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FINAL REPORT

PACKAGING CORPORATION OF AMERICA

FILER CITY, MICHIGAN

2024 NON-CONDENSABLE GAS CLOSED VENT SYSTEM SOURCE TESTING REPORT

RWDI #2402010

May 30, 2024

SUBMITTED TO

Shane Nixon
Michigan Department of Environment, Great Lakes, and Energy
Cadillac District Supervisor, Air Quality Division
120 West Chapin Street, Cadillac, Michigan 49601

Jeremy Howe
Michigan Department of Environment, Great Lakes, and Energy
Air Quality Division Technical Programs Unit (TPU)
Constitution Hall 2nd Floor, South
525 West Allegan Street Lansing, Michigan 48909-7760

Zebadiah Jones
zebjones@packagingcorp.com

Packaging Corporation of America
2246 Udell Street
FILER CITY, MI 49634

SUBMITTED BY

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LIST OF APPENDICES

1 INTRODUCTION

1.1 Overview

RWDI USA LLC (RWDI) was retained by Packaging Corporation of America (PCA) to complete the Leak Detection and Repair (LDAR) testing on the non-condensable closed vent system (CVS) identified as FGMACT_SUBPART_S in Permit No. 209-18A at their facility located at 2246 Udell Street in Filer City, Michigan. The test program was conducted to identify any leaks that may be present along the CVS that comes off the digester and evaporative system to where it exits the building and is transferred and introduced into the flame zone of an on-site boiler.

1.2 Test Date

RWDI conducted the testing program on April 2nd, 2024.

1.3 Test Program Organization

Details with respect to the key individuals involved with the stack sampling survey are provided below:

Company Name:	**Packaging Corporation of America**
Company Address:	2246 Udell St, Filer City, Michigan
Environmental Contact:	Zebadiah Jones
Cellular No:	231-510-6390
E-mail:	Zebjones@packagingcorp.com
Sampling Company:	**RWDI USA LLC**
Project Manager:	Steve Smith
Telephone Number:	971-940-5038
Fax No:	519-823-1316
Email:	Steve.Smith@rwdi.com

2 SOURCE DESCRIPTION

2.1 Plant Overview

The low volume, high concentration (LVHC) Collection System at PCA's Filer City Mill includes various equipment (hoods, vents, ductwork, gas movers) that collect the LVHC gases from the digester and evaporator systems and conveys the gases to Boilers 1, 2, or 4 for destruction. In addition, the mill collects gases from the pulp washers using LVHC Collection System and conveys these gases to Boilers 1, 2, or 4 for destruction.

The sampling was performed in accordance with the procedures outlined in Appendix A or 40 CFR part 60, Method 21, and the specifications described in Subpart S of 40 CFR part 63.

2.2 Overview

Table 2.2.1: Summary of Sampling Program

CVS
All locations less than 500 ppm

3 TEST PROGRAM

3.1 Description of Testing Methodologies

3.1.1 USEPA Method 21

A portable flame ionization detector (FID) was used to measure VOC emissions from all locations required within FGMACT_SUBPART_S. The instrument was calibrated prior to use with certified zero air and a certified methane mixture for the upscale calibration. The probe of the FID was placed at the surface of the testing locations to detect potential leaks. The FID sampled each location for a minimum of two (2) times the response time. A leak is defined as a constant reading of 500 ppm above background.

3.2 Applicable Regulations

The following information is provided to show the applicable regulations and standards pertaining to the CVS located at PCA in Filer City, Michigan

63.450 Standards for enclosures and closed-vent system:

a) Each enclosure and closed vent specified in 63.443(c), 63.444(b), and 63.445(b) for capturing and transporting vent streams that contain HAP shall meet the requirements specified in paragraphs (b) and (d) of this section.

b) Each enclosure shall maintain negative pressure at each enclosure or hood opening as demonstrated by the procedures specified in 63.457(e). Each enclosure or hood opening closed during the initial performance test specified in 63.457(a) shall be maintained in the same closed and sealed position as during the performance test at all times except when necessary to use the opening for sampling, inspection, maintenance, or repairs.

c) Each component of the closed-vent system used to comply with 63.443(c), 63.444(b), and 63.445(b) that is operated at positive pressure and located prior to a control device shall be designed for and operated with no detectable leaks as indicated by an instrument reading of less than 500 parts per million by volume above background, as measured by the procedures specified in 65.457(d).

d) Each bypass line in the closed-vent system that could divert vent streams containing HAP to the atmosphere without meeting the emission limitations in 63.443, 63.444, or 63.445 shall comply with either of the following requirements:

1) On each bypass line, the owner or operator shall install, calibrate, maintain, and operate according to the manufacturer's specifications a flow indicator that is capable of taking periodic readings as frequently as specified in 63.454(e). The flow indicator shall be installed in the bypass line in such a way as to indicate flow in the bypass line.

