

→Kazoo D.O  
extra copy



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Burr Ridge, Illinois 60527  
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TRCcompanies.com

May 29, 2019

Ms. Karen Kajiya-Mills  
Supervisor, TPU  
MDEQ-Air Quality Division  
Constitution Hall-3<sup>rd</sup> Floor North T  
525 West Allegan Street  
Lansing, Michigan 48933



Dear Ms. Kajiya-Mills:

On behalf of USG-Otsego Paper, enclosed please find two (2) copies of the Test Report for the Continuous Emissions Monitoring System (CEMS) Relative Accuracy Test Audit (RATA) Determination performed by TRC Environmental Corporation (TRC) at the USG-Otsego Paper, Inc. facility located in Otsego, Michigan. The CEMS are associated with EUTURBINE1 (North) and EUTURBINE2 (South).

The tests were performed on April 23 and 24, 2019 to demonstrate compliance with the Michigan Department of Environmental Quality (MDEQ) Permit MI-ROP-A0023-2013, SRN A0023.

If you have any questions regarding this report, please let us know. We appreciate the opportunity to provide you with our services.

Sincerely,

TRC Environmental Corporation

A handwritten signature in black ink that reads "Gavin Lewis".

Gavin Lewis  
Project Manager

Enclosure: Certification Form signed by Otsego Paper and 326438A RATA Report  
CC: Mr. Franklin Knowles, USG-Otsego Paper – Two (2) Copies.





Michigan Department Of Environmental Quality - Air Quality Division

**RENEWABLE OPERATING PERMIT APPLICATION  
C-001: CERTIFICATION**



*This information is required by Article II, Chapter 1, part 55 (Air Pollution Control) of P.A. 451 of 1994, as amended, and the Federal Clean Air Act of 1990. Failure to provide this information may result in civil and/or criminal penalties. Please type or print clearly.*

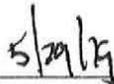
**This form is completed and included as part of Renewable Operating Permit (ROP) initial and renewal applications, notifications of change, amendments, modifications, and additional information.**

Form Type <b>C-001</b>	SRN <b>A0023</b>
------------------------	------------------

Stationary Source Name <b>USG-Otsego Paper, Inc.</b>	
City <b>Otsego</b>	County <b>Allegan</b>

<b>SUBMITTAL CERTIFICATION INFORMATION</b>	
1. Type of Submittal <i>Check only one box.</i>	
<input type="checkbox"/> Initial Application (Rule 210)	<input type="checkbox"/> Notification / Administrative Amendment / Modification (Rules 215/216)
<input type="checkbox"/> Renewal (Rule 210)	<input checked="" type="checkbox"/> Other, describe on AI-001
2. If this ROP has more than one Section, list the Section(s) that this Certification applies to _____	
3. Submittal Media <input type="checkbox"/> E-mail <input type="checkbox"/> FTP <input type="checkbox"/> Disk <input checked="" type="checkbox"/> Paper	
4. Operator's Additional Information ID - Create an Additional Information (AI) ID that is used to provide supplemental information on AI-001 regarding a submittal.	
AI <b>Test Report for RATA</b>	

<b>CONTACT INFORMATION</b>	
Contact Name <b>Frank Knowles</b>	Title <b>Environmental Compliance Supervisor</b>
Phone number <b>269-271-2018</b>	E-mail address <b>fknowles@usg.com</b>

<b>This form must be signed and dated by a Responsible Official.</b>				
Responsible Official Name <b>Henry Krell</b>			Title <b>Plant Manager</b>	
Mailing address <b>320 N. Farmer Street</b>				
City <b>Otsego</b>	State <b>MI</b>	ZIP Code <b>49078</b>	County <b>Allegan</b>	Country <b>USA</b>
<b>As a Responsible Official, I certify that, based on information and belief formed after reasonable inquiry, the statements and information in this submittal are true, accurate and complete.</b>				
 Signature of Responsible Official			 Date	



MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY  
AIR QUALITY DIVISION

**RENEWABLE OPERATING PERMIT  
REPORT CERTIFICATION**

*Authorized by 1994 P.A. 451, as amended. Failure to provide this information may result in civil and/or criminal penalties.*

Reports submitted pursuant to R 336.1213 (Rule 213), subrules (3)(c) and/or (4)(c), of Michigan's Renewable Operating Permit (ROP) program must be certified by a responsible official. Additional information regarding the reports and documentation listed below must be kept on file for at least 5 years, as specified in Rule 213(3)(b)(ii), and be made available to the Department of Environmental Quality, Air Quality Division upon request.

