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RELATIVE ACCURACY TEST AUDIT
FOR THE
GENERAL ELECTRIC, PG7121 (EA),
UNIT #1 CEMS
PREPARED FOR
WOLVERINE POWER SUPPLY COOPERATIVE, INC.
AT THE
SUMPTER GENERATION PLANT
BELLEVILLE, MICHIGAN
JUNE 13, 2023

Permit No: MI-ROP-M4854-2021

Report Date: June 26, 2023



Corporate Headquarters

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Broken Arrow, OK 74012



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I, 

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certify this testing was conducted and
this report was created in conformance
with the requirements of ASTM D7036

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**Relative Accuracy Test Audit
General Electric, PG7121 (EA), Unit #1 CEMS
Wolverine Power Supply Cooperative, Inc.
Sumpter Generation Plant
Belleville, Michigan
June 13, 2023**

1.0 INTRODUCTION

Air Hygiene International, Inc. (Air Hygiene) has completed the Relative Accuracy Test Audit (RATA) for nitrogen oxides (NO_x) and oxygen (O₂) from the exhaust of the General Electric, PG7121 (EA), Unit #1 for Wolverine Power Supply Cooperative, Inc. at the Sumpter Generation Plant near Belleville, Michigan. This report details the background, results, process description, and the sampling/analysis methodology of the stack sampling survey conducted on June 13, 2023.

The accumulated data from the RATA provides the figures for evaluating the acceptability of the operation of the on-site continuous emission monitoring system (CEMS) for the monitoring of NO_x and O₂ from the General Electric, PG7121 (EA), Unit #1 for Wolverine Power Supply Cooperative, Inc. at the Sumpter Generation Plant near Belleville, Michigan.

1.1 TEST PURPOSE AND OBJECTIVES

The purpose of the test was to perform periodic quality assurance (QA) RATA on the CEMS that serves the General Electric, PG7121 (EA), Unit #1 for Wolverine Power Supply Cooperative, Inc. at the Sumpter Generation Plant near Belleville, Michigan. Reference method (RM) testing followed the Code of Federal Regulations (CFR), Title 40 (40 CFR), Part 60 (40 CFR 60), Appendix A, Methods 1, 3A, 7E, and 19. RM values are compared with the on-site CEMS to document performance as required in the 40 CFR 60, Appendix B, Performance Specifications (PS) and 40 CFR 75 Appendix A and B. All relative accuracies were established on-site and were governed by the following sets of rules:

In accordance with 40 CFR 60, Appendix B, PS 2, Section 13.2, the NO_x RATA results are acceptable if the relative accuracy (RA) does not exceed 20.0 percent when average emissions during the test are greater than 50 percent of the emission standard or alternative relative accuracy (ARA) does not exceed 10.0 percent when the average emissions during the test are less than 50 percent of the emission standard. Part 60 further requires that the unit be operating at greater than 50 percent of normal load.

In accordance with 40 CFR 75, Appendix A, Section 3.3.2(a) and (b), the NO_x RATA results are acceptable if the relative accuracy (RA) does not exceed 10.0 percent or if during the RATA the average NO_x emission rate is less than or equal to 0.200 lb/MMBtu and the average difference between the CEMS and reference method (RM) values does not exceed 0.020 lb/MMBtu. Passing this set of criteria requires the CEMS to be retested after no more than two operating quarters. Alternatively, in accordance with 40 CFR 75, Appendix B, Section 2.3.1.2(a) and (f), and Appendix B, Figure 2, the NO_x RATA results are acceptable if the RA does not exceed 7.5 percent or if during the RATA the average NO_x emission rate is less than or equal to 0.200 lb/MMBtu and the average difference between the CEMS and RM values does not exceed 0.015 lb/MMBtu. Passing this set of criteria allows the CEMS to be retested after four operating quarters or at least within eight calendar quarters.

In accordance with 40 CFR 75, Appendix A, Section 3.3.3, the O₂ RATA results are acceptable if the relative accuracy (RA) does not exceed 10.0 percent or if during the RATA the average difference between the CEMS and reference method (RM) values does not exceed 1.0 percent. Passing this set of criteria requires the CEMS to be

retested after no more than two operating quarters. Alternatively, in accordance with 40 CFR 75, Appendix B, Section 2.3.1.2(a) and (h), and Appendix B, Figure 2, the O₂ RATA results are acceptable if the RA does not exceed 7.5 percent or if during the RATA the average difference between the CEMS and RM values does not exceed 0.7 percent absolute. Passing this set of criteria allows the CEMS to be retested after four operating quarters or at least within eight calendar quarters.