2) For bypass line valves that are not computer controlled, the owner or operator shall maintain the bypass line valve in the closed position with a car seal or a seal placed on the valve or closure mechanism in such a way that valve or closure mechanism cannot be opened without breaking the seal.

4 SUMMARY OF RESULTS

Testing was conducted on April 2nd, 2024. All sampling locations were under the 500 ppm limit.

APPENDIX A

GRETCHEN WHITMER
GOVERNOR

STATE OF MICHIGAN
DEPARTMENT OF
ENVIRONMENT, GREAT LAKES, AND ENERGY
LANSING

PHILLIP D. ROOS

March 20, 2024

VIA E-MAIL

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

SRN: B3692; Manistee County

Dear Zebadiah Jones:

SUBJECT: Approval of Test Protocol for HAPs Leak Testing

The Michigan Department of Environment, Great Lakes, and Energy (EGLE), Air Quality Division (AQD) has completed our review of the protocol for the emissions testing at Packaging Corporation of America located in Manistee, Manistee County. This protocol was received by EGLE, AQD on February 28, 2024. Testing is scheduled to begin April 2, 2024. Testing is required by Renewable Operating Permit Number MI-ROP-B3692-2015b, Permit to Install (PTI) 209-19A, and Title 40 of the Code of Federal Regulations (40 CFR), Part 63, Subpart S. Detectable leaks will be determined as listed below:

Source	Parameter	Method*	Unit	Limit**
FGMACT SUBPART S	HAP	21	ppm	500

*40 CFR, Part 60, Appendix A
**Above background concentrations
ppm = parts per million

The proposed methods are acceptable given the following stipulations:

- TESTING
  - A mixture of methane or n-hexane and air at a concentration of approximately, but less than, 10,000 parts per million by volume methane or n-hexane shall be used to calibrate leak detection instrument.
  - Testing will be performed in accordance with EGLE, AQD, Air Pollution Control Rules, Part 10, Intermittent Testing and Sampling.
  - All requirements and specifications of the above methods apply; any modifications of the test methods on-site must be approved by the AQD.
- PROCESS
  - Lindsey Wells of the Cadillac District Office will coordinate process operation and the collection of process parameter data during testing. Please contact WellsL8@Michigan.gov or 517-282-2345 with process related inquiries.
  - Sufficient process information will be recorded during testing to demonstrate that the facility is operating at routine normal conditions.

- REPORT
  - For each valve, flange, connection, pump, compressor, pressure relief device, process drain, open ended line, degassing vent, accumulator vent and access door tested:
    - Unique identifier or description;
    - Concentration measured; and
    - Diagramed location within system.
  - All process data listed above to include:
    - Each individual reading; and
    - Average/total for each run.
  - All data reported in tabular format.
  - Certificate of Analysis sheets for all calibration gases used.
  - All aborted, failed or repeated runs must be included in the report.

Please submit a complete copy of the final test report to the following locations:

Shane Nixon
EGLE, Air Quality Division
120 West Chapin Street
Cadillac, Michigan 49601

Jeremy Howe
EGLE, Air Quality Division
Constitution Hall, 2nd Floor South
525 West Allegan Street
Lansing, Michigan 48933

Please inform Jeremy Howe, Technical Programs Unit Supervisor, at 231-878-6687 or HoweJ1@Michigan.gov to change the test date or if you have any questions regarding this letter.

Sincerely,

Daniel J. Droste
Environmental Quality Analyst
Air Quality Division
989-225-6052
DrosteD3@Michigan.gov

cc: Steve Smith, RWDI
Jeremy Howe, EGLE
Shane Nixon, EGLE
Lindsey Wells, EGLE

EGLE

MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY
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 Environment, Great Lakes, and Energy, Air Quality Division upon request.

Source Name: Packaging Corporation of America - Filer City Mill County: Manistee

Source Address: 2246 Udell Street City: Filer City

AQD Source ID (SRN): B3692 ROP No.: MI-ROP-B3692-2015b 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 N/A To N/A

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

Test plan for LDAR testing from non-condensable closed vent system (CVS) identified as FGMACT_SUBPART_S.

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

Paul Cova	Mill Manager	231-723-9951
Name of Responsible Official (print or type)	Title	Phone Number

Signature of Responsible Official — Date: 2/26/2024

* Photocopy this form as needed.