Source Name USG-Otsego Paper, Inc. County Allegan

Source Address 320 N. Farmer Street City Otsego

AQD Source ID (SRN) A0023 ROP No. MI-ROP-A0023-2013 ROP Section No. 1

Please check the appropriate box(es):

**Annual Compliance Certification (Pursuant to Rule 213(4)(c))**

Reporting period (provide inclusive dates): From \_\_\_\_\_ To \_\_\_\_\_

1. During the entire reporting period, this source was in compliance with **ALL** terms and conditions contained in the ROP, each term and condition of which is identified and included by this reference. The method(s) used to determine compliance is/are the method(s) specified in the ROP.

2. During the entire reporting period this source was in compliance with all terms and conditions contained in the ROP, each term and condition of which is identified and included by this reference, **EXCEPT** for the deviations identified on the enclosed deviation report(s). The method used to determine compliance for each term and condition is the method specified in the ROP, unless otherwise indicated and described on the enclosed deviation report(s).

**Semi-Annual (or More Frequent) Report Certification (Pursuant to Rule 213(3)(c))**

Reporting period (provide inclusive dates): From \_\_\_\_\_ To \_\_\_\_\_

1. During the entire reporting period, **ALL** monitoring and associated recordkeeping requirements in the ROP were met and no deviations from these requirements or any other terms or conditions occurred.

2. During the entire reporting period, all monitoring and associated recordkeeping requirements in the ROP were met and no deviations from these requirements or any other terms or conditions occurred, **EXCEPT** for the deviations identified on the enclosed deviation report(s).

**Other Report Certification**

Reporting period (provide inclusive dates): From \_\_\_\_\_ To \_\_\_\_\_

Additional monitoring reports or other applicable documents required by the ROP are attached as described:

Test Report for RATA performed at EUTRUBINE1 and TURBINE2

\_\_\_\_\_

\_\_\_\_\_

I certify that, based on information and belief formed after reasonable inquiry, the statements and information in this report and the supporting enclosures are true, accurate and complete

<u>Henry Krell</u>	<u>Plant Manager</u>	<u>269-692-6141</u>
Name of Responsible Official (print or type)	Title	Phone Number
		<u>3/24/19</u>
Signature of Responsible Official		Date

\* Photocopy this form as needed.



Michigan Department Of Environmental Quality - Air Quality Division

**RENEWABLE OPERATING PERMIT APPLICATION  
AI-001: ADDITIONAL INFORMATION**

This information is required by Article II, Chapter 1, part 55 (Air Pollution Control) of P.A. 451 of 1994, as amended, and the Federal Clean Air Act of 1990. Failure to obtain a permit required by Part 55 may result in penalties and/or imprisonment. Please type or print clearly. Refer to instructions for additional information to complete this form.

Form Type <b>AI-001</b>	SRN A0023
-------------------------	-----------

1. Operator's Additional Information ID <b>AI RATA Report</b>
--

<b>Additional Information</b>
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2. Is This Information Confidential?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
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3. Narrative TRC Environmental Corporation (TRC) prepared the attached RATA report as required by MDEQ MI-ROP-A0023-2013 at the request of USG-Otsego Paper, Inc. TRC performed the NOx and O2 RATA of the CEMS associated with EUTURBINE1 and EUTURBINE2.
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**CONTINUOUS EMISSIONS MONITORING SYSTEM  
RELATIVE ACCURACY TEST AUDIT DETERMINATION**

*Performed At*

**USG-Otsego Paper, Inc.  
USG-Otsego Facility  
EUTURBINE1 (North – Unit 24)  
EUTURBINE2 (South – Unit 25)  
Otsego, Michigan**

*Test Dates*

**April 23 and 24, 2019**

*Report No.*

**TRC Environmental Corporation Report 326438A**

*Report Submittal Date*

**May 29, 2019**

TRC Environmental Corporation  
7521 Brush Hill Road  
Burr Ridge, Illinois 60527  
USA

T (312) 533-2042  
F (312) 533-2070



## Report Certification

I certify that to the best of my knowledge:

- Testing data and all corresponding information have been checked for accuracy and completeness.
- Sampling and analysis have been conducted in accordance with the approved protocol and applicable reference methods (as applicable).
- All deviations, method modifications, or sampling and analytical anomalies are summarized in the appropriate report narrative(s).

A handwritten signature in black ink, appearing to read 'Gavin Lewis'.

