



# Oxides of Nitrogen Relative Accuracy Test Audit Emissions Test Report

*Prepared for:*  
**Packaging Corporation of America**

Packaging Corporation of America  
2246 Udell Street  
Filer City, Michigan 49634

**RECEIVED**  
JUL 27 2015  
AIR QUALITY DIV.

Project No. 15-4681.00  
July 20, 2015

BT Environmental Consulting, Inc.  
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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 (RO) Permit 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 described in General Condition No. 22 in the RO Permit and be made available to the Department of Environmental Quality, Air Quality Division upon request.

Source Name Packaging Corporation of America County Manistee  
Source Address 2246 Udell Street City Filer City  
AQD Source ID (SRN) B3692 RO Permit No. MI-ROP-B3692-2015 RO Permit Section No. \_\_\_\_\_

Please check the appropriate box(es):

**Annual Compliance Certification (General Condition No. 28 and No. 29 of the RO Permit)**  
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 RO Permit, 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 RO Permit.  
 2. During the entire reporting period this source was in compliance with all terms and conditions contained in the RO Permit, 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 RO Permit, unless otherwise indicated and described on the enclosed deviation report(s).

**Semi-Annual (or More Frequent) Report Certification (General Condition No. 23 of the RO Permit)**  
Reporting period (provide inclusive dates): From \_\_\_\_\_ To \_\_\_\_\_  
 1. During the entire reporting period, ALL monitoring and associated recordkeeping requirements in the RO Permit 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 RO Permit 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 NA To NA  
Additional monitoring reports or other applicable documents required by the RO Permit are attached as described:  
2015 RATA Report: Boiler 2 and Boiler 4A  
2015 Non-Condensable Gas Closed Vent System Leak Detection Report  
2015 EUBIOGASFLARE Emissions Test Report

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.

Andrew Richards Operations Manager (231) 723-9951  
Name of Responsible Official (print or type) Title Phone Number  
Andrew Richards Signature of Responsible Official 7/24/15 Date



**EXECUTIVE SUMMARY**

BT Environmental Consulting, Inc. (BTEC) was retained by Packaging Corporation of America (PCA) to conduct a relative accuracy test audit (RATA) of the continuous emission monitoring systems serving Boiler 2 and Boiler 4A located at the PCA facility in Filer City, Michigan. This emissions testing program included evaluation of oxides of nitrogen (NO<sub>x</sub>) and oxygen (O<sub>2</sub>) concentrations and corresponding NO<sub>x</sub> emission rates (lb/MMBtu) EUBOILER2 and EUBOILER4A at a single load while firing natural gas.

Pursuant to Title 40, Part 60, Appendix B, Performance Specification 2, the relative accuracy of the Boilers 2 and 4A CEMS must remain less than 20%. Table I summarizes the results of the test program.

**Table I  
Test Results Summary**

<b>Test Date</b>	<b>Unit</b>	<b>Parameter</b>	<b>Result</b>
5/27/2015	Boiler 2	NO <sub>x</sub> (lb/MMBtu)	2.0% RA
5/28/2015	Boiler 4A	NO <sub>x</sub> (lb/MMBtu)	2.2% RA

JUL 27 2015

**1. Introduction**

AIR QUALITY DIV.

BT Environmental Consulting, Inc. (BTEC) has been retained by Packaging Corporation of America (PCA) to conduct a relative accuracy test audit (RATA) of the continuous emission monitoring systems serving Boiler 2 and Boiler 4A located at the PCA facility in Filer City, Michigan. This emissions testing program included evaluation of oxides of nitrogen (NO<sub>x</sub>) and oxygen (O<sub>2</sub>) concentrations and corresponding NO<sub>x</sub> emission rates (lb/MMBtu) EUBOILER2 and EUBOILER4A at a single load while firing natural gas.

AQD has published a guidance document entitled "Format for Submittal of Source Emission Test Plans and Reports" (December 2013). This document is provided as Appendix A. The following is a summary of the emissions test program and results in the format suggested by the aforementioned document.