EQP 5736 (Rev 04/30/2019)

SOURCE TESTING PLAN

PACKAGING CORPORATION OF AMERICA

FILER CITY, MICHIGAN

2024 NON-CONDENSABLE GAS CLOSED VENT SYSTEM SOURCE TESTING PROGRAM PLAN

RWDI #2402010

February 28, 2024

SUBMITTED TO

Shane Nixon
Michigan Department of Environment, Great Lakes and Energy
Cadillac District Supervisor, Air Quality Division
120 West Chapin Street, Cadillac,
Michigan 49601

Jeremy Howe
Michigan Department of Environment, Great Lakes and Energy
Air Quality Division Technical Programs Unit (TPU)
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525 West Allegan Street Lansing,
Michigan 48909-7760

Zebadiah Jones
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Packaging Corporation of America
2246 Udell Street
Filer City, MI 49634

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TABLE OF CONTENTS

1 INTRODUCTION

1.1 Overview

RWDI USA LLC (RWDI) has been retained by Packaging Corporation of America (PCA) to complete testing on the non-condensable closed vent system (CVS) identified as FGMACT_SUBPART_S at their facility located at 2246 Udell St, Filer City, Michigan. The test program is being conducted to identify any leaks that may be present along the CVS that comes off the digester and evaporative system to where it exits the building and is transferred and introduced into the flame zone of an on-site boiler.

1.2 Schedule and Summary of Testing Parameters

RWDI will be completing the testing program during the week of April 1st, 2024.

1.3 Test Program Organization

Details with respect to the key individuals involved with the stack sampling survey are provided below:

Company Name:	**Packaging Corporation of America**
Company Address:	2246 Udell St, Filer City, Michigan
Environmental Contact:	Zebadiah Jones
Cellular No:	231-510-9815
E-mail:	zebjones@packagingcorp.com
Sampling Company:	**RWDI USA LLC**
Project Manager:	Steve Smith
Telephone Number:	971-940-5038
Fax No:	519-823-1316
Email:	Steve.Smith@rwdi.com

2 SOURCE DESCRIPTION

2.1 Plant Overview

The low volume, high concentration (LVHC) Collection System at PCA's Filer City Mill includes various equipment (hoods, vents, ductwork, gas movers) that collect the LVHC gases from the digester and evaporator systems and conveys the gases to Boiler 1 or Boiler 2 for destruction. In addition, the mill collects gases from the pulp washers using LVHC Collection System and conveys these gases to Boiler 1 or Boiler 2 for destruction.

The sampling will be performed in accordance with the procedures outlined in Appendix A or 40 CFR part 60, Method 21, and the specifications described in Subpart S of 40 CFR part 63.

2.2 Overview

Table 2.2.1: Summary of Sampling Program

CVS
All locations less than 500 ppm

3 TEST PROGRAM

3.1 Description of Testing Methodologies

The following section provides brief descriptions of the proposed sampling methods and discusses any proposed modifications to the reference test methods. A summary of test durations, methodologies and sampling location is provided in Section 1.2.

3.1.1 Summary of Specific Methodologies

3.1.1.1 Method 21

A portable flame ionization detector (FID) will be used to measure VOC emissions from numerous locations within FGMACT_SUBPART_S. The instrument will be calibrated prior to use with certified zero air and a certified methane mixture for the upscale calibration. The probe of the FID will be placed at the surface of the testing locations to detect potential leaks. The FID will sample each location for a minimum of two (2) times the response time. A leak is defined as a constant reading of 500 ppm above background.

3.2 Process Data

During the air pollutant emissions testing, plant will operate at normal conditions.

4 INTERNAL QUALITY ASSURANCE/QUALITY CONTROL ACTIVITIES

4.1 Sample Identification and Custody

The following persons are responsible for sample handling and recording during this study:

- **Sample Identification:** Steve Smith
- **Sample Log Sheet:** Kate Strang
- **Collection of Process Data:** Zebadiah Jones

5 REPORTING

Source test results will be submitted to the Michigan Department of Environment, Great Lakes and Energy (EGLE), Air Quality Division within 60 days of testing as required by the facility's ROP.

The proposed Table of Contents for the source testing report will be as follows:

6 SAFETY

The following table outlines the additional safety requirements for this survey as identified by RWDI.

Head Protection	Required
Foot Protection	Required
Eye Protection	Required
Hearing Protection	Required
Safety Belt or Harness	Harness when in lift – NA for this project
Respiratory Equipment with combined Acid Gases and Particulate Cartridges	Not Required
Other Protective Clothing or Equipment	Flame Retardant jacket
Safety Training Session	Required on site
Date of Session, if Required	To be determined
Sampling Location	Indoor/Outdoor
Temperature of Sampling Location	Indoor/Outdoor
Work Area	Indoor/Outdoor
COVID-19 Procedure	Face Mask requirement will follow company policy and state recommendations

7 PERSONNEL RESPONSIBLE

7.1 Test Site Organization

The following individuals are responsible for the key tasks during the survey.