---

Gavin Lewis  
Project Manager

May 29, 2019

Date

TRC was operating in conformance with the requirements of ASTM D7036-04 during this test program.

A handwritten signature in black ink, appearing to read 'Bruce Randall'.

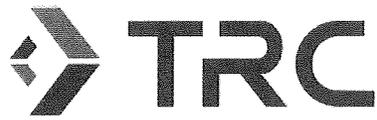
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Bruce Randall  
TRC Emission Testing Technical Director



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## CONTINUOUS EMISSIONS MONITORING SYSTEM RELATIVE ACCURACY TEST AUDIT DETERMINATION

### 1.0 INTRODUCTION

TRC Environmental Corporation (TRC) performed an oxides of nitrogen (NO<sub>x</sub>) and oxygen (O<sub>2</sub>) relative accuracy test audit (RATA) determination of the continuous emission monitoring system (CEMS) associated with the natural gas fired combustion turbines EUTURBINE1 (North-Unit 24) and EUTURBINE2 (South-Unit 25) on April 23 and 24, 2019 at the USG-Otsego Paper, Inc. facility located in Otsego, Michigan. The tests were authorized by and performed for USG-Otsego Paper, Inc.

This test program was performed to demonstrate compliance with Michigan Department of Environmental Quality (MDEQ) Renewable Operating Permit (ROP) No. MI-ROP-A0023-2013 and the CAIR Ozone Nitrogen Oxide Budget Permit No. MI-NOO-55799-2013 in Appendix 9 of the ROP. The test program was conducted according to the TRC Test Protocol 326438 dated March 13, 2019.

#### 1.1 Project Contact Information

Participants		
Test Facility	USG-Otsego Paper, Inc. USG-Otsego Facility 320 N. Farmer Street Otsego, Michigan 49078	Franklin Knowles Environmental Compliance Supervisor 269-384-6351 (phone) <a href="mailto:fkowles@usg.com">fkowles@usg.com</a>
Air Emissions Testing Body (AETB)	TRC Environmental Corporation 7521 Brush Hill Road Burr Ridge, Illinois 60527	Gavin Lewis Project Manager 312-533-2025 (phone) <a href="mailto:glewis@trccompanies.com">glewis@trccompanies.com</a>
State Representative	MDEQ – Air Quality Division 120 West Chapin Street Cadillac, Michigan 49601-2158	Jeremy Howe Environmental Quality Analyst Air Quality Division/Cadillac Distric Office 231-878-6687 (phone) <a href="mailto:howej1@michigan.gov">howej1@michigan.gov</a>

The tests were coordinated through Franklin Knowles, Environmental Compliance Supervisor, of Otsego Paper and conducted by Sam Wainneck and Gavin Lewis of TRC. Jeremy Howe of Michigan Department of Environmental Quality (MDEQ) observed the testing. Documentation of the on-site ASTM D7036-04 Qualified Individual(s) (QI) can be found in the appendix to this report.



## 2.0 FACILITY DESCRIPTION

Otsego Paper, Inc is a subsidiary of the United States Gypsum Company. The facility manufactures gypsum paper.

The Otsego Paper facility produces electricity from two (2) Mars T-15000 gas turbines, designated as EUTURBINE1 and EUTURBINE2, with a maximum heat input rate of 141.5 million British thermal unit per hour (MMBtu/hr) at low temperature operating conditions as measured on a higher heating value (HHV) basis. Energy is generated at the combustion turbine by drawing in ambient air by means of burning fuel and expanding the hot combustion gases in the turbine. The hot exhaust gases of each turbine are directed to a multi-pressure ABCO heat recovery steam generator (HRSG). There are also natural gas-fired duct burners associated with each HRSG and coupled to a turbine, designated as EUDUCTBURNER1 and EUDUCTBURNER2, respectively.

The facility has one paper machine, No. 1 Paper Machine (EUPAPERMACHINE1), used to produce paper from 100 percent recycle stock and corrugated material. The paper machine has three fourdriniers and is capable of producing a triple ply sheet.

Plant capacity for base load operations is 11 megawatts (MW) for each turbine and 160,000 pounds per hour (lb/hr) of steam for each HRSG.

EUTURBINE1 and EUTURBINE2 each have a maximum heat input rate of 141.5 MMBtu/hr at low temperature operating conditions.