1.2 SUMMARY OF TEST PROGRAM

The following list details pertinent information related to this specific project:

- 1.2.1 Participating Organizations
 - Michigan Department of Environment, Great Lakes & Energy (EGLE)
 - Wolverine Power Supply Cooperative, Inc. (WP)
 - Fishbeck
 - Air Hygiene
- 1.2.2 Industry
 - Electric Utility / Electric Services
- 1.2.3 Air Permit and Federal Requirements
 - Permit Number: MI-ROP-M4854-2021
 - 40 CFR 60, Appendix B, Performance Specifications (PS)
 - 40 CFR 75, Appendix A and B
- 1.2.4 Plant Location
 - Sumpter Generation Plant near Belleville, Michigan
 - GPS Coordinates [Latitude 42.167, Longitude -83.532]
 - Physical Address: 8509 Rawsonville Road, Belleville, Wayne County, Michigan 48111-9371
 - Federal Registry System / Facility Registry Service (FRS) No. – 110017414172
 - Source Classification Code (SCC) – 20100201
- 1.2.5 Equipment Tested
 - General Electric, PG7121 (EA), Unit #1
 - NOx Analyzer (Thermo, 42i, Serial No. 1331859772)
 - O₂ Analyzer (Servomex, 1440C1, Serial No. 01440C1-STD2589)
- 1.2.6 Emission Points
 - Exhaust from the General Electric, PG7121 (EA), Unit #1
 - For all gases, one sample point in the exhaust duct from the General Electric, PG7121 (EA), Unit #1, determined after conducting a stratification test
- 1.2.7 Emission Parameters Measured
 - NOx
 - O₂
- 1.2.8 Date of Emission Test
 - June 13, 2023
- 1.2.9 Federal Certifications
 - Stack Testing Accreditation Council AETB Certificate No. 3796.02
 - International Standard ISO/IEC 17025:2005 Certificate No. 3796.01

1.3 KEY PERSONNEL

WP:	Joe Hazewinkel (jhazewinkel@wpsci.com)	231-779-3367
WP:	Ken Sowards (ksowards@wpsci.com)	734-461-9287
Fishbeck:	Stephanie A. Jarrett (sajarrett@ftch.com)	248-324-2146
Air Hygiene:	Michael Stockwell (mstockwell@airhygiene.com)	918-307-8865
Air Hygiene:	Luke Brandon	918-307-8865

2.0 SUMMARY OF TEST RESULTS

Results from the sampling conducted on Wolverine Power Supply Cooperative, Inc.'s General Electric, PG7121 (EA), Unit #1 located at the Sumpter Generation Plant on June 13, 2023 are summarized in the following table and relate only to the items tested.

**TABLE 2.1
SUMMARY OF GENERAL ELECTRIC, PG7121, UNIT #1 RATA RESULTS**

Pollutant	Units	Criteria			Results	Passed / Test Frequency
		CFR	Specification / Section	Standard		
NOx	ppmvd	Part 60	Appendix B, Performance Specification 2, Section 13.2	RA ≤ 20.0%, or ARA ≤ 10.0%	RA = 1.7%	YES / ANNUAL
NOx	lb/MMBtu	Part 75	Appendix A, Section 3.3.2(a),(b) Appendix B, Section 2.3.1.2(a),(f), Figure 2	RA ≤ 10.0%, or if lb/MMBtu ≤ 0.200, d ≤ ±0.020 lb/MMBtu Annual Incentive RA ≤ 7.5%, or if lb/MMBtu ≤ 0.2, d ≤ ±0.015 lb/MMBtu	RA = 2.8% BAF=1.015	YES / ANNUAL
O ₂	%vd	Part 60	Appendix B, Performance Specification 3, Section 13.2	RA ≤ 20.0%, or d ≤ ±1.0%	RA = 1.3%	YES / ANNUAL
Load	MW	Part 60	Appendix B, Performance Specifications	> 50% max load	75.0	WITHIN TOLERANCE
Load	MW	Part 75	Appendix A and B	normal or secondary normal load range	75.0	WITHIN TOLERANCE

Notes: RA = relative accuracy, ARA = alternative relative accuracy, RM = reference method value, d = difference between RM and CEMS value, BAF = bias adjustment factor

The RATA passed for all pollutants (NOx and O₂) in all units (ppmvd, lb/MMBtu, and %vd) under all 40 CFR 60 and 40 CFR 75 criteria.

Specifically, NOx in units of ppmvd passed 40 CFR 60 criteria with a RA less than 20 percent. NOx in units of lb/MMBtu passed the 40 CFR 75 annual incentive criteria with a RA less than 7.5 percent. Also, the Bias

Adjustment Factor test resulted in an adjustment factor equal to 1.015 (adjustment required). O₂ in units of %vd passed the 40 CFR 60 criteria with a RA less than 20 percent.