Task	Individual
Project Management:	Steve Smith, RWDI
Test Preparation/Site Restoration:	Zebadiah Jones, PCA
Modifications to Facility/Services:	Zebadiah Jones, PCA
Sample Site Accessibility:	Zebadiah Jones, PCA
Data Recovery:	Kate Strang, RWDI
Sample Schedule:	Steve Smith, RWDI

7.2 Test Preparations

Personnel at Packaging Corporation of America will ensure that the plant is operating at acceptable capacity during the source testing. PCA personnel will also ensure that RWDI field crew has access to sampling ports and electrical power.

APPENDIX B

PCA Filer City

Name	Description	ppm	Label Code
Rotary Drum Washers to "Rats Nest"			
NCG-RD-1	Flange on Rotary Drum Washer	2.5	1
NCG-RD-2	Flange on Rotary Drum Washer	3.1	2
NCG-R-1	Blow Tower	4.2	3
NCG-R-2	V-105 1B 24" Valve	6.5	4
NCG-R-3	Asset 13590 Pressure/Vacuum Relief Valve	6.3	5
NCG-R-4	V-101 24" Valve	6.1	6
NCG-R-5	V-102 1/2" P-Gauge	6.4	7
NCG-R-6	C.O. 6"	6.2	8
NCG-R-7	C.O. 12"	6.4	9
NCG-R-8	24" Flange	6.3	10
NCG-R-9	Cyclone	6.3	11
NCG-R-10	V-104 1/2" P-Gauge	6.4	12
NCG-R-11	V-103 1/2" Valve	6.5	13
NCG-R-12	Condenser	6.9	14
NCG-R-13	1" Nub	6.5	15
"Rats Nest"			
NCG-V-1	3/4" to Instrument	3.9	16
NCG-V-2	Auto Valve to Atmosphere	4.9	17
NCG-V-3	Valve	4.3	18
NCG-V-4	1/2" Pressure Switch	2.3	19
NCG-V-5	Rupture Disc	3.6	20
NCG-V-6	Valve	4.2	21
NCG-V-7	2" Valve	3.3	22
NCG-V-8	1/2" to Instrument	3.2	23
NCG-V-9	1/2" P-Gauge	4.9	24
NCG-V-10	1/2" Temp. Gauge	4.3	25
NCG-V-11	Valve	4.1	26
NCG-V-12	Valve	4.3	27
NCG-V-13	3/4" to Instrument	4.1	28
NCG-V-14	Auto Valve to Atmosphere	3.6	29
NCG-V-15	Valve	3.1	30
NCG-V-16	1/2" Capped	3.1	31
NCG-V-17	Rupture Disc	3.3	32
NCG-V-18	Valve	4.0	33
NCG-V-19	2" Valve	3.6	34
NCG-V-20	1/2" to Instrument	3.7	35
NCG-V-21	1/2" P-Gauge	3.4	36
NCG-V-22	1/2" Temp. Gauge	3.9	37
NCG-V-23	Valve	3.9	38
NCG-V-24	Valve	4.2	39

PCA Filer City

Name	Description	ppm	Label Code
NCG-V-25	1" nub outside on roof	4.1	40
LTV Evaporators			
NCG-L-1	Flange on 5th effect	2.1	41
NCG-L-2	Valve	3	42
NCG-L-3	Valve	3.6	43
NCG-L-4	Valve	4.2	44
NCG-L-5	Valve	5.0	45
NCG-L-6	Valve	2.0	46
NCG-L-7	Valve	3.0	47
NCG-L-8	Valve	3.0	48
NCG-L-9	Valve Near Surface Condenser	1.2	49
NCG-L-10	Valve Near Surface Condenser	0.9	50
NCG-L-11	Surface Condenser	0.9	51
NCG-L-12	1/2" P-Gauge	1.0	52
NCG-L-13	High Vacuum Condenser Feed Flange	1.0	53
NCG-L-14	High Vacuum Condenser Return Flange	1.0	54
NCG-L-15	Capped Y	0.4	55
NCG-L-16	Valve	0.8	56
NCG-L-17	High Vacuum Condenser	0.5	57
NCG-L-18	High Vacuum Condenser NCG Outlet Flange	0.7	58
NCG-L-19	Flange	1.4	59
NCG-L-20	1/2" P-Gauge	1.0	60
NCG-L-21	Steam Ejector	4.2	61
NCG-L-22	Flange	3.1	62
NCG-L-23	Flange	5.3	63
NCG-L-24	Low Vacuum Condenser	5.9	64
NCG-L-25	Low Vacuum Condenser Return Flange	0.9	65
NCG-L-26	Capped Y	1.0	66
NCG-L-27	Valve	1.1	67
NCG-L-28	Low Vacuum Condenser NCG Outlet Flange	3.2	68
NCG-L-29	Flange	3.5	69
NCG-L-30	1/2" P-Gauge	3.5	70
NCG-L-31	Steam Ejector	3.5	71
NCG-L-32	Flange	11.0	72
NCG-L-33	1/2" P-Gauge	2.3	73
NCG-L-34	Valve	2.7	74
NCG-L-35	Flange	6.1	75
NCG-L-36	NCG Tank Flange From Condensers	3.0	76
NCG-L-37	NCG Tank Flange From Condensers	5.0	77
NCG-L-38	NCG Tank Flange From Condensers	3.0	78
NCG-L-39	NCG Tank Flange To Vacuum Break	3.2	79
NCG-L-40	NCG Tank Flange For Mill Water	5.0	80

