

**Source Test Report for the 2024 Relative Accuracy
Test Audit
Boiler No. 4 (EUBLR004)
UP Paper LLC
Manistique, Michigan**

Prepared For:

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For Submission To:

**Michigan Department of Environment, Great Lakes, and Energy
525 W. Allegan Street
Lansing, MI 48933**

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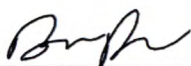
Submittal Date: November 14, 2024



Review and Certification

All work, calculations, and other activities and tasks performed and presented in this document were carried out by me or under my direction and supervision. I hereby certify that, to the best of my knowledge, Montrose operated in conformance with the requirements of the Montrose Quality Management System and ASTM D7036-04 during this test project.

Signature:



Date:

11 / 13 / 2024

Name:

Brian Romani

Title:

Logistics Manager

I have reviewed, technically and editorially, details, calculations, results, conclusions, and other appropriate written materials contained herein. I hereby certify that, to the best of my knowledge, the presented material is authentic, accurate, and conforms to the requirements of the Montrose Quality Management System and ASTM D7036-04.

Signature:



Date:

11 / 13 / 2024

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Henry M. Taylor, QSTO

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1.0 Introduction

1.1 Summary of Test Program

UP Paper LLC (UP Paper) contracted Montrose Air Quality Services, LLC (Montrose) to perform a PEMS RATA on Boiler No. 4 (EUBLR004) at their facility located in Manistique, Michigan.

The tests were conducted to satisfy the emission testing requirements of UP Paper; Permit No. MI-ROP-A6475-2019 issued by the State of Michigan Department of Environment, Great Lakes, and Energy (EGLE); and 40 CFR Part 60, Appendix B.

The specific objectives were to:

- Determine the RA for the Oxygen (O₂) and Nitrogen Oxides (NO_x) PEMS serving Boiler No. 4
- Conduct the test program with a focus on safety

Montrose performed the tests to measure the emission parameters listed in Table 1-1.

Table 1-1
Summary of Test Program

Test Date	Unit ID/ Source Name	Activity/Parameters	Test Methods	No. of Runs	Duration (Minutes)
10/29/2024	Boiler No. 4	Velocity/Volumetric Flow Rate	EPA 1	--	--
		O ₂	EPA 3A	10	21
		NO _x	EPA 7E	10	21

To simplify this report, a list of Units and Abbreviations is included in Appendix C.1. Throughout this report, chemical nomenclature, acronyms, and reporting units are not defined. Please refer to the list for specific details.

This report presents the test results and supporting data, descriptions of the testing procedures, descriptions of the facility and sampling locations, and a summary of the quality assurance procedures used by Montrose. The RA test results are summarized and compared to their respective regulatory requirements in Table 1-2. Detailed results for individual test runs can be found in Section 4.0. All supporting data can be found in the appendices.

The testing was conducted by the Montrose personnel listed in Table 1-3. The tests were conducted according to the test plan (protocol) dated June 28, 2024 that was submitted to EGLE.

Table 1-2
Summary of Part 60 RA Test Results – Boiler No. 4
October 29, 2024

Parameter/Units	Regulatory Reference	RA	Allowable
Part 60			
Oxygen (O₂)			
% volume dry	PS-16	0.10%	≤ 1.0% O ₂
Nitrogen Oxides (NO_x as NO₂)			
lb/MMBtu	PS-16	3.15%	≤ 20.0% of RM

1.2 Key Personnel

A list of project participants is included below:

Facility Information

Source Location: UP Paper LLC
402 West Elk Street
Manistique, MI 49845
Project Contact: Mark Ozoga
Role: Environmental Manager
Telephone: 260-729-8213
Email: markozoga@uppaperllc.com

Agency Information

Regulatory Agency: EGLE
525 West Allegan Street
Lansing, MI 48933
Telephone: 517-335-3122

Testing Company Information

Testing Firm: Montrose Air Quality Services, LLC
Contact: Brian Romani
Title: Logistics Manager
Telephone: 630-860-4740
Email: bromani@montrose-env.com

Test personnel and observers are summarized in Table 1-3.