### 3.0 SUMMARY OF RESULTS

#### 3.1 CEMS RATA Test Matrix

Parameter	Reference Methods (RM)	No. of Test Runs	Test Run Length (min)
NO <sub>x</sub>	7E, 3A	10	21
O <sub>2</sub>	3A	10	21

#### 3.2 CEMS RATA Results

EUTURBINE1 (Unit 24)						
Load (MW)	Parameter	Units	Performance Specifications (40CFR75)		CEMS Performance	
			Semi-Annual	Annual	Relative Accuracy	Bias Adjustment Factor
~37.1	NO <sub>x</sub>	lb/MMBtu	7.5% < RA ≤ 10.0%	RA ≤ 7.5%	5.72 %	1.000
Load (MW)	Parameter	Units	Performance Specifications (40CFR60)		CEMS Performance	
			Specification No.	Acceptance Criteria	Relative Accuracy	
~37.1	NO <sub>x</sub>	ppmvd	2	RA ≤ 20%	1.76 %	
	NO <sub>x</sub>	ppmvd @ 15% O <sub>2</sub>	2	RA ≤ 20%	5.83 %	
	O <sub>2</sub>	%	3	RA ≤ 1.0% difference for %O <sub>2</sub>	0.39 %	

EUTURBINE2 (Unit 25)						
Load (MW)	Parameter	Units	Performance Specifications (40CFR75)		CEMS Performance	
			Semi-Annual	Annual	Relative Accuracy	Bias Adjustment Factor
~35.6	NO <sub>x</sub>	lb/MMBtu	7.5% < RA ≤ 10.0%	RA ≤ 7.5%	7.31 %	1.000
Load (MW)	Parameter	Units	Performance Specifications (40CFR60)		CEMS Performance	
			Specification No.	Acceptance Criteria	Relative Accuracy	
~35.6	NO <sub>x</sub>	ppmvd	2	RA ≤ 20%	0.80 %	
	NO <sub>x</sub>	ppmvd @ 15% O <sub>2</sub>	2	RA ≤ 20%	7.00 %	
	O <sub>2</sub>	%	3	RA ≤ 1.0% difference for %O <sub>2</sub>	0.29 %	



Based on the above summary of results, the facility CEMS passed the RATA. The complete test results from this program are tabulated in Section 7.0

#### **4.0 DISCUSSION OF RESULTS**

The data acquisition and handling system (DAHS) computer printout for the same time periods as TRC's reference method (RM) testing was used to determine the relative accuracy (RA) of the CEMS. The watches of the test crew were synchronized with the facility's CEM system prior to the commencement of and during each test run. A total of ten (10) RATA runs, each 21-minutes in duration, were performed at each turbine unit location while operating greater than 50% of maximum load. The CEMS RATA data, comprised of twenty-one (21) minutes of data points for each test run, was provided to TRC by the facility.

Source operation appeared normal during the entire test program. Each turbine was operated near base load during the RATA.

Data collected from the O<sub>2</sub> and NO<sub>x</sub> analyzers were averaged for each test run. A standard fuel factor of 8,710 dscf/MMBtu was used to calculate the NO<sub>x</sub> emission rates on a pound per million Btu basis (lb/MMBtu) following the guidelines of USEPA Method 19.

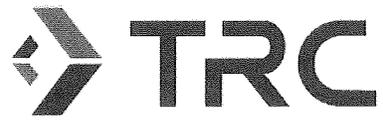
#### **5.0 TEST PROCEDURES**

All testing, sampling, analytical, and calibration procedures used for this test program were performed in accordance with the methods presented in the following sections. Where applicable, the Quality Assurance Handbook for Air Pollution Measurement Systems, Volume III, Stationary Source Specific Methods, USEPA 600/R-94/038c, September 1994 was used to supplement procedures.

##### **5.1 Determination of the Concentration of Gaseous Pollutants**

Concentrations of the pollutants in the following sub-sections were determined using one sampling system. The number of points at which sample was collected was determined in accordance with 40CFR75 Appendix A, Section 6.5.6. Sampling was performed at three points (16.7%, 50%, and 83.3%) across one diameter of each turbine exhaust stack.

A straight-extractive sampling system was used. A data logger continuously recorded pollutant concentrations and generated one-minute averages of those concentrations. All calibrations and system checks were conducted using USEPA Protocol gases. Three-point linearity checks were performed prior to sampling, and in the event of a failing system bias or drift test (and subsequent corrective action). System bias and drift checks were performed using the low-level gas and either the mid- or high-level gas prior to and following each test run.



