Graphic Packaging
INTERNATIONAL

May 31, 2019

Ms. Angeline Dunning
Air Monitoring Section, Air and Radiation Division
AR-18-J
US Environmental Protection Agency; Region 5
77 West Jackson Boulevard
Chicago, IL 60604-3507

RE: Boiler 8 CEMS RATA (Relative Accuracy Test Audit) and Linearity Report for a boiler subject to the NOx SIP Call during the ozone season (May 1 through September 30); Graphic Packaging International, LLC. – ORISPL No. 10698

Dear Ms. Dunning:

This report is being submitted by Graphic Packaging International, LLC. (GPI) for a boiler at our facility in Kalamazoo, Michigan, that is subject to the NOx SIP Call during the ozone season (May 1 through September 30). This report is related to the annual NOx CEMS RATA testing that was completed on April 16, 2019 and Pre-season Linearity that was completed on April 17, 2019.

If you have any questions or need any additional information please contact me at 269-383-5440.

Sincerely,
Graphic Packaging International, LLC.

Donald J. Krug
Environmental Engineer

Cc:

Karen Kajiya-Mills
Michigan Department of Environment, Great Lakes and Energy
Air Quality Division; Compliance Support Unit
525 West Allegan
Constitution Hall, 3rd Floor North
Lansing, Michigan 48933

Mr. Rex Lane; District Supervisor
Michigan Department of Environment, Great Lakes and Energy
Air Quality Division; Kalamazoo District Office
7953 Adobe Road
Kalamazoo, Michigan 49009

Encl: Report on CEMS RATA, Boiler 8, April 16, 2019
Report on CEMS Linearity Check, Boiler 8, April 17, 2019

DATA ACCURACY ASSESSMENT REPORT

BOILER NO. 8

Annual Quality Assurance
Relative Accuracy Test Audit (RATA)

Performance Specifications 2 and 3
Utilizing EPA Reference Methods 3A, 7E, and 19

Test Date(s): April 16, 2019
Facility ID: MIB1678
Source Location: Kalamazoo, Michigan
Permit: EGLE Permit No. MI-ROP-B1678-2015

Prepared For:

Graphic Packaging International, LLC
1500 North Pitcher Street • Kalamazoo, MI 49007

Prepared By:

Montrose Air Quality Services, LLC
P.O. Box 41156 • Cleveland, OH 44141
Phone: (440) 262-3760

Document Number: M011AS-554631-RT-2R0
Document Date: May 13, 2019
Scope ID / Project: 11658 / 190401

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REVIEW AND CERTIFICATION

The results of the Data Accuracy Assessment for Continuous Emission Monitoring Systems (CEMS) conducted on April 16, 2019 are a product of the application of the United States Environmental Protection Agency (US EPA) Stationary Source Sampling Methods listed in 40 CFR Part 60, Appendix A, that were in effect at the time of this test in accordance with 40 CFR Part 75, Appendices A and B.

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: John Hoard Date: 5/13/2019

Name: Jack Hoard Title: Field Project 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: robert j lisy jr Date: 05/13/2019

Name: Robert J. Lisy, Jr. Title: District Manager

1.0 INTRODUCTION

1.1 SUMMARY OF TEST PROGRAM

Graphic Packaging International, LLC (Facility ID: MIB1678), located in Kalamazoo, Michigan, contracted Montrose Air Quality Services (Montrose) of Cleveland, Ohio, to conduct the Annual Quality Assurance (QA) Relative Accuracy Test Audit (RATA) for the Continuous Emission Monitoring Systems (CEMS) associated with their Boiler No. 8. Testing was performed on April 16, 2019, for the purpose of evaluating the quality of the emissions data produced by Graphic Packaging International, LLC's CEMS in accordance with 40 CFR Part 75, Appendices A and B, and Michigan Department of Environment, Great Lakes, and Energy (EGLE) Permit No. MI-ROP-B1678-2015.