Table 1-3
Test Personnel and Observers

Name	Affiliation	Role/Responsibility
Paul Repuyan	Montrose	Project Manager/Field Team Leader/Qualified Individual (QI)/Trailer operator
Trevor Bennett	Montrose	Field Support
Levi Butler	Montrose	Calculations and report preparation
Mark Ozoga	UP Paper	Client Liaison/Test Coordinator

2.0 Plant and Sampling Location Descriptions

2.1 Process Description, Operation, and Control Equipment

Boiler No. 4 (EUBLR004) has an input capacity of 186.8 MMBtu/hr while firing natural gas. The steam from the boiler is dispatched to various process equipment at the facility. Low-NO_x combustors minimize the emissions of NO_x from the boiler.

2.2 PEMS Description

The PEMS analyzers are presented in Table 2-1.

Table 2-1
PEMS Information

Analyzer Type	Manufacturer	Model No.	Serial No.
O ₂	CMC Solutions	SmartCEMS®-60	EUBLR004.9995
NO _x	CMC Solutions	SmartCEMS®-60	EUBLR004.9995

2.3 Flue Gas Sampling Location

Information regarding the sampling location is presented in Table 2-2.

Table 2-2
Sampling Location

Sampling Location	Stack Inside Diameter (in.)	Distance from Nearest Disturbance		Number of Traverse Points
		Downstream EPA "B" (in./dia.)	Upstream EPA "A" (in./dia.)	
Boiler No. 4	52	240/4.62	350/6.73	Gaseous: 3

The sample location was verified in the field to conform to EPA Method 1. See Appendix A.1 for more information.

2.4 Operating Conditions and Process Data

Emission tests were performed while the source and air pollution control devices were operating at the conditions required by the permit.

Plant personnel were responsible for establishing the test conditions and collecting all applicable unit-operating data. The PEMS data that was provided is presented in Appendix B.

3.0 Sampling and Analytical Procedures

3.1 Test Methods

The test methods for this test program have been presented in Table 1-1. Additional information regarding specific applications or modifications to standard procedures is presented below.

3.1.1 EPA Method 1, Sample and Velocity Traverses for Stationary Sources

EPA Method 1 is used to assure that representative samples or measurements of volumetric flow rate are obtained by dividing the cross-section of the stack or duct into equal areas, and then locating a traverse point within each of the equal areas. Acceptable sample locations must be located at least two stack or duct equivalent diameters downstream from a flow disturbance and one-half equivalent diameter upstream from a flow disturbance.

Pertinent information regarding the performance of the method is presented below:

- Method Options:
 - None
- Method Exceptions:
 - None

The sample port and traverse point locations are detailed in Appendix A.

3.1.2 EPA Methods 3A and 7E, Determination of Oxygen, Carbon Dioxide, and, Nitrogen Oxides Concentrations in Emissions from Stationary Sources (Instrumental Analyzer Procedure)