PCA Filer City

Name	Description	ppm	Label Code
NCG-L-41	NCG Tank Flange to Boilers	3.8	81
NCG-L-42	NCG Tank Flange	3.1	82
NCG-L-43	Auto Valve	4.8	83
NCG-L-44	Valve	5.1	84
NCG-L-45	1/2" to Instrument	5.3	85
NCG-L-46	Rupture Disc	4.5	86
NCG-L-47	Valve	3.5	87
NCG-L-48	2" Valve	6.0	88
NCG-L-49	1/2" to Instrument	5.0	89
NCG-L-50	1/2"Valve	4.2	90
NCG-L-51	1/2" Temp. Gauge	1.1	91
NCG-L-52	Valve	3.0	92
NCG-L-53	Valve	4.0	93
FCs			
NCG-F-1	Flange on FC Condenser	3.3	94
NCG-F-2	Flange on FC Condenser	3.0	95
NCG-F-3	Valve	4.2	96
NCG-F-4	Vacuum Break	4.0	97
NCG-F-5	NCG Inlet Flange	0.3	98
NCG-F-6	Large Vacuum Condenser	1.0	99
NCG-F-7	Condensate Flange	0.2	100
NCG-F-8	Valve on condensate line	1.0	101
NCG-F-9	NCG Outlet Flange	0.8	102
NCG-F-10	1/2" P-Gauge	0.9	103
NCG-F-11	Steam Ejector	0.8	104
NCG-F-12	Flange	0.9	105
NCG-F-13	NCG Inlet Flange	0.9	106
NCG-F-14	Small Vacuum Condenser	0.7	107
NCG-F-15	Condensate Flange	0.8	108
NCG-F-16	Valve	0.5	109
NCG-F-17	Valve	0.1	110
NCG-F-18	NCG Outlet Flange	0.1	111
NCG-F-19	1/2" P-Gauge	1.1	112
NCG-F-20	Steam Ejector	0.7	113
NCG-F-21	Flange	0.7	114
NCG-F-22	Valve	0.9	115
NCG-F-23	Valve	0.8	116
NCG-F-24	NCG Tank Flange	4.5	117
NCG-F-25	NCG Tank Flange	3.4	118
NCG-F-26	NCG Tank Flange	4.5	119
To Boiler 1 or Boiler 4			
NCG-B-1	1/2" valve	3.2	120

PCA Filer City

Name	Description	ppm	Label Code
NCG-B-2	V-216 1/2" P-Gauge	3.5	121
NCG-B-3	Valve	2	122
NCG-B-4	60 lb Steam Ejector	5	123
NCG-B-5	Flange	2.5	124
NCG-B-6	1/2" Temp. Gauge	2.4	125
NCG-B-7	1/2" Valve	3	126
NCG-B-8	V-223 1/2" Valve	2	127
NCG-B-9	Orifice plate	3.1	128
NCG-B-10	V-218 1/2" Valve	3.3	129
NCG-B-11	Auto Valve to Atmosphere	1.5	130
NCG-B-12	12" Valve	2	131
NCG-B-13	1/2" to Instrument	2.2	132
NCG-B-14	Rupture Disc	2.3	133
NCG-B-15	V-228 1/2" Valve	1	134
NCG-B-16	Entrainment Separator Asset 13600	1.3	135
NCG-B-17	V-229 1/2"	9.8	136
NCG-B-30	#4 Boiler NCG Feed Flange	9.9	142
NCG-B-31	Flange	3	143
NCG-B-32	V-226 12" Valve	3	144
NCG-B-33	9508 Valve	2	145
NCG-B-34	Steam Tie-in	1.8	146
NCG-B-35	V-230 1/2" Valve	2.8	147
NCG-B-36	Flame Arrestor	4.2	148
NCG-B-37	V-231 1/2" Valve	1	149
NCG-B-38	Pressure Gauge 1/2"	2.9	150
NCG-B-39	Temperature Gauge Electric 9206 1/2"	3.9	151
NCG-B-40	Temperature Gauge 9208 1/2"	3.3	152
NCG-B-41	V-221 12" Valve	4	153
NCG-B-42	#1 Boiler NCG Feed Flange	4.6	154