Reference Method (RM) sampling for nitrogen oxides (NO_x) and oxygen (O_2) was performed at normal load conditions in accordance with Performance Specification 2 (PS-2) and Performance Specification 3 (PS-3) to determine the Relative Accuracy (RA) of the CEMS associated with the Boiler No. 8 Exhaust Stack. RAs were determined for NO_x emissions (lb/MMBtu) (as NO_2), NO_x concentration (ppmvd), and O_2 concentration (%-dry).

For the RATA, ten (10) NO_x and O_2 runs were performed, and nine were utilized in the RA calculations. Each concentration run was 21-minutes in duration.

The test methods that were conducted during this test were US EPA Reference Methods 3A, 7E, and 19 following the procedures contained within PS-2 and PS-3.

1.2 KEY PERSONNEL

The key personnel who coordinated this test program (and their phone numbers) were:

- Donald Krug, Environmental Engineer, Graphic Packaging International, LLC, 269-383-5000
- Loretta Lehrman, Air Toxics, US EPA - Region 5, 312-886-5482
- David Patterson, Environmental Quality Analyst, Michigan Department of Environment, Great Lakes and Energy (EGLE), 517-241-7469
- Karen Kajiya-Mills, Environmental Manager, Michigan Department of Environment, Great Lakes and Energy (EGLE), 517-256-0880
- Monica Brothers, Environmental Quality Analyst, Michigan Department of Environment, Great Lakes and Energy (EGLE), 269-567-3552
- Cody Yazzie, Environmental Engineer, Michigan Department of Environment, Great Lakes and Energy (EGLE), 269-567-3554
- John Hoard QI, Field Project Manager, Montrose, 800-372-2471

2.0 SUMMARY AND DISCUSSION OF TEST RESULTS

2.1 OBJECTIVES AND TEST MATRIX

The purpose of this test was to conduct the Annual QA RATA for the CEMS associated with Boiler No. 8. Ten (10) NO_x and O_2 RATA runs were performed at normal load conditions in accordance with PS-2 and PS-3 to determine the RA between the CEMS and the applicable RMs. Testing was performed for the purpose of evaluating the quality of the emissions data produced by Graphic Packaging International's CEMS in accordance with 40 CFR Part 75, Appendices A and B, and EGLE Permit No. MI-ROP-B1678-2015.

The specific test objectives for this test were as follows:

- Measure the concentration of NO_x and O_2 at the Boiler No. 8 Exhaust Stack at normal load conditions in accordance with PS-2, PS-3, and US EPA Reference Methods 3A and 7E.
- Utilize the above variables, in conjunction with EPA Method 19, to calculate the corresponding RA of the CEMS for NO_x emissions (lb/MMBtu) (as NO_2), NOx concentration (ppmvd), and O_2 concentration (%-dry) and evaluate the RAs against 40 CFR Part 75 requirements.

Table 2-1 presents the sampling matrix log for this test.

2.2 FIELD TEST CHANGES AND PROBLEMS

No field test changes or problems occurred during the performance of this test that would bias the accuracy of the results of this test.

2.3 PRESENTATION OF RESULTS

A single sampling train was utilized at normal load conditions to determine the RA of the CEMS for NO_x emissions (lb/MMBtu) (as NO_2), NO_x concentration (ppmvd), and O_2 concentration (%-dry). This sampling train measured the stack gas concentrations of O_2 and NO_x.

Tables 2-2 to 2-4 display the results of this RATA.

Table 2-5 displays the specifications of the Boiler No. 8 CEMS and Reference Method analyzers utilized.

Table 2-6 displays the US EPA Protocol Gas Cylinders utilized to calibrate the Reference Method analyzers during this RATA.

Figure 2-1 schematically illustrates the concentration traverse point location utilized for this test.