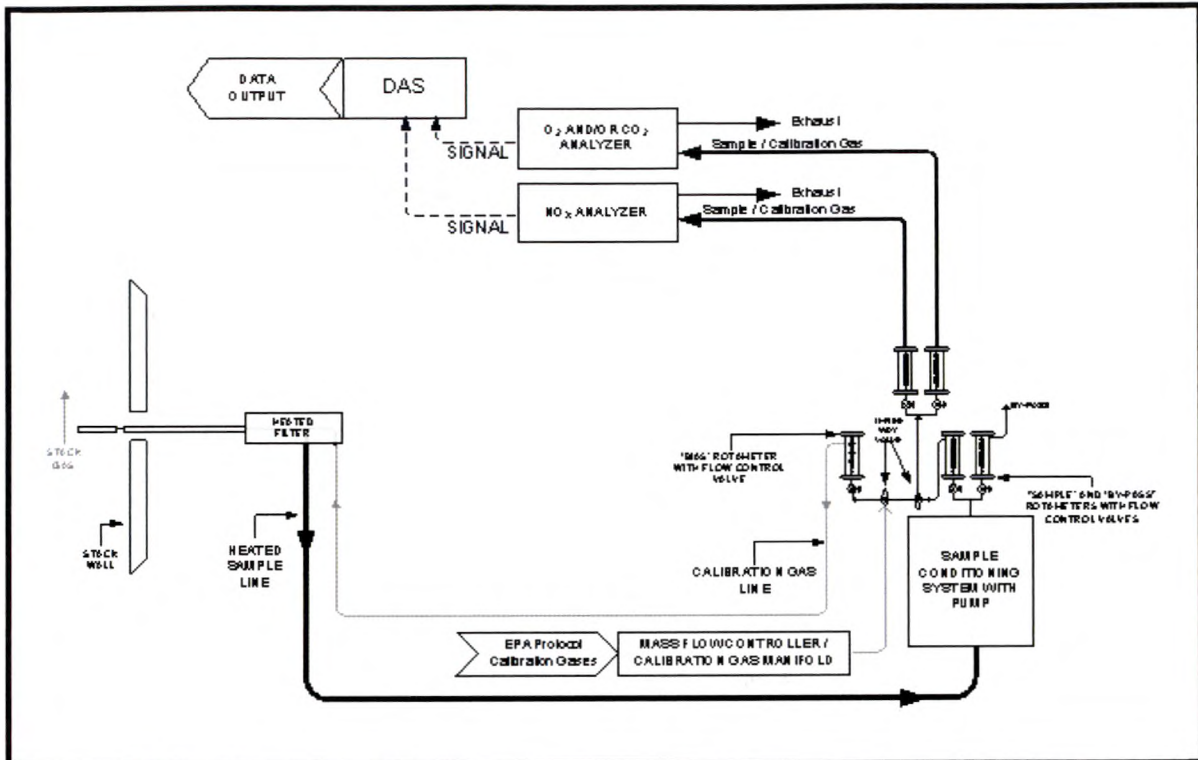
Concentrations of O₂ and NO_x are measured simultaneously using EPA Methods 3A and 7E, which are instrumental test methods. Conditioned gas is sent to a series of analyzers to measure the gaseous emission concentrations. The performance requirements of the method must be met to validate the data.

Pertinent information regarding the performance of the method is presented below:

- Method Options:
 - A dry extractive sampling system is used to report emissions on a dry basis
 - A paramagnetic analyzer is used to measure O₂
 - A chemiluminescent analyzer is used to measure NO_x
- Method Exceptions:
 - None
- Target and/or Minimum Required Sample Duration: 21 minutes
- Target Analytes: O₂ and NO_x

The typical sampling system is detailed in Figure 3-1.

Figure 3-1
EPA Methods 3A and 7E Sampling Train



3.1.3 EPA Method 19, Measurement of Sulfur Dioxide Removal Efficiency and Particulate Matter, Sulfur Dioxide, and Nitrogen Oxide Emission Rates

EPA Method 19 is a manual method used to determine (a) PM, SO₂, and NO_x emission rates; (b) sulfur removal efficiencies of fuel pretreatment and SO₂ control devices; and (c) overall reduction of potential SO₂ emissions. This method provides data reduction procedures, but does not include any sample collection or analysis procedures.

EPA Method 19 is used to calculate mass emission rates in units of lb/MMBtu. EPA Method 19, Table 19-2 contains a list of assigned fuel factors for different types of fuels, which can be used for these calculations.

Pertinent information regarding the performance of the method is presented below:

- Method Options:
 - F factor is the oxygen-based F factor, dry basis (dscf/MMBtu) (F_d)

- F factor is the published source-based F factor in EPA Method 19, Table 19-2
- Method Exceptions:
 - None

3.1.4 EPA Performance Specification 16, Specifications and Test Procedures for Predictive Emission Monitoring Systems in Stationary Sources

EPA Performance Specification 16 is a specification used to evaluate the acceptability of Predictive Emission Monitoring Systems (PEMS) to show compliance with an emission limitation under 40 CFR 60, 61, or 63. These procedures are used to certify a PEMS after initial installation and periodically thereafter to ensure the system is operating properly and meets the requirements of all applicable regulations. Ongoing QA/QC tests include sensor evaluation, bias correction, quarterly Relative Accuracy Audits (RAA), and annual Relative Accuracy Test Audits (RATA).