APPENDIX C

PCA Filer City

Leak Detection and Repair (LDAR) Inspection Report

Date: 4-2-24

Technicians: Kate Strang & Mike Nummer

Name	Description	ppm	Label Code
Rotary Drum Washers to "Rats Nest"			
NCG-RD-1	Flange on Rotary Drum Washer	2.5	1
NCG-RD-2	Flange on Rotary Drum Washer	3.1	2
NCG-R-1	Blow Tower	4.2	3
NCG-R-2	V-105 1B 24" Valve	6.5	4
NCG-R-3	Asset 13590 Pressure/Vacuum Relief Valve	6.3	5
NCG-R-4	V-101 24" Valve	6.1	6
NCG-R-5	V-102 1/2" P-Gauge	6.4	7
NCG-R-6	C.O. 6"	6.2	8
NCG-R-7	C.O. 12"	6.4	9
NCG-R-8	24" Flange	6.3	10
NCG-R-9	Cyclone	6.3	11
NCG-R-10	V-104 1/2" P-Gauge	6.4	12
NCG-R-11	V-103 1/2" Valve	6.5	13
NCG-R-12	Condenser	6.9	14
NCG-R-13	1" Nub	6.5	15
"Rats Nest"			
NCG-V-1	3/4" to Instrument	3.9	16
NCG-V-2	Auto Valve to Atmosphere	4.9	17
NCG-V-3	Valve	4.3	18
NCG-V-4	1/2" Pressure Switch	2.3	19
NCG-V-5	Rupture Disc	3.6	20
NCG-V-6	Valve	4.2	21
NCG-V-7	2" Valve	3.3	22
NCG-V-8	1/2" to Instrument	3.2	23
NCG-V-9	1/2" P-Gauge	4.9	24
NCG-V-10	1/2" Temp. Gauge	4.3	25
NCG-V-11	Valve	4.1	26
NCG-V-12	Valve	4.3	27
NCG-V-13	3/4" to Instrument	4.1	28
NCG-V-14	Auto Valve to Atmosphere	3.6	29
NCG-V-15	Valve	3.1	30
NCG-V-16	1/2" Capped	3.1	31
NCG-V-17	Rupture Disc	3.3	32
NCG-V-18	Valve	4.0	33
NCG-V-19	2" Valve	3.6	34

PCA Filer City

Leak Detection and Repair (LDAR) Inspection Report

Date: 4-2-24

Technicians: Kate Strang & Mike Nummer

Name	Description	ppm	Label Code
NCG-V-20	1/2" to Instrument	3.7	35
NCG-V-21	1/2" P-Gauge	3.4	36
NCG-V-22	1/2" Temp. Gauge	3.9	37
NCG-V-23	Valve	3.9	38
NCG-V-24	Valve	4.2	39
NCG-V-25	1" nub outside on roof	4.1	40
LTV Evaporators			
NCG-L-1	Flange on 5th effect	2.1	41
NCG-L-2	Valve	3.0	42
NCG-L-3	Valve	3.6	43
NCG-L-4	Valve	4.2	44
NCG-L-5	Valve	5.0	45
NCG-L-6	Valve	3.0	46
NCG-L-7	Valve	3.0	47
NCG-L-8	Valve	3.0	48
NCG-L-9	Valve Near Surface Condenser	1.2	49
NCG-L-10	Valve Near Surface Condenser	0.9	50
NCG-L-11	Surface Condenser	0.9	51
NCG-L-12	1/2" P-Gauge	1.0	52
NCG-L-13	High Vacuum Condenser Feed Flange	1.0	53
NCG-L-14	High Vacuum Condenser Return Flange	1.0	54
NCG-L-15	Capped Y	0.4	55
NCG-L-16	Valve	0.8	56
NCG-L-17	High Vacuum Condenser	0.5	57
NCG-L-18	High Vacuum Condenser NCG Outlet Flange	0.7	58
NCG-L-19	Flange	1.4	59
NCG-L-20	1/2" P-Gauge	1.0	60
NCG-L-21	Steam Ejector	4.2	61
NCG-L-22	Flange	3.1	62
NCG-L-23	Flange	5.3	63
NCG-L-24	Low Vacuum Condenser	5.9	64
NCG-L-25	Low Vacuum Condenser Return Flange	0.9	65
NCG-L-26	Capped Y	1.0	66
NCG-L-27	Valve	1.1	67
NCG-L-28	Low Vacuum Condenser NCG Outlet Flange	3.2	68
NCG-L-29	Flange	3.5	69
NCG-L-30	1/2" P-Gauge	3.5	70