**1.a Identification, Location, and Dates of Test**

The relative accuracy of the CEM systems serving PCA Boiler Nos. 2 and 4A was evaluated. Each CEM system monitors and records the concentration of oxides of nitrogen (NO<sub>x</sub>) and oxygen (O<sub>2</sub>) in the boiler exhaust gas and then calculates the resultant NO<sub>x</sub> emission rate (in terms of pounds per million Btu heat input, lbs/MMBtu). The relative accuracy of each CEM system was verified in terms of NO<sub>x</sub> emission rate (lbs/MMBtu).

Each CEM system is located at PCA (2246 Udell Street, Filer City, Michigan). Testing of the Boiler Nos. 2 and 4A CEM systems was conducted on May 27 and 28, 2015.

**1.b Purpose of Testing**

The purpose of the testing was to verify the relative accuracy of the CEM systems. Boiler Nos. 2 and 4A are affected by the requirements of Title 40, Part 60, Appendix B, Performance Specification 2, the relative accuracy of the Boilers 2 and 4A CEMS must remain less than 20%.

**1.c Source Description**

Boiler 2:

Boiler No. 2 has a maximum heat input rating of 186 MMBtu/hr. The boiler has the capability to burn coal, natural gas, biogas, and No. 6 fuel oil. The exhaust is controlled by a baghouse when burning coal and can bypass the baghouse when both EUBOILER1 and EUBOILER2 have ceased firing coal.



**Boiler 4:**

PCA operates a Babcock & Wilcox boiler unit, designated as EUBOILER4A, to provide steam for various mill processes and for use in electrical generation while burning natural gas or biogas. EUBOILER4A is rated at 227MMBtu/hr and is equipped with low-NOx burners. The maximum steam load for the boiler is 150,000 pounds of steam.

**1.d Test Program Contact**

The contact for information regarding the test program as well as the test report is as follows:

Ms. Sara Kaltunas  
Packaging Corporation of America  
2246 Udell Street  
Filer City, MI 49634  
(231) 723-9951 ext. 465

**1.e Testing Personnel**

Names and affiliations for personnel who were present during the testing program are summarized by Table 1.

**Table 1  
Testing Personnel**

<b>Name</b>	<b>Affiliation</b>
Sara Kaltunas	PCA
Robert Dickman	MDEQ-AQD
Todd Wessel	BTEC
Steve Smith	BTEC

**2. Summary of Results**

Sections 2.a through 2.d summarize the results of the emissions test program.

**2.a Operating Data**

Natural gas flowrate (scf/hr), boiler steam load (klbs/hr), NOx concentration, and O<sub>2</sub> concentration were monitored throughout the RATA emissions test program. The data is presented in Appendices B and G.

**2.b Applicable Permit**

Boiler Nos. 2 and 4A are covered by AQD Renewable Operating Permit No. MI-ROP-B3692-2015.



## **2.c Results**

The results of the RATA emissions test program for Boiler Nos. 2 and 4A are summarized in Appendices B and C, respectively.

## **2.d Emission Regulation Comparison**

The boilers are affected by the requirements of Title 40, Part 60, Subpart Db of the Code of Federal Regulations (40 CFR 60, Subpart Db) which require that NOx emissions be continuously monitored by installing, maintaining, and operating a continuous emission monitoring (CEM) system and that the relative accuracy of each CEM system be verified on, at a minimum, an annual basis. The RA limit is 20%. The RA of each boiler CEM system was far less than 20%.

## **3. Source Description**

Sections 3.a through 3.e provide a detailed description of the process.

### **3.a Process Description**

Boiler 2:

Boiler No. 2 has a maximum heat input rating of 186 MMBtu/hr. The boiler has the capability to burn coal, natural gas, biogas, and No. 6 fuel oil. The exhaust is controlled by a baghouse when burning coal and can bypass the baghouse when both EUBOILER1 and EUBOILER2 have ceased firing coal.

