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**EMISSION TEST REPORT**  
**For**  
**CO Reduction Efficiency**  
**Catalyst on Engines 1, and 3-5**  
**Sebewaing Light & Water**  
**Sebewaing, MI**  
**August 1-3, 2017**

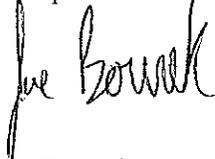
Comprehensive Emission Services, Inc  
PO Box 910  
Waukee, IA 50263  
Project No. 10517

Phone 515 - 987-0200

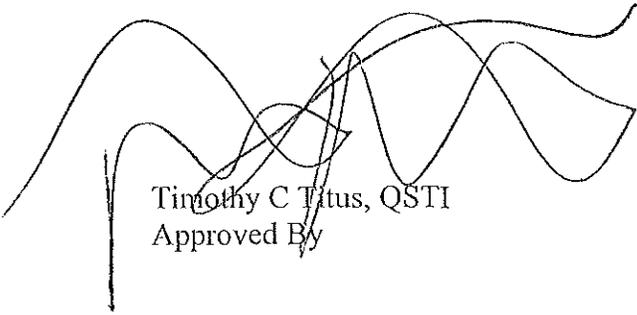
## PREFACE

This report was prepared by Comprehensive Emission Services, Inc. in response to an emission test that was conducted on Units 1, and 3-5, at the Sebewaing Light & Water facility. The testing was conducted at the facility in Sebewaing, MI on August 1-3, 2017. Any questions concerning this report should be directed to Mr. Joe Bourek or Mr. Tim Titus.

Comprehensive Emission Services Inc.



Joe Bourek  
Test Leader



Timothy C Titus, QSTI  
Approved By

Date: September 1, 2017

**SECTION 1**  
**INTRODUCTION**

An emission test was conducted by Comprehensive Emission Services, Inc. on Units 1, and 3-5, at Sebewaing Light & Water, located in Sebewaing, MI.

Coordinating the field test:

Melanie McCoy - Superintendent of Sebewaing Light & Water  
Tim Titus - Comprehensive Emission Services, Inc.  
Kevin DeValkenaere - Farabee Mechanical, Inc.

Conducting the field test:

Joe Bourek - Comprehensive Emission Services, Inc.  
Mason Woltz - Comprehensive Emission Services, Inc.

Observing the field test:

Tom Gasoli - Department of Environmental Quality

The results were used to evaluate the Generator with regards to the following:

CO Emission reduction efficiency

The appendices contain the following:

Appendix A: Analyzer Data  
Appendix B: Plant Process Data  
Appendix C: Monitor Calibration Data  
Appendix D: Protocol 1 Certification Sheets  
Appendix E: Certificates of accreditation

**SECTION 2**

**SUMMARY OF RESULTS**

Table 1 summarizes the test results for testing at Sebewaing Light & Water, located in Sebewaing, MI. The CO results are presented in ppm corrected to 15 percent O<sub>2</sub>. The catalyst on the Engines were tested to demonstrate compliance with the outlet concentration limit of ≤ 23 ppm corrected to 15 percent O<sub>2</sub>, or a 70% or greater reduction of CO emissions as required in NESHAP ZZZZ, 40 CFR, Part 63.

**SUMMARY OF TEST RESULTS**

<b>Parameters</b>	<b>CO (ppm @ 15% O<sub>2</sub>)</b>	<b>CO (ppm @ 15% O<sub>2</sub>)</b>	<b>%</b>
<b>Fairbanks Morse</b>	Inlet	Outlet	CO Reduction (%)
<b>Unit 1</b>	288.1	18.6	93.55
<b>Unit 3</b>	170.6	22.3	87.15
<b>Unit 4</b>	83.4	14.1	83.04
<b>Unit 5</b>	91.1	13.9	84.69

## SECTION 3

### SAMPLING AND ANALYTICAL PROCEDURES

#### **Carbon Monoxide**

Carbon Monoxide (CO) and Oxygen (O<sub>2</sub>) were measured by EPA Methods 10 and 3A. The Diesel Engines were sampled with each test run lasting approximately one hour. A Teflon heated line was used to transfer the sample from the probe to the sampling trailer. At the sampling trailer, the sample was conditioned by a series of refrigeration dryers to remove the moisture from the gas stream. After the refrigeration dryers, the sample was transported through a Teflon line to the analyzers. The flow of the stack gas sample was regulated at a constant rate to minimize drift.

#### **3.3 Calibration Procedure**

At the start of the day, the each monitor was checked for calibration error by introducing zero, low, mid, and high-range EPA Protocol 1 gases to the measurement system at a point upstream of the analyzers. Comprehensive Emission Services, Inc. refers to the calibration error test as the instrument calibration. The gas was injected into the sampling valve located at the inlet of the sampling probe. The bias test was conducted before and after each consecutive test condition by introducing zero and upscale calibration gases for each monitor. The upscale calibration gases used for the each monitors bias tests were the calibration gases which most closely approximates the effluent concentration monitored during the test runs.

