeneration Venture (MCV)

Facility: Midland Michigan Generating Station

Location: 100 ProgressPlace
Midland, Michigan 48640

Type of Process Tested: EU 005 Non - Fired
EU 012 Fired -- Duct Burners

Test Protocols Performed: Oxygen/Carbon Dioxide-EPA Method 3A
Carbon Monoxide-EPA Method 10

Testing Firm: Coastal Air Consulting, Inc.
1531 Wyngate Dr.
DeLand, FL 32724

Test Personnel: Stephen Webb QSTI
Troy Marlowe
James Garrett

Test Dates: August 22, 26 & 25, 2022

Client Representative: Jim Lazzaro

Observers: Dan Droste - MDEQ

1.0 Introduction

Coastal Air Consulting, Inc. (Coastal) was contracted by Midland Cogeneration Venture (MCV) to perform the annual compliance testing for Carbon Monoxide. Testing was performed to satisfy the requirements contained in the Michigan Department of Environmental Quality (MDEQ) Renewable Operating Permit (ROP) No. MI-ROP-B6527a. The testing was performed by Coastal personnel, with the assistance of personnel assigned by Midland Cogeneration Venture (MCV).

2.0 Test Program Summary

A summary of test results developed by this source sampling program is presented in Tables 1, 2 & 3.

**TABLE 1
SUMMARY OF EMISSIONS Unit EUT05 50% LOAD 8/22/2022**

Run #	Start	End	Load MW	O2 %	CO ppm	CO lb/hr	CO lb/mmBtu	Heating Value Btu/Kscf	Gas Flow scfm	Heat Rate mmBtu/hr
1	0941	1041	52	16.00	1.32	2.30	0.003	1043	10322.57	644
2	1051	1151	52	16.01	0.45	0.78	0.001	1043	10294.45	642
3	1200	1300	52	16.00	0.260	0.44	0.001	1043	10184.36	635
Avg	-	-	52	16.00	0.677	1.17	0.002	1043	10267.13	640
Permit Limit	-	-	-	-	-	26	-	-	-	-
EF	-	-	-	-	-	-	0.002	-	-	-

**TABLE 2
SUMMARY OF EMISSIONS Unit EUT05 100% LOAD 8/26/2022**

Run #	Start	End	Load MW	O2 %	CO ppm	CO lb/hr	CO lb/mmBtu	Heating Value Btu/Kscf	Gas Flow scfm	Heat Rate mmBtu/hr
1	1217	1317	93	14.98	0.76	1.65	0.002	1043	15709.94	980
2	1323	1423	93	15.02	0.97	2.14	0.002	1043	15719.98	981
3	1430	1530	93	14.96	0.78	1.70	0.002	1043	15691.87	979
Avg	-	-	93	14.99	0.84	1.83	0.002	1043	15707.26	980
Permit Limit	-	-	-	-	-	26	-	-	-	-
EF	-	-	-	-	-	-	0.002	-	-	-

**TABLE 3
SUMMARY OF EMISSIONS Unit EUT12 100% LOAD 8/29/2022**

Run #	Start	End	Load MW	O2 %	CO ppm	CO lb/hr	CO lb/mmBtu	Heating Value Btu/Kscf	Gas Flow scfm	Heat Rate mmBtu/hr
1	1220	1320	80	13.94	7.18	16.22	0.014	1043	18632.81	1191
2	1330	1430	80	13.93	7.04	15.81	0.013	1043	18559.35	1185
3	1440	1540	80	13.98	6.06	13.62	0.012	1043	18441.27	1178
Avg	-	-	80	13.95	6.76	15.22	0.013	1043	18544.48	1185
Permit Limit	-	-	-	-	-	246	-	-	-	-
EF	-	-	-	-	-	-	0.013	-	-	-

3.0 Results of Testing

The testing was conducted according to the procedures in the Code of Federal Regulations, Title 40, Part 60 (40CFR60), Appendix A, Reference Methods 3A and 10, for Oxygen (O2) and carbon monoxide (CO), respectively. Emissions data analysis was performed according to 40 CFR 60 Appendix B.

The number of sampling points for each traverse of the stack was determined after a 12-point stratification test was performed. Sampling and analysis of the stack effluent stream was performed by the Coastal Air Consulting Reference Method analyzer system. CO and O2 in-line analyzers measured CO and O2 concentrations. Initial calibrations of the analyzers with EPA Protocol 1 gases were conducted. Appropriate analyzer calibrations and analyzer bias and drift measurements were performed as required before, during, and after testing.

Three one-hour runs were performed at 50% and 100% load on unit 5. Reference Method CO and O2 analyzer measurements were recorded on a one-minute continuous basis by the Reference Method CEMS. An average of the CO and O2 concentrations is calculated for each run.

Three one-hour runs were performed at 100% load on unit 12 with duct burners. Reference Method CO and O2 analyzer measurements were recorded on a one-minute continuous basis by the Reference Method CEMS. An average of the CO and O2 concentrations is calculated for each run.

These results indicate that Units 5 & 12 passed the compliance testing at the time of testing under normal operating conditions.

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4.0 Description of Source

MCV produces steam and electricity from twelve combined-cycle natural gas-fired combustion turbines. Turbine Unit 3 through 14 are each rated with a maximum heat input of 984 million British thermal units (MMBtu) per hour and consist of a compressor, combustion turbine, and generator. Energy is generated at the combustion turbine by drawing in ambient air by means of burning fuel and expanding the hot combustion gases in a three-stage turbine.

Turbine Units 9 through 14 are also configured with supplemental natural gas-fired duct burners rated at 249mmBtu/hr maximum heat input. The duct burners utilize the hot exhaust gases from the combustion turbine to supplement the steam producing capabilities of the combined cycle turbine.

5.0 Sampling Procedures

EPA testing methods utilized during this test program include the following;

EPA Method 3A Gas Analysis for CO₂, O₂, Excess Air and Dry Molecular Weight (Instrumental Analyzer Method)

EPA Method 10 Determination of Carbon Monoxide Emissions From Stationary Sources

6.0 Operating Conditions

MCV personnel monitored operating conditions throughout the duration of the sampling program. The data is included in Appendix 2 "Plant Data".

7.0 Quality Assurance Procedures

Quality assurance procedures followed during these testing activities were applied consistent with the requirements outlined by the EPA methods referenced in 40 CFR Parts 60.