The Low Concentration Analyzers (those that routinely operate with a calibration span of less than 20 ppm) used by TRC are ambient-level analyzers. Per Section 3.12 of Method 7E, a Manufacturer's Stability Test is not required for ambient-level analyzers. Analyzer interference tests were conducted in accordance with the regulations in effect at the time that TRC placed an analyzer model in service.

#### **5.1.1 O<sub>2</sub> Determination by USEPA Method 3A**

This method is applicable for the determination of O<sub>2</sub> concentrations in controlled and uncontrolled emissions from stationary sources only when specified within the regulations. The O<sub>2</sub> analyzer was equipped with a paramagnetic-based detector.

#### **5.1.2 NO<sub>x</sub> Determination by USEPA Method 7E**

This method is applicable for the determination of NO<sub>x</sub> concentrations in controlled and uncontrolled emissions from stationary sources only when specified within the regulations. The NO<sub>x</sub> analyzer used a photomultiplier tube to measure the light emitted from the chemiluminescent decomposition of NO<sub>2</sub>. A NO<sub>x</sub> converter efficiency test was performed on site. The results show the NO<sub>x</sub> analyzer passed. Results are appended.

#### **5.1.3 Determination of F-Factors by USEPA Method 19**

This method is applicable for the determination of the pollutant emission rate using oxygen (O<sub>2</sub>) concentrations and the appropriate F factor (the ratio of combustion gas volumes to heat inputs) and the pollutant concentration. The appropriate F-Factor was selected from Table 19-2 of Method 19.

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## 6.0 QUALITY ASSURANCE PROCEDURES

TRC integrates our Quality Management System (QMS) into every aspect of our testing service. We follow the procedures specified in current published versions of the test Method(s) referenced in this report. Any modifications or deviations are specifically identified in the body of the report. We routinely participate in independent, third party audits of our activities, and maintain:

- Accreditation from the Louisiana Environmental Laboratory Accreditation Program (LELAP);
- Accreditation from the Stack Testing Accreditation Council (STAC) and the American Association for Laboratory Accreditation (A2LA) that our operations conform with the requirements of ASTM D 7036 as an Air Emission Testing Body (AETB).

These accreditations demonstrate that our systems for training, equipment maintenance and calibration, document control and project management will fully ensure that project objectives are achieved in a timely and efficient manner with a strict commitment to quality.

All calibrations are performed in accordance with the test Method(s) identified in this report. If a Method allows for more than one calibration approach, or if approved alternatives are available, the calibration documentation in the appendices specifies which approach was used. All measurement devices are calibrated or verified at set intervals against standards traceable to the National Institute of Standards and Technology (NIST). NIST traceability information is available upon request.

ASTM D7036-04 specifies that: *“AETBs shall have and shall apply procedures for estimating the uncertainty of measurement. Conformance with this section may be demonstrated by the use of approved test protocols for all tests. When such protocols are used, reference shall be made to published literature, when available, where estimates of uncertainty for test methods may be found.”* TRC conforms with this section by using approved test protocols for all tests.



## 7.0 TEST RESULTS SUMMARIES



**RATA Type:** Nitrogen Oxides (NO<sub>x</sub>), lb/MMBtu  
**Regulation:** 40CFR75  
**RM Used:** 3A, 7E

Customer:	USG-Otsego Paper	Project #:	326428
Unit ID:	EUTURBINE-1 (North)	CEM Model:	Horiba/CMA-EC622
Sample Loc:	Stack	CEM Serial #:	41678240071

Use? 1 = Y 0 = N	Test Run	Date	Start Time	End Time	RM NO <sub>x</sub> lb/MMBtu	CEM NO <sub>x</sub> lb/MMBtu	(RM-CEM) Difference (di)	Unit Load (MW)
1	1	4/23/19	8:10	8:30	0.090	0.095	-0.005	37.256
0	2	4/23/19	8:45	9:05	0.091	0.097	-0.006	37.347
1	3	4/23/19	9:20	9:40	0.091	0.096	-0.005	37.386
1	4	4/23/19	9:54	10:14	0.091	0.096	-0.005	37.294
1	5	4/23/19	10:27	10:47	0.090	0.095	-0.005	37.177
1	6	4/23/19	11:00	11:20	0.090	0.095	-0.005	37.094
1	7	4/23/19	11:34	11:54	0.090	0.095	-0.005	37.160
1	8	4/23/19	12:08	12:28	0.089	0.094	-0.005	36.882
1	9	4/23/19	12:41	13:01	0.090	0.094	-0.004	36.916
1	10	4/23/19	13:15	13:35	0.089	0.094	-0.005	36.886

n	9	
t(0.025)	2.306	
Mean RM Value	0.090	RM avg
Mean CEM Value	0.095	CEM avg
Mean Difference	-0.0049	d avg
Standard Deviation	0.000	sd
Confidence Coefficient	0.000	CC
RA based on RM	5.72	%
Bias Adjustment Factor	1.000	BAF