Boiler 4:

PCA operates a Babcock & Wilcox boiler unit, designated as EUBOILER4A, to provide steam for various mill processes and for use in electrical generation while burning natural gas or biogas. EUBOILER4A is rated at 227MMBtu/hr and is equipped with low-NOx burners. The maximum steam load for the boiler is 150,000 pounds of steam.

### **3.b Process Flow Diagram**

Due to the simplicity of the boiler process, a process flow diagram is not necessary.

### **3.c Raw and Finished Materials**

The raw materials used by the boilers include natural gas and water and the product is steam.

### **3.d Process Capacity**

Boiler No. 2 has a maximum heat input rating of 186 MMBtu/hr.

EUBOILER4A is rated at 227 MMBtu/hr and is equipped with low-NO<sub>x</sub> burners. The maximum steam load for the boiler is 150,000 pounds of steam.

### **3.e Process Instrumentation**

Natural gas flowrate (scf/hr), boiler steam load (klbs/hr), NO<sub>x</sub> concentration, and O<sub>2</sub> concentration were monitored throughout the RATA emissions test program. The data is presented in Appendices B and G.

## **4. Sampling and Analytical Procedures**

Sections 4.a through 4.d provide a summary of the sampling and analytical procedures used to verify the relative accuracy of the Boiler Nos. 2 and 4A CEM systems.

### **4.a Sampling Train and Field Procedures**

The NO<sub>x</sub> concentration of the exhaust gas was measured using a TECO 42i NO<sub>x</sub> gas analyzer (Serial No. 1032645647) and the O<sub>2</sub> content was measured using a Servomex 1400 O<sub>2</sub> gas analyzer (Serial No. 1420B/894). A sample of the gas stream was drawn through an insulated stainless-steel probe with an in-line glass fiber filter to remove any particulate, a heated Teflon<sup>®</sup> sample line, and through a refrigerated Teflon<sup>®</sup> impinger train with a peristaltic pump to remove the moisture from the sample before it enters the analyzer. Data was recorded at 4-second intervals on an IBM PC equipped with data acquisition software.

Sampling and analysis procedures followed the requirements of 40 CFR 60, Appendix B, PS2.

### **4.b Recovery and Analytical Procedures**

Because all measurements were conducted using on-line analyzers, no samples were recovered during the test program.

### **4.c Sampling Ports**

During the first test run on Boiler 4A, a stratification test was conducted and sampling was subsequently conducted at a single sampling point. For Boiler 2, the reference method sampling probe was moved to three points across the stack during each emissions test run.

During the first test run on Boiler 4A, a twelve-point stratification test was conducted and sampling was subsequently conducted at a single sampling point. For Boiler 2, the reference method sampling probe was moved to three points across the stack during each emissions test run.

## **5. Test Results and Discussion**

Sections 5.a through 5.k provide a summary of the test results.

### **5.a Results Tabulation**

The results of the RATA emissions test program for Boiler Nos. 2 and 4A are summarized by Appendices B and C, respectively. Relevant raw test data for emissions test runs and for analyzer calibrations are provided electronically in Appendix D.

### **5.b Discussion of Results**

The boilers are affected by the requirements of Title 40, Part 60, Subpart Db of the Code of Federal Regulations (40 CFR 60, Subpart Db) which require that NO<sub>x</sub> emissions be continuously monitored by installing, maintaining, and operating a continuous emission monitoring (CEM) system and that the relative accuracy of each CEM system be verified on, at a minimum, an annual basis. The RA limit is 20%. The RA of each boiler CEM system was far less than 20%.

### **5.c Sampling Procedure Variations**

During the sixth test run on Boiler 2, the CEM system started to auto-calibrate during the test run and, consequently, this run was not used in the average.

A stratification test was performed on each boiler during the first run, which caused the runs to be longer than 21 minutes.

### **5.d Process or Control Device Upsets**

No upset conditions occurred during testing.

### **5.e Control Device Maintenance**

Only routine maintenance was performed on Boilers 2 and 4A prior to the emissions test program.

### **5.f Re-Test Changes**

The emissions test program was not a re-test.



**5.g Audit Sample Analyses**

No audit samples were requested by AQD.