2.4 RELATIVE ACCURACY CALCULATIONS

Confidence Coefficient =T-Value * Standard Deviation / Square Root of Number of Runs

0.00142 = 2.306 * 0.00184 / SQRT 9

RA = Mean Difference

RA = -0.0026

TABLE 2-1
NORMAL LOAD RATA - SAMPLING MATRIX OF TEST METHODS UTILIZED

Date	Run No.	Sampling Location	US EPA METHOD 3A (O_2) Sampling Time / Duration (min)		US EPA METHOD 7E (NO_x) Sampling Time / Duration (min)	
4/16/2019	1	Boiler No. 8 Exhaust Stack	8:42 - 9:03	/ 21	8:42 - 9:03	/ 21
4/16/2019	2	Boiler No. 8 Exhaust Stack	9:20 - 9:41	/ 21	9:20 - 9:41	/ 21
4/16/2019	3	Boiler No. 8 Exhaust Stack	10:08 - 10:29	/ 21	10:08 - 10:29	/ 21
4/16/2019	4	Boiler No. 8 Exhaust Stack	10:45 - 11:06	/ 21	10:45 - 11:06	/ 21
4/16/2019	5	Boiler No. 8 Exhaust Stack	11:15 - 11:36	/ 21	11:15 - 11:36	/ 21
4/16/2019	6	Boiler No. 8 Exhaust Stack	11:48 - 12:09	/ 21	11:48 - 12:09	/ 21
4/16/2019	7	Boiler No. 8 Exhaust Stack	12:17 - 12:38	/ 21	12:17 - 12:38	/ 21
4/16/2019	8	Boiler No. 8 Exhaust Stack	12:47 - 13:08	/ 21	12:47 - 13:08	/ 21
4/16/2019	9	Boiler No. 8 Exhaust Stack	13:18 - 13:39	/ 21	13:18 - 13:39	/ 21
4/16/2019	10	Boiler No. 8 Exhaust Stack	13:50 - 14:11	/ 21	13:50 - 14:11	/ 21

All times are Facility Time.

TABLE 2-2
PRIMARY CEMS - NORMAL LOAD - NO_x (lb/MMBtu) RELATIVE ACCURACY

CEMS: **Primary**
Load: **Normal**
RATA: **NOx**
RATA Units: **lb/MMBtu**
RA Criteria: **±0.015 lb/MMBtu**
RATA Label: **Normal-NOx-lb/MMBtu**

Run Number	RM All lb/MMBtu	RM Used lb/MMBtu	CEMS All lb/MMBtu	CEMS Used lb/MMBtu	Difference All lb/MMBtu	Difference Used lb/MMBtu	Production Rate klbs/hr	Used as Valid Test Run (yes/no)
1	0.136	0.136	0.137	0.137	-0.001	-0.001	110.3	yes
2	0.139	0.139	0.138	0.138	0.000	0.000	110.2	yes
3	0.132	0.132	0.134	0.134	-0.002	-0.002	109.0	yes
4	0.131	0.131	0.134	0.134	-0.003	-0.003	109.0	yes
5	0.130	0.130	0.135	0.135	-0.004	-0.004	109.0	yes
6	0.130	0.130	0.134	0.134	-0.004	-0.004	108.6	yes
7	0.129		0.135		-0.005			no
8	0.134	0.134	0.134	0.134	0.000	0.000	108.6	yes
9	0.128	0.128	0.132	0.132	-0.004	-0.004	108.7	yes
10	0.128	0.128	0.133	0.133	-0.004	-0.004	108.3	yes
Average	**0.132**	**0.132**		**0.135**		**-0.0026**	**109.1**	

Standard Deviation	0.00184	
T-Value	2.306	
Confidence Coefficient	0.00142	
Relative Accuracy (lb/MMBtu)	**-0.0026**	**(Calculated as the Mean Difference)**

TABLE 2-3
PRIMARY CEMS - NORMAL LOAD - NO_x (ppm) RELATIVE ACCURACY

CEMS: **Primary**
Load: **Normal**
RATA: **NOx**
RATA Units: **ppm**
RA Criteria: **±12 ppm**
RATA Label: **Normal-NOx-ppm**