Pertinent information regarding the performance of the method is presented below:

- Method Options:
 - None
- Method Exceptions:
 - None
- Applicable Performance Specifications - NO_x:
 - When average RM results are > 10 ppm and ≤ 100 ppm, RA calculated with RM in the denominator must be ≤ 20%
 - When average RM results are > 0.02 lb/MMBtu and ≤ 0.2 lb/MMBtu, RA calculated with RM in the denominator must be ≤ 20%
- Applicable Performance Specifications – O₂:
 - When RA is calculated as the absolute mean difference between the RM and PEMS, the RA must be within 1.0% O₂

3.2 Process Test Methods

The test plan did not require that process samples be collected during this test program; therefore, no process sample data are presented in this test report.

4.0 Test Discussion and Results

4.1 Field Test Deviations and Exceptions

No field deviations or exceptions from the test plan or test methods occurred during this test program.

4.2 Presentation of Results

The RA results are compared to the regulatory requirements in Table 1-2. The results of individual test runs performed are presented in Tables 4-1 and 4-2. Emissions are reported in units consistent with those in the applicable regulations or requirements. Additional information is included in the appendices as presented in the Table of Contents.

Table 4-1
O₂ (% volume dry) RATA Results -
Boiler No. 4

Run No.	Date	Time	RM	PEMS	Difference	Run used (Y or N)
1	10/29/2024	10:06-10:26	3.61	3.48	0.13	Y
2	10/29/2024	10:27-10:47	3.60	3.55	0.04	N
3	10/29/2024	10:48-11:08	3.60	3.51	0.09	Y
4	10/29/2024	11:21-11:41	3.60	3.53	0.07	Y
5	10/29/2024	11:42-12:02	3.54	3.50	0.04	Y
6	10/29/2024	12:03-12:23	3.57	3.52	0.04	Y
7	10/29/2024	12:35-12:55	3.60	3.49	0.11	Y
8	10/29/2024	12:56-13:16	3.58	3.49	0.09	Y
9	10/29/2024	13:17-13:37	3.65	3.52	0.13	Y
10	10/29/2024	13:49-14:09	3.65	3.45	0.19	Y
Averages			3.60	3.50	0.10	--
Standard Deviation			0.049			
Confidence Coefficient (CC)			0.037			
RA based on absolute difference			0.10	% vd		

Table 4-2
NO_x (lb/MMBtu) RATA Results -
Boiler No. 4

Run No.	Date	Time	RM	PEMS	Difference	Run used (Y or N)
1	10/29/2024	10:06-10:26	0.098	0.096	0.002	Y
2	10/29/2024	10:27-10:47	0.098	0.092	0.006	N
3	10/29/2024	10:48-11:08	0.098	0.095	0.003	Y
4	10/29/2024	11:21-11:41	0.097	0.093	0.004	Y
5	10/29/2024	11:42-12:02	0.096	0.095	0.001	Y
6	10/29/2024	12:03-12:23	0.097	0.094	0.003	Y
7	10/29/2024	12:35-12:55	0.096	0.095	0.001	Y
8	10/29/2024	12:56-13:16	0.095	0.096	-0.001	Y
9	10/29/2024	13:17-13:37	0.095	0.093	0.002	Y
10	10/29/2024	13:49-14:09	0.093	0.098	-0.005	Y
Averages			0.096	0.095	0.001	--
Standard Deviation			0.003			
Confidence Coefficient (CC)			0.002			
RA based on mean RM value			3.15	%		

5.0 Internal QA/QC Activities

5.1 QA/QC Audits

EPA Method 3A and 7E calibration audits were all within the measurement system performance specifications for the calibration drift checks, system calibration bias checks, and calibration error checks.

5.2 QA/QC Discussion

All QA/QC criteria were met during this test program.

5.3 Quality Statement

Montrose is qualified to conduct this test program and has established a quality management system that led to accreditation with ASTM Standard D7036-04 (Standard Practice for Competence of Air Emission Testing Bodies). Montrose participates in annual functional assessments for conformance with D7036-04 which are conducted by the American Association for Laboratory Accreditation (A2LA). All testing performed by Montrose is supervised on site by at least one Qualified Individual (QI) as defined in D7036-04 Section 8.3.2. Data quality objectives for estimating measurement uncertainty within the documented limits in the test methods are met by using approved test protocols for each project as defined in D7036-04 Sections 7.2.1 and 12.10. Additional quality assurance information is included in the report appendices. The content of this report is modeled after the EPA Emission Measurement Center Guideline Document (GD-043).