RATA Type: Nitrogen Oxides (NO<sub>x</sub>), ppm  
 Regulation: 40CFR60  
 RM Used: 7E

Customer:		USG-Otsego Paper			Project #:		326428	
Unit ID:		EUTURBINE-1 (North)			CEM Model:		Horiba/CMA-EC622	
Sample Loc:		Stack			CEM Serial #:		41678240071	
Use? 1 = Y 0 = N	Test Run	Date	Start Time	End Time	RM NO <sub>x</sub> ppmvd	CEM NO <sub>x</sub> ppmvd	(RM-CEM) Difference (di)	Unit Load (MW)
1	1	4/23/19	8:10	8:30	22.8	22.5	0.300	37.256
1	2	4/23/19	8:45	9:05	23.0	22.9	0.100	37.347
1	3	4/23/19	9:20	9:40	23.1	22.8	0.300	37.386
1	4	4/23/19	9:54	10:14	22.9	22.7	0.200	37.294
1	5	4/23/19	10:27	10:47	22.7	22.4	0.300	37.177
1	6	4/23/19	11:00	11:20	22.7	22.2	0.500	37.094
0	7	4/23/19	11:34	11:54	22.8	22.3	0.500	37.160
1	8	4/23/19	12:08	12:28	22.5	22.1	0.400	36.882
1	9	4/23/19	12:41	13:01	22.5	22.2	0.300	36.916
1	10	4/23/19	13:15	13:35	22.5	22.1	0.400	36.886

n	9
t(0.975)	2.306
Mean RM Value	22.744 RM
Mean CEM Value	22.433 CEM avg
Mean Difference	0.311 d avg
Standard Deviation	0.117 sd
Confidence Coefficient	0.090 CC
RA based on RM	1.76 %



**RATA Type:** Nitrogen Oxides (NO<sub>x</sub>), ppmvd at 15% Oxygen  
**Regulation:** 40CFR60  
**RM Used:** 7E

Customer:		USG-Otsego Paper			Project #:		326428		
Unit ID:		EUTURBINE-1 (North)			CEM Model:		Horiba/CMA-EC622		
Sample Loc:		Stack			CEM Serial #:		41678240071		
Use? 1 = Y 0 = N	Test Run	Date	Start Time	End Time	RM NO <sub>x</sub> ppmvd at 15% Oxygen	CEM NO <sub>x</sub> ppmvd at 15% Oxygen	(RM-CEM) Difference (di)	Unit Load (MW)	
1	1	4/23/19	8:10	8:30	24.4	25.9	-1.500	37.256	
0	2	4/23/19	8:45	9:05	24.6	26.3	-1.700	37.347	
1	3	4/23/19	9:20	9:40	24.8	26.2	-1.400	37.386	
1	4	4/23/19	9:54	10:14	24.6	26.1	-1.500	37.294	
1	5	4/23/19	10:27	10:47	24.5	25.9	-1.400	37.177	
1	6	4/23/19	11:00	11:20	24.4	25.7	-1.300	37.094	
1	7	4/23/19	11:34	11:54	24.5	25.7	-1.200	37.160	
1	8	4/23/19	12:08	12:28	24.3	25.6	-1.300	36.882	
1	9	4/23/19	12:41	13:01	24.4	25.6	-1.200	36.916	
1	10	4/23/19	13:15	13:35	24.3	25.5	-1.200	36.886	

n	9	
t(0.975)	2.306	
Mean RM Value	24.467	RM avg
Mean CEM Value	25.800	CEM avg
Mean Difference	-1.333	d avg
Sum of Differences <sup>2</sup>	16.120	di <sup>2</sup>
Standard Deviation	0.122	sd
Confidence Coefficient	0.094	CC
RA based on RM	5.83	%



RATA Type: Oxygen (O<sub>2</sub>), % by volume  
 Regulation: 40CFR60  
 RM Used: 3A

Customer:	USG-Otsego Paper	Project #:	326428
Unit ID:	EUTURBINE-1 (North)	CEM Model:	Horiba/CMA-EC622
Sample Loc:	Stack	CEM Serial #:	41678240071