**SECTION 4**  
**TEST RESULTS**

Table 2 summarizes the CO emissions and other parameters for Engine Unit 1. The raw data is presented in appendix B.

Table 2 Test Results August 3, 2017 Unit 1 Fairbanks Morse 38TDD8-1/8 Rating: 1000 KW and 1440 HP			
Parameters	Run 1	Run 2	Run 3
Start time	09:07 AM	10:13 AM	11:18 AM
Stop time	10:07 AM	11:13 AM	12:18 PM
O2( %) Inlet	9.3	9.4	9.3
O2( %) Outlet	9.2	9.3	9.1
CO(ppm) Inlet	572.8	560.2	562.6
CO(ppm @ 15% O2) Inlet	291.26	287.08	286.00
CO(ppm) CO(ppm) Outlet	49.6	34.0	27.4
CO(ppm @ 15% O2) Outlet	24.94	17.25	13.68
CO Reduction (%)	91.44	93.99	95.22
HAPS emitted CO tons/hr	5.66E-005		
Average Output (%)	95		
Average Output (KW)	950		
Average Catalyst Pressure	0.3		
Average Catalyst Inlet Temp	951.2		

Table 3 summarizes the CO emissions and other parameters for Engine Unit 3. The raw data is presented in appendix B.

Table 3 Test Results August 1, 2017 Unit 3 Fairbanks Morse 38DD8-1/8 Rating: 1250 KW and 1600 HP			
Parameters	Run 1	Run 2	Run 3
Start time	11:21 AM	12:27 PM	01:33 PM
Stop time	12:21 PM	01:27 PM	02:33 PM
O2( %) Inlet	12.9	12.8	12.7
O2( %) Outlet	12.8	12.8	12.7
CO(ppm) Inlet	261.6	228.2	209.1
CO(ppm @ 15% O2) Inlet	193.61	166.99	151.26
CO(ppm) CO(ppm) Outlet	42.8	25.7	23.9
CO(ppm @ 15% O2) Outlet	30.99	18.65	17.21
CO Reduction (%)	83.99	88.83	88.63
HAPS emitted CO tons/hr	4.99E-004		
Average Output (%)	96		
Average Output (KW)	1200		
Average Catalyst Pressure	2.2		
Average Catalyst Inlet Temp	658.9		

Table 4 summarizes the CO emissions and other parameters for Engine Unit 4. The raw data is presented in appendix B.

Table 4 Test Results August 2, 2017 Unit 4 Fairbanks Morse 38DD8-1/8 Rating: 1360 KW and 1920 HP			
Parameters	Run 1	Run 2	Run 3
Start time	09:28 AM	10:34 AM	11:39 AM
Stop time	10:28 AM	11:34 AM	12:39 PM
O2( %) Inlet	14.4	14.4	14.3
O2( %) Outlet	14.4	14.4	14.2
CO(ppm) Inlet	96.1	88.4	92.1
CO(ppm @ 15% O2) Inlet	87.54	80.29	82.36
CO(ppm) CO(ppm) Outlet	16.7	15.3	15.3
CO(ppm @ 15% O2) Outlet	15.12	13.83	13.48
CO Reduction (%)	82.73	82.77	83.63
HAPS emitted CO tons/hr	3.42E-004		
Average Output (%)	96		
Average Output (KW)	1300		
Average Catalyst Pressure	2.1		
Average Catalyst Inlet Temp	575.1		

Table 5 summarizes the CO emissions and other parameters for Engine Unit 5. The raw data is presented in appendix B.

Table 5 Test Results August 2, 2017 Unit 5 Fairbanks Morse 38DD8-1/8 Rating: 1136 KW and 1600 HP			
Parameters	Run 1	Run 2	Run 3
Start time	01:38 PM	02:43 PM	03:48 PM
Stop time	02:38 PM	03:43 PM	04:48 PM
O2( %) Inlet	14.2	14.3	14.3
O2( %) Outlet	14.2	14.2	14.2
CO(ppm) Inlet	99.4	103.4	104.1
CO(ppm @ 15% O2) Inlet	87.99	92.17	92.99
CO(ppm) CO(ppm) Outlet	15.4	15.8	16.5
CO(ppm @ 15% O2) Outlet	13.51	13.86	14.44
CO Reduction (%)	84.64	84.96	84.48
HAPS emitted CO tons/hr	2.72E-004		
Average Output (%)	92		
Average Output (KW)	1050		
Average Catalyst Pressure	2.2		
Average Catalyst Inlet Temp	658.9		