**5.h Calibration Sheets**

Certificates of analysis for the calibration gases used during testing are provided as Appendix E.

**5.i Sample Calculations**

Sample calculations are provided as Appendix F.

**5.j Field Data Sheets**

Copies of field data sheets and relevant field notes are provided as Appendix E.

**5.k Laboratory Data**

No laboratory analysis was included in this test program.

## Figures

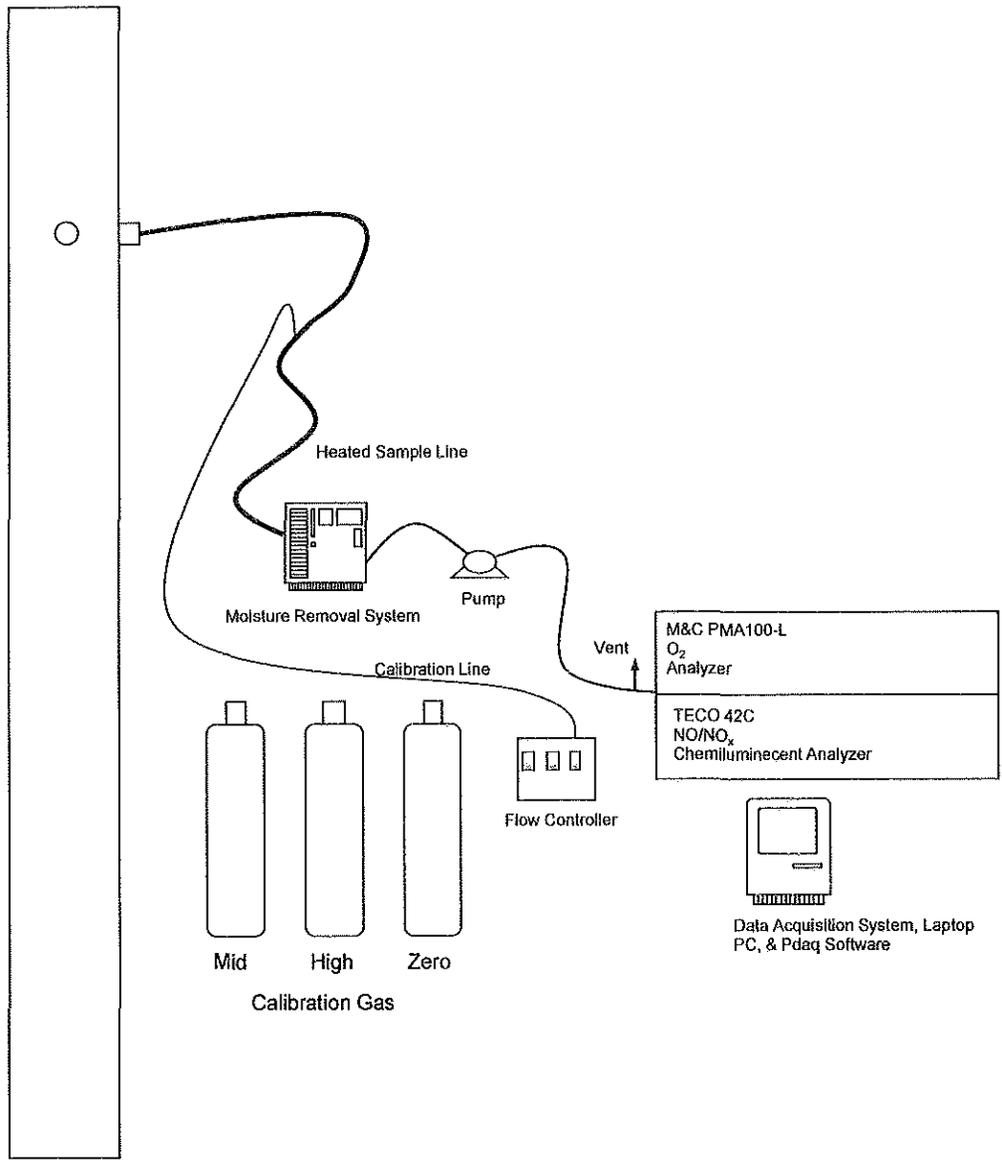


Figure No. 1

Site:  
USEPA Method 3A and 7E  
PCA  
Filer City, Michigan

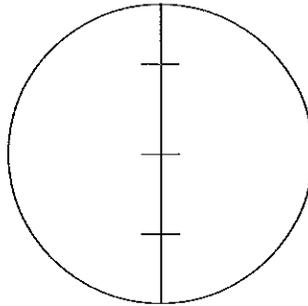
Sampling Date:  
May 27-28, 2015

BT Environmental Consulting Inc.  
4949 Fernlee Avenue  
Royal Oak, MI 48073



diameter = 48 inches

Points	Distance "
1	8.0
2	24.0
3	40.0



Not to Scale

Note: NOx/O2 sampling will be extracted at three points through a stainless steel probe positioned at approximately 16.7%, 50% and 83.3% of the sample stream diameter (7 minutes at each point).