Use? 1 = Y 0 = N	Test Run	Date	Start Time	End Time	RM O <sub>2</sub> % v/v dry	CEM O <sub>2</sub> % v/v dry	(RM-CEM) Difference (di)	Unit Load (MW)
1	1	4/23/19	8:10	8:30	15.4	15.8	-0.400	37.256
1	2	4/23/19	8:45	9:05	15.4	15.7	-0.300	37.347
1	3	4/23/19	9:20	9:40	15.4	15.8	-0.400	37.386
1	4	4/23/19	9:54	10:14	15.4	15.8	-0.400	37.294
1	5	4/23/19	10:27	10:47	15.4	15.8	-0.400	37.177
1	6	4/23/19	11:00	11:20	15.4	15.8	-0.400	37.094
1	7	4/23/19	11:34	11:54	15.4	15.8	-0.400	37.160
0	8	4/23/19	12:08	12:28	15.4	15.8	-0.400	36.882
1	9	4/23/19	12:41	13:01	15.4	15.8	-0.400	36.916
1	10	4/23/19	13:15	13:35	15.4	15.8	-0.400	36.886

n	9	
t(0.975)	2.306	
Mean RM Value	15.400	RM avg
Mean CEM Value	15.789	CEM avg
Mean Difference	-0.389	d avg
Standard Deviation	0.033	sd
Confidence Coefficient	0.026	CC
RA (Absolute Mean Difference)	0.39	% vol diff.



**RATA Type:** Nitrogen Oxides (NO<sub>x</sub>), lb/MMBtu  
**Regulation:** 40CFR75  
**RM Used:** 3A, 7E

Customer:		USG-Otsego Paper			Project #:		326428	
Unit ID:		EUTURBINE-2 (South)			CEM Model:		Horiba/CMA-EC622	
Sample Loc:		Stack			CEM Serial #:		41678240073	
Use? 1 = Y 0 = N	Test Run	Date	Start Time	End Time	RM NO <sub>x</sub> lb/MMBtu	CEM NO <sub>x</sub> lb/MMBtu	(RM-CEM) Difference (di)	Unit Load (MW)
1	1	4/24/19	7:00	7:20	0.038	0.041	-0.003	36.721
1	2	4/24/19	8:00	8:20	0.041	0.044	-0.003	36.257
1	3	4/24/19	8:33	8:53	0.041	0.044	-0.003	36.114
0	4	4/24/19	9:07	9:27	0.042	0.044	-0.002	35.959
1	5	4/24/19	9:40	10:00	0.043	0.045	-0.002	35.776
1	6	4/24/19	10:13	10:33	0.043	0.046	-0.003	35.665
1	7	4/24/19	10:47	11:07	0.044	0.047	-0.003	35.478
1	8	4/24/19	11:21	11:41	0.045	0.048	-0.003	35.294
1	9	4/24/19	11:58	12:18	0.046	0.049	-0.003	34.898
1	10	4/24/19	12:31	12:51	0.046	0.049	-0.003	34.677

n	9	
t(0.025)	2.306	
Mean RM Value	0.043	RM avg
Mean CEM Value	0.046	CEM avg
Mean Difference	-0.0029	d avg
Standard Deviation	0.000	sd
Confidence Coefficient	0.000	CC
RA based on RM	7.31	%
Bias Adjustment Factor	1.000	BAF



RATA Type: Nitrogen Oxides (NO<sub>x</sub>), ppm  
 Regulation: 40CFR60  
 RM Used: 7E

Customer:		USG-Otsego Paper			Project #:		326428	
Unit ID:		EUTURBINE-2 (South)			CEM Model:		Horiba/CMA-EC622	
Sample Loc:		Stack			CEM Serial #:		41678240073	
Use? 1 = Y 0 = N	Test Run	Date	Start Time	End Time	RM NO <sub>x</sub> ppmvd	CEM NO <sub>x</sub> ppmvd	(RM-CEM) Difference (di)	Unit Load (MW)
0	1	4/24/19	7:00	7:20	9.4	9.8	-0.400	36.721
1	2	4/24/19	8:00	8:20	10.0	10.0	0.000	36.257
1	3	4/24/19	8:33	8:53	10.0	10.0	0.000	36.114
1	4	4/24/19	9:07	9:27	10.2	10.2	0.000	35.959
1	5	4/24/19	9:40	10:00	10.4	10.4	0.000	35.776
1	6	4/24/19	10:13	10:33	10.6	10.5	0.100	35.665
1	7	4/24/19	10:47	11:07	10.8	10.7	0.100	35.478
1	8	4/24/19	11:21	11:41	11.0	10.9	0.100	35.294
1	9	4/24/19	11:58	12:18	11.2	11.2	0.000	34.898
1	10	4/24/19	12:31	12:51	11.2	11.1	0.100	34.677