PCA Filer City

Leak Detection and Repair (LDAR) Inspection Report

Date: 4-2-24

Technicians: Kate Strang & Mike Nummer

Name	Description	ppm	Label Code
NCG-L-31	Steam Ejector	3.5	71
NCG-L-32	Flange	11.0	72
NCG-L-33	1/2" P-Gauge	2.3	73
NCG-L-34	Valve	2.7	74
NCG-L-35	Flange	6.1	75
NCG-L-36	NCG Tank Flange From Condensers	3.0	76
NCG-L-37	NCG Tank Flange From Condensers	5.0	77
NCG-L-38	NCG Tank Flange From Condensers	3.0	78
NCG-L-39	NCG Tank Flange To Vacuum Break	3.2	79
NCG-L-40	NCG Tank Flange For Mill Water	5.0	80
NCG-L-41	NCG Tank Flange to Boilers	3.8	81
NCG-L-42	NCG Tank Flange	3.1	82
NCG-L-43	Auto Valve	4.8	83
NCG-L-44	Valve	5.1	84
NCG-L-45	1/2" to Instrument	5.3	85
NCG-L-46	Rupture Disc	4.5	86
NCG-L-47	Valve	3.8	87
NCG-L-48	2" Valve	6.0	88
NCG-L-49	1/2" to Instrument	5.0	89
NCG-L-50	1/2"Valve	4.2	90
NCG-L-51	1/2" Temp. Gauge	1.1	91
NCG-L-52	Valve	3.0	92
NCG-L-53	Valve	4.0	93
FCs			
NCG-F-1	Flange on FC Condenser	3.3	94
NCG-F-2	Flange on FC Condenser	34.0 *	95
NCG-F-3	Valve	4.2	96
NCG-F-4	Vacuum Break	4.0	97
NCG-F-5	NCG Inlet Flange	0.3	98
NCG-F-6	Large Vacuum Condenser	1.6	99
NCG-F-7	Condensate Flange	0.2	100
NCG-F-8	Valve on condensate line	1.0	101
NCG-F-9	NCG Outlet Flange	0.8	102
NCG-F-10	1/2" P-Gauge	0.9	103
NCG-F-11	Steam Ejector	0.8	104
NCG-F-12	Flange	0.9	105
NCG-F-13	NCG Inlet Flange	0.9	106

* MSN 4-2-24

PCA Filer City

Leak Detection and Repair (LDAR) Inspection Report

Date: 4-2-24

Technicians: Kate Strang & Mike Nummer

Name	Description	ppm	Label Code
NCG-F-14	Small Vacuum Condenser	0.7	107
NCG-F-15	Condensate Flange	0.8	108
NCG-F-16	Valve	0.5	109
NCG-F-17	Valve	0.1	110
NCG-F-18	NCG Outlet Flange	0.1	111
NCG-F-19	1/2" P-Gauge	1.1	112
NCG-F-20	Steam Ejector	0.7	113
NCG-F-21	Flange	0.7	114
NCG-F-22	Valve	0.9	115
NCG-F-23	Valve	0.8	116
NCG-F-24	NCG Tank Flange	4.5	117
NCG-F-25	NCG Tank Flange	3.4	118
NCG-F-26	NCG Tank Flange	4.5	119
To Boiler 1 or Boiler 4			
NCG-B-1	1/2" valve	3.2	120
NCG-B-2	V-216 1/2" P-Gauge	3.5	121
NCG-B-3	Valve	2.0	122
NCG-B-4	60 lb Steam Ejector	5.0	123
NCG-B-5	Flange	2.5	124
NCG-B-6	1/2" Temp. Gauge	2.4	125
NCG-B-7	1/2" Valve	3.0	126
NCG-B-8	V-223 1/2" Valve	2.0	127
NCG-B-9	Orifice plate	3.1	128
NCG-B-10	V-218 1/2" Valve	3.3	129
NCG-B-11	Auto Valve to Atmosphere	1.5	130
NCG-B-12	12" Valve	2.0	131
NCG-B-13	1/2" to Instrument	2.2	132
NCG-B-14	Rupture Disc	2.3	133
NCG-B-15	V-228 1/2" Valve	1.0	134
NCG-B-16	Entrainment Separator Asset 13600	1.3	135
NCG-B-17	V-229 1/2"	9.8	136
NCG-B-30	#4 Boiler NCG Feed Flange	9.9	149
NCG-B-31	Flange	3.0	150
NCG-B-32	V-226 12" Valve	3.0	151
NCG-B-33	9508 Valve	2.0	152
NCG-B-34	Steam Tie-in	1.8	153
NCG-B-35	V-230 1/2" Valve	2.8	154