Run Number	RM All ppm	RM Used ppm	CEMS All ppm	CEMS Used ppm	Difference All ppm	Difference Used ppm	Used as Valid Test Run (yes/no)
1	91.393	91.393	90.937	90.937	0.456	0.456	yes
2	93.256	93.256	91.748	91.748	1.508	1.508	yes
3	89.017	89.017	88.743	88.743	0.274	0.274	yes
4	88.202	88.202	88.729	88.729	-0.527	-0.527	yes
5	87.881	87.881	88.890	88.890	-1.009	-1.009	yes
6	87.335	87.335	88.633	88.633	-1.298	-1.298	yes
7	87.130	87.130	88.924	88.924	-1.794	-1.794	yes
8	86.478		88.286		-1.808		no
9	86.280	86.280	87.086	87.086	-0.806	-0.806	yes
10	86.430	86.430	87.544	87.544	-1.114	-1.114	yes
Average	**88.340**	**88.547**		**89.026**		**-0.479**	

Standard Deviation	1.03594	
T-Value	2.306	
Confidence Coefficient	0.79630	
Relative Accuracy (ppm)	**-0.479**	**(Calculated as the Mean Difference)**

TABLE 2-4
PRIMARY CEMS - NORMAL LOAD - O_2 (%) RELATIVE ACCURACY

CEMS: **Primary**
Load: **Normal**
RATA: **O2**
RATA Units: **%**
RA Criteria: **7.5**
RATA Label: **Normal-O2-%**

Run Number	RM All %	RM Used %	CEMS All %	CEMS Used %	Difference All %	Difference Used %	Used as Valid Test Run (yes/no)
1	6.314	6.314	6.282	6.282	0.032	0.032	yes
2	6.271	6.271	6.271	6.271	-0.001	-0.001	yes
3	6.271	6.271	6.286	6.286	-0.015	-0.015	yes
4	6.270	6.270	6.305	6.305	-0.035	-0.035	yes
5	6.261	6.261	6.340	6.340	-0.079	-0.079	yes
6	6.256	6.256	6.305	6.305	-0.049	-0.049	yes
7	6.260	6.260	6.348	6.348	-0.088	-0.088	yes
8	6.825		6.343		0.483		no
9	6.261	6.261	6.357	6.357	-0.096	-0.096	yes
10	6.278	6.278	6.340	6.340	-0.061	-0.061	yes
Average	**6.327**	**6.271**		**6.315**		**-0.043**	

Standard Deviation	0.04300	
T-Value	2.306	
Confidence Coefficient	0.03305	
Relative Accuracy (%)	**1.219**	**(Based on the Reference Method Mean)**

TABLE 2-5
ANALYZER SPECIFICATIONS

BOILER NO.8 CEMS

Parameter	NO_x Analyzer	O_2 Analyzer
Analyzer Manufacturer	Horiba	Horiba
Analyzer Model Number	CMA-EC622	CMA-EC622
Analyzer Serial Number	41866400054	41866400054
System Type	Straight-Extractive	Straight-Extractive
Analyzer Span Value	500-PPM	25.00%