n	9	
t(0.975)	2.306	
Mean RM Value	10.600	RM
Mean CEM Value	10.556	CEM avg
Mean Difference	0.044	d avg
Standard Deviation	0.053	sd
Confidence Coefficient	0.041	CC
RA based on RM	0.80	%



RATA Type: Nitrogen Oxides (NO<sub>x</sub>), ppmvd at 15% Oxygen  
 Regulation: 40CFR60  
 RM Used: 7E

Customer:	USG-Otsego Paper				Project #:	326428			
Unit ID:	EUTURBINE-2 (South)				CEM Model:	Horiba/CMA-EC622			
Sample Loc:	Stack				CEM Serial #:	41678240073			
Use? 1 = Y 0 = N	Test Run	Date	Start Time	End Time	RM NO <sub>x</sub> ppmvd at 15% Oxygen	CEM NO <sub>x</sub> ppmvd at 15% Oxygen	(RM-CEM) Difference (di)	Unit Load (MW)	
0	1	4/24/19	7:00	7:20	10.4	11.3	-0.900	36.721	
1	2	4/24/19	8:00	8:20	11.0	11.8	-0.800	36.257	
1	3	4/24/19	8:33	8:53	11.1	11.9	-0.800	36.114	
1	4	4/24/19	9:07	9:27	11.3	11.9	-0.600	35.959	
1	5	4/24/19	9:40	10:00	11.5	12.3	-0.800	35.776	
1	6	4/24/19	10:13	10:33	11.8	12.5	-0.700	35.665	
1	7	4/24/19	10:47	11:07	12.0	12.8	-0.800	35.478	
1	8	4/24/19	11:21	11:41	12.1	12.9	-0.800	35.294	
1	9	4/24/19	11:58	12:18	12.4	13.2	-0.800	34.898	
1	10	4/24/19	12:31	12:51	12.4	13.2	-0.800	34.677	

n	9	
t(0.975)	2.306	
Mean RM Value	11.733	RM avg
Mean CEM Value	12.500	CEM avg
Mean Difference	-0.767	d avg
Sum of Differences <sup>2</sup>	5.330	di <sup>2</sup>
Standard Deviation	0.071	sd
Confidence Coefficient	0.054	CC
RA based on RM	7.00	%



**RATA Type:** Oxygen (O<sub>2</sub>), % by volume  
**Regulation:** 40CFR60  
**RM Used:** 3A

Customer:		USG-Otsego Paper			Project #:		326428	
Unit ID:		EUTURBINE-2 (South)			CEM Model:		Horiba/CMA-EC622	
Sample Loc:		Stack			CEM Serial #:		41678240073	
Use? 1 = Y 0 = N	Test Run	Date	Start Time	End Time	RM O <sub>2</sub> % v/v dry	CEM O <sub>2</sub> % v/v dry	(RM-CEM) Difference (di)	Unit Load (MW)
1	1	4/24/19	7:00	7:20	15.6	15.7	-0.100	36.721
1	2	4/24/19	8:00	8:20	15.6	15.9	-0.300	36.257
1	3	4/24/19	8:33	8:53	15.6	15.9	-0.300	36.114
1	4	4/24/19	9:07	9:27	15.6	15.9	-0.300	35.959
1	5	4/24/19	9:40	10:00	15.6	15.9	-0.300	35.776
1	6	4/24/19	10:13	10:33	15.6	15.9	-0.300	35.665
1	7	4/24/19	10:47	11:07	15.6	16.0	-0.400	35.478
1	8	4/24/19	11:21	11:41	15.6	15.9	-0.300	35.294
1	9	4/24/19	11:58	12:18	15.6	15.9	-0.300	34.898
0	10	4/24/19	12:31	12:51	15.6	16.0	-0.400	34.677

n	9	
t(0.975)	2.306	
Mean RM Value	15.600	RM avg
Mean CEM Value	15.889	CEM avg
Mean Difference	-0.289	d avg
Standard Deviation	0.078	sd
Confidence Coefficient	0.060	CC
RA (Absolute Mean Difference)	0.29	% vol diff.