Unit load was within the 40 CFR 60 required criteria of greater than 50 percent of the maximum load and also fell within the normal load criteria as defined by the plants Quality Control and Monitoring Plan which defined the upper and lower boundary on the unit and the normal and alternative load ranges.

The results of all measured pollutant emissions were below the required limits. All testing was performed without any real or apparent errors. All testing was conducted according to the approved testing protocol.

3.0 SOURCE OPERATION

3.1 PROCESS DESCRIPTION

Wolverine Power Supply Cooperative, Inc. (WP) owns and operates the Sumpter Generation Plant located at 8509 Rawsonville Road in Wayne County, Michigan. The station consists of four General Electric (GE) PG7121 (EA) simple cycle combustion turbines, designated as Unit #1, 2, 3, and 4. Each unit has a nominal rating of 83 MW.

A single, dedicated dry extraction based continuous emissions monitoring system (CEMS) is installed on each unit. The CEMS configurations includes nitrogen oxide (NO_x) analyzers, diluent gas oxygen (O₂) analyzers, and a data acquisition and handling system (DAHS).

3.2 SAMPLING LOCATION

The stack is rectangular and measures 9 feet (ft) (108 inches) deep and 19 ft (228 inches) wide at the test ports which are approximately 45 ft above grade level with an exit elevation of approximately 60 ft above grade level. The test ports are located approximately 13 ft (156 inches) downstream and approximately 29 ft (344 inches) upstream from the nearest disturbances. Air Hygiene has field verified the measurable dimensions. Non-field verified dimensions are provided by Wolverine Power Supply Cooperative, Inc. All exhaust samples for gaseous emissions were continuously drawn from the exhaust system at the sample ports from a single point determined after conducting a stratification test. During the stratification test two points were traversed from each of the seven ports. The probe was allowed to remain at a point for at least two times the system response time.

4.0 SAMPLING AND ANALYTICAL PROCEDURES

4.1 TEST METHODS

The emission test on the General Electric, PG7121 (EA), Unit #1 at the Sumpter Generation Plant was performed following United States Environmental Protection Agency (EPA) methods described by the Code of Federal Regulations (CFR). Table 4.1 outlines the specific methods performed on June 13, 2023.

**TABLE 4.1
SUMMARY OF SAMPLING METHODS**

Pollutant or Parameter	Sampling Method	Analysis Method
Sample Point Location	EPA Method 1	Equal Area Method
Oxygen	EPA Method 3A	Paramagnetic Cell
Nitrogen Oxides	EPA Method 7E	Chemiluminescent Analyzer
Stack Flow Rate	EPA Method 19	Dry Oxygen F Factor

4.2 INSTRUMENT CONFIGURATION AND OPERATIONS FOR GAS ANALYSIS

The sampling and analysis procedures used during these tests conform with the methods outlined in the Code of Federal Regulations (CFR), Title 40, Part 60, Appendix A, Methods 1, 3A, 7E, and 19.

Figure 4.1 depicts the sample system used for the real-time gas analyzer tests. The gas sample was continuously pulled through the probe and transported, via heat-traced Teflon® tubing, to a stainless-steel minimum-contact condenser designed to dry the sample. Transportation of the sample, through Teflon® tubing, continued into the sample manifold within the mobile laboratory via a stainless steel/Teflon® diaphragm pump. From the manifold, the sample was partitioned to the real-time analyzers through rotameters that controlled the flow rate of the sample.

Figure 4.1 shows that the sample system was also equipped with a separate path through which a calibration gas could be delivered to the probe and back through the entire sampling system. This allowed for convenient performance of system bias checks as required by the testing methods.

All instruments were housed in a climate controlled, trailer-mounted mobile laboratory. Gaseous calibration standards were provided in aluminum cylinders with concentrations certified by the vendor. EPA Protocol No. 1 was used to determine the cylinder concentrations where applicable (i.e., NO_x calibration gases).

