

EMISSION TEST REPORT
For
CO Reduction Efficiency
Catalyst on EU-ENG-5
City of Marshall
Marshall, MI
November 03, 2015

Comprehensive Emission Services, Inc
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Project No. 13715

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**SECTION 1
INTRODUCTION**

An emission test was conducted by Comprehensive Emission Services Inc. on a Nordberg TSGl 216 Generator (EU-ENG-5) at the City of Marshall Electric Power Plant, located in Marshall, MI.

Coordinating the field test:

Tim Titus - Comprehensive Emission Services Inc.
Tim Martin - Miratech Corporation
Edward Rice - City of Marshall

Conducting the field test:

Matt Milligan - Comprehensive Emission Services, Inc.

Observing the field test:

Rex I. Lane - Michigan Dept. of Environmental Quality
David Patterson - Michigan Dept. 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 the City of Marshal Electric Power Plant, located in Marshall, MI. The CO results are presented in ppm corrected to 15 percent O₂. The catalyst on the Generator was tested to demonstrate compliance with the outlet concentration limit of ≤ 23 ppm corrected to 15 percent O₂, 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% O₂)	CO (ppm @ 15% O₂)	%
Nordberg TSGL 216	Inlet	Outlet	CO Reduction (%)
EU-ENG-5	261.40	48.29	81.48

SECTION 3

SAMPLING AND ANALYTICAL PROCEDURES

Carbon Monoxide and Oxygen

Carbon Monoxide (CO) and Oxygen (O₂) were measured by EPA Methods 10 and 3A. The Diesel Generator was 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 Nordberg TSGL 216 Generator (EU-ENG-5). The raw data is presented in appendix B.

Table 2 Test Results November 03, 2015 EU-ENG-5 Nordberg TSGL 216 Rating: 2400 HP and 1875 kW			
Parameters	Run 1	Run 2	Run 3
Start time	08:47 AM	09:53 AM	10:59 AM
Stop time	09:47 AM	10:53 AM	11:59 AM
O2(%) Inlet	15.9	16.0	15.9
O2(%) Outlet	15.8	15.9	15.8
CO(ppm) Inlet	218.4	240.8	201.8
CO(ppm @ 15% O2) Inlet	257.52	289.20	237.49
CO(ppm) CO(ppm) Outlet	42.2	43.2	38.9
CO(ppm @ 15% O2) Outlet	49.19	50.92	44.78
CO Reduction (%)	80.90	82.39	81.14
Average output (KW)	1560	1520	1600
Catalyst Pressure Differential	0.4	0.4	0.4
Catalyst Inlet Temp (*F)	563.00	563.00	563.00