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**EMISSION TEST REPORT  
For  
CO Reduction Efficiency  
Catalyst on Generator Unit 4  
Portland Light and Power  
Portland, MI  
October 29, 2013**

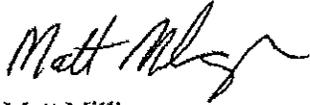
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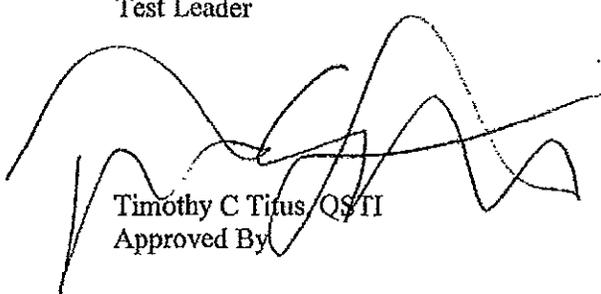
## PREFACE

This report was prepared by Comprehensive Emission Services, Inc. in response to an emission test that was conducted on Diesel Generator Unit 4 at Portland Light and Power. The testing was conducted at the facility in Portland, MI on October 29, 2013. Any questions concerning this report should be directed to Mr. Matt Milligan or Mr. Tim Titus.

Comprehensive Emission Services Inc.



Matt Milligan  
Test Leader



Timothy C Titus, QSTI  
Approved By

Date: November 8, 2013

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**SECTION 1**  
**INTRODUCTION**

An emission test was conducted by Comprehensive Emission Services Inc. on Diesel Generator Unit 4 at Portland Light and Power, located in Portland, MI.

Coordinating the field test:

Tim Titus - Comprehensive Emission Services Inc.  
Donna Oehm – Farabee Mechanical Inc.

Conducting the field test:

Matt Milligan – Comprehensive Emission Services, Inc.  
Ted Webb – Comprehensive Emission Services, Inc.

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 Portland Light and Power, located in Portland, MI. The CO results are presented in ppm corrected to 15 percent O<sub>2</sub>. The catalyst on the Diesel Generator was tested to demonstrate compliance with the outlet concentration limit of  $\leq 23$  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

Parameters	CO (ppm @ 15% O <sub>2</sub> )	CO (ppm @ 15% O <sub>2</sub> )	%
Unit 4	Inlet	Outlet	CO Reduction (%)
Cooper-Bessemer JS-8T	167.39	8.44	94.96

## 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. Diesel Generators 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 the Diesel Generator. The raw data is presented in appendix B.

Table 2 Test Results October 29, 2013 Unit 4 Cooper-Bessemer JS-8T Rating of 820 KW and 1158 HP			
Parameters	Run 1	Run 2	Run 3
Start time	08:36	09:44	10:52
Stop time	09:36	10:44	11:52
O2(%) Inlet	13.2	13.2	13.2
O2(%) Outlet	13.4	13.3	13.3
CO(ppm) Inlet	221.4	216.0	215.2
CO(ppm @ 15% O2) Inlet	170.16	166.17	165.83
CO(ppm) CO(ppm) Outlet	11.2	10.7	10.6
CO(ppm @ 15% O2) Outlet	8.80	8.29	8.24
CO Reduction (%)	94.83	95.01	95.03
HAPS emitted CO tons/hr	8.68E-005		
Average Electric Output (KW)	750		
Catalyst Pressure Differential	1.9	1.9	1.9
Catalyst Inlet Temp	752.7	752.7	752.7