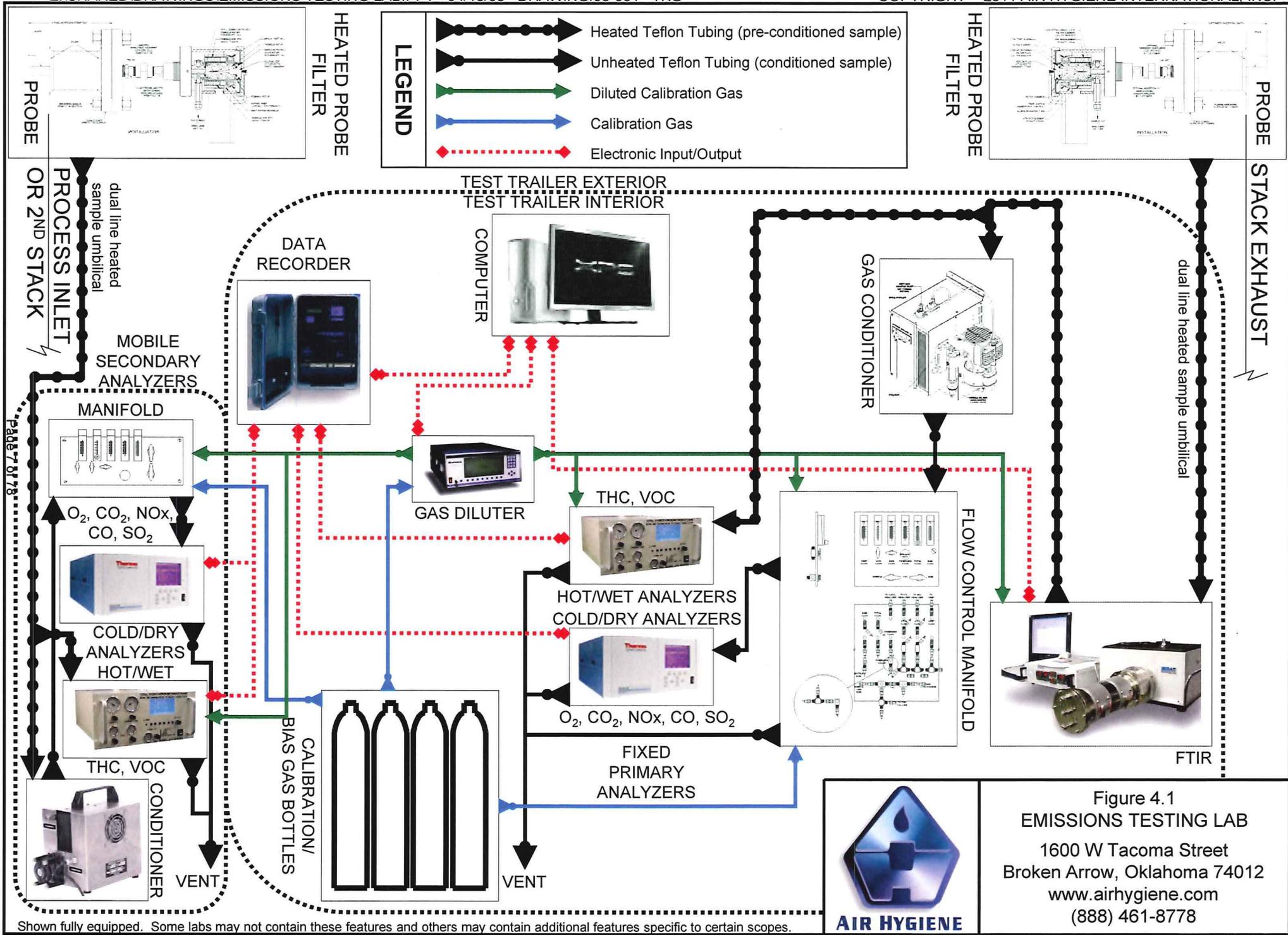
Table 4.2 provides a description of the analyzers used for the instrument portion of the tests. All data from the continuous monitoring instruments were recorded on a Logic Beach Portable Data Logging System which retrieves calibrated electronic data from each instrument every one second and reports an average of the collected data every 30 seconds.

The stack gas analysis for O₂ concentrations was performed in accordance with procedures set forth in EPA Method 3A. The O₂ analyzer uses a paramagnetic cell detector.

EPA Method 7E was used to determine concentrations of NO_x. A chemiluminescent analyzer was used to determine the nitrogen oxides concentration in the gas stream. A NO₂ in nitrogen certified gas cylinder was used to verify at least a 90 percent NO₂ conversion on the day of the test.

TABLE 4.2
ANALYTICAL INSTRUMENTATION

Parameter	Manufacturer and Model	Range	Sensitivity	Detection Principle
NO _x	THERMO 42 series	User may select up to 5,000 ppm	0.1 ppm	Thermal reduction of NO ₂ to NO. Chemiluminescence of reaction of NO with O ₃ . Detection by PMT. Inherently linear for listed ranges.
O ₂	SERVOMEX 1440	0-25%	0.1%	Paramagnetic cell, inherently linear.



Shown fully equipped. Some labs may not contain these features and others may contain additional features specific to certain scopes.



Figure 4.1
EMISSIONS TESTING LAB
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