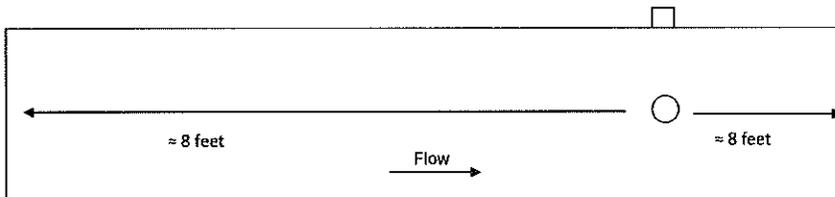


Figure No. 2

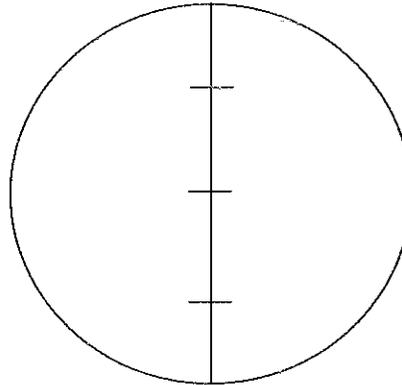
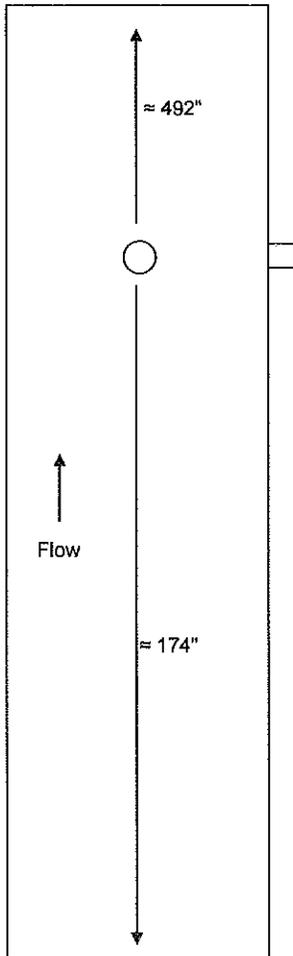
Site:  
EUBOILER2 Exhaust  
Packaging Corporation of America  
Filer City, Michigan

Sampling Date:  
May 27, 2015

BT Environmental Consulting, Inc.  
4949 Fernlee Avenue  
Royal Oak, Michigan 48073



diameter = 67.5 inches



Not to Scale

Points	CEM Distance "
1	11.3
2	33.8
3	56.2

Note: NOx/O2 sampling will be extracted at three points through a stainless steel probe positioned at approximately 16.7%, 50% and 83.3% of the sample stream diameter (7 minutes at each point).

Figure No. 3

Site:  
EUBOILER4A Exhaust  
Packaging Corporation of America  
Filer City, Michigan

Sampling Date:  
May 28, 2015

BT Environmental Consulting, Inc.  
4849 Fernlee Avenue  
Royal Oak, Michigan 48073