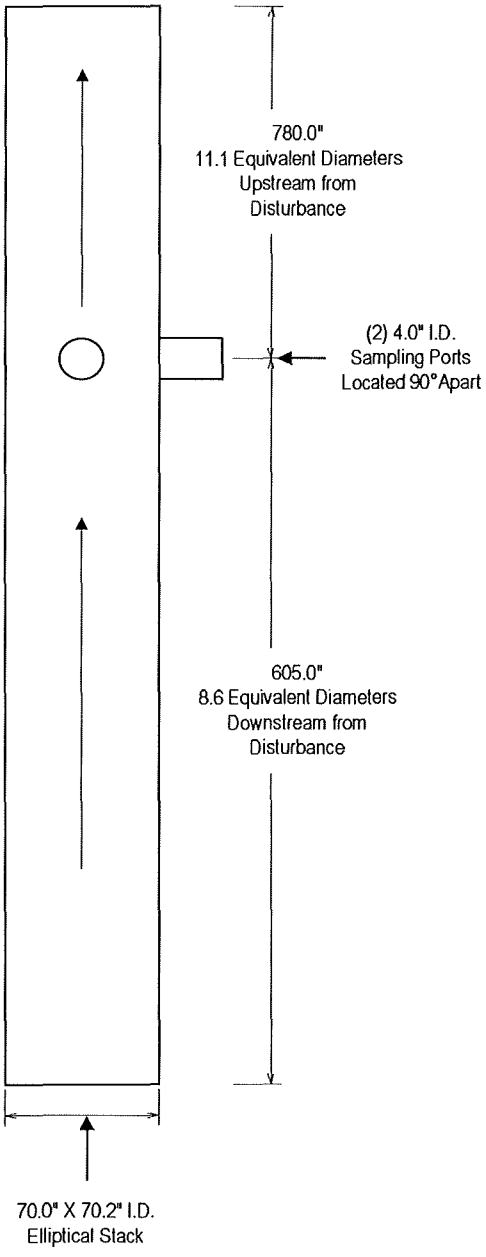
REFERENCE METHOD CEMS

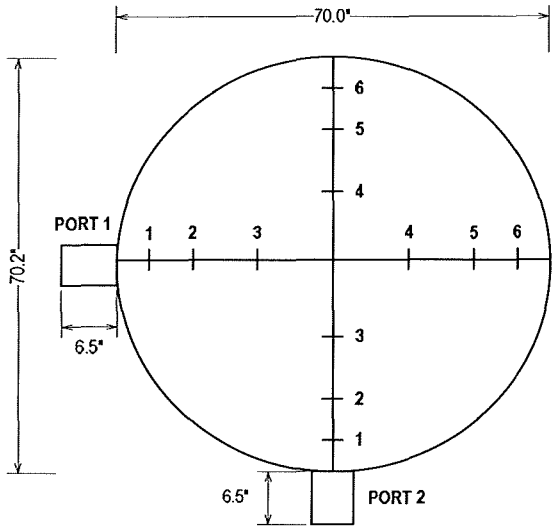
Parameter	NO_x Analyzer	O_2 Analyzer
Analyzer Manufacturer	Thermo	Servomex
Analyzer Model Number	42C	1400
Analyzer Serial Number	42CHL-66127-351	01440D1/4049
Analyzer Type	Extractive	Extractive
Analyzer Technique	Chemiluminescent Reaction	Paramagnetic
Analyzer Span Value	277.0-PPM	10.02%

TABLE 2-6
US EPA PROTOCOL GAS CERTIFICATIONS

Component	Certified Concentration	Cylinder Number	Certification Date	Expiration Date
Oxygen	5.538 ± 0.05%	CC93920	3/12/2018	3/12/2026
Oxygen	10.02 ± 10.12%	SG9128477BAL	8/28/2018	8/28/2026
Nitrogen Dioxide	50.39 ± 1.00 PPM	CC501876	3/27/2018	3/27/2021
Nitrogen Oxides	112.3 ± 1.45 PPM	CC29760	1/11/2019	1/11/2027
Nitrogen Oxides	277.0 ± 2.2 PPM	SG9139024BAL	11/6/2018	11/6/2026

FIGURE 2-1
BOILER NO. 8 EXHAUST TRAVERSE POINT LOCATION DRAWING





Point	% of Stack Depth	Distance from Inside Wall (in.) PORT 1	Distance from Inside Wall (in.) PORT 2
1	4.4	3.1	3.1
2	14.6	10.2	10.2
3	29.6	20.7	20.8
4	70.4	49.3	49.4
5	85.4	59.8	60.0
6	95.6	66.9	67.1