PCA Filer City

Leak Detection and Repair (LDAR) Inspection Report

Date: 4-2-24

Technicians: Kate Strang & Mike Nummer

Name	Description	ppm	Label Code
NCG-B-36	Flame Arrestor	4.2	155
NCG-B-37	V-231 1/2" Valve	1.0	156
NCG-B-38	Pressue Gauge 1/2"	2.9	157
NCG-B-39	Temperature Gauge Electric 9206 1/2"	3.9	158
NCG-B-40	Temperature Gauge 9208 1/2"	3.3	159
NCG-B-41	V-221 12" Valve	4.0	160
NCG-B-42	#1 Boiler NCG Feed Flange	4.6	161

Pre Calibrations:	*Date:* 4-2-24		
	Time	Zero	Span
Actual Values		0.0	10,000.0
Check 1	12:40	0.8	9,998.8
Check 2	12:45	0.8	9,999.1
Check 3	12:50	0.7	9,999.0

Post Calibrations:	*Date:* 4-2-24		
	Time	Zero	Span
Actual Values		0.0	10,000.0
Check 1	15:05	0.9	9,999.2
Check 2	15:10	0.9	9,999.3
Check 3	15:15	0.9	9,999.1

Signature: ~~Kate~~ Strang

Reviewed by: Mike Nummer

NorLAB®
A DIVISION OF NORCO, INC.
Calibration Gases & Equipment

CERTIFICATE OF ANALYSIS

Premier Safety & Service

33596 Sterling Pond Blvd
Sterling Hights MI 48312

Cust Number 07152
Order Number 71965881
PO Number 04A41252

Lot Number	3-005-81
Norlab Part#	J197120LA
Cylinder Size	103 Liter
Number of Cyl	1

Date on Manufacture	4/17/2023
Expires	04/2027
Analytical Accuracy	+/- 2 %

Customer Part# N/A

Component	Reported Concentration	Requested Concentration
Methane	1.00 % (20 % L.E.L.)	1.00 % (20 % L.E.L.)
Air	Balance	Balance

Storage: Keep away from heat, flames, and sparks. Store and use with adequate ventilation. Close valve when not in use and when empty. Never allow cylinder temperature to exceed 125 degrees F.

The cylinders in this lot were transfilled from cylinders prepared gravimetrically and traceable to the NIST by the certified weights used to calibrate the scale. The transfilled cylinders were then analyzed against standards traceable to the NIST by weights or SRMs.

NIST Traceable Numbers are available upon request.

Approved: _____ Date Signed: 4/17/2023

Aaron Schwenken
Lab Manager

898 W. GOWEN ROAD • BOISE, IDAHO 83705
Phone (208) 336-1643 • Fax (208) 331-3038 • 800-657-6672

FINAL REPORT

PACKAGING CORPORATION OF AMERICA

FILER CITY, MICHIGAN

2024 BOILER 4A CARBON MONOXIDE EMISSIONS TEST

RWDI #2402350

May 28, 2024

SUBMITTED TO

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EXECUTIVE SUMMARY

RWDI USA LLC (RWDI) was retained by Packaging Corporation of America (PCA) to conduct carbon monoxide emissions testing from Boiler 4A at the PCA Filer City Mill location at 2246 Udell Street located in Filer City, Michigan. The testing program was completed on April 3rd, 2023, on EUBOILER4A for Carbon Monoxide (CO), carbon dioxide (CO_2), and Oxygen (O_2). The carbon monoxide emissions testing was conducted in to fulfill the requirements of the Michigan Department of Environment, Great Lakes, and Energy (EGLE) Permit No. 209-18A.

During the review of the data, RWDI noticed and communicated with the State of Michigan Department of Environment, Great Lakes and Energy (EGLE) regarding a perceived anomaly with the moisture data from Test 1 in comparison to Test 2 and 3 as well as previous testing at the facility. In order to evaluate the data, RWDI completed a comparison of the calculated emission rates using three (3) methods:

1) Calculation of CO emission rate in lb/hr using data as measured;
2) Calculation of CO emission rate in lb/hr using the average moisture data from Test 2 and Test 3 applied to Test 1 to estimate flow rate;
3) Calculation of CO emission rate in lb/hr using techniques from USEPA Method 19.

Executive Table i: Average Emission Rate – EUBOILER4A

Parameter	EUBOILER4A
Carbon Monoxide Emission Rate (as measured)	1.42 lb/hr
Carbon Monoxide Emission Rate (Moisture data from Test 2 and 3 used for Test 1)	1.49 lb/hr
Carbon Monoxide Emission Rate (as measured) (based on USEPA Method 19)	1.44 lb/hr

The was conducted in to fulfill the requirements of the Michigan Department of Environment, Great Lakes, and Energy (EGLE) Permit No. 209-18A. In all cases, the difference in the data was minor and resulted in a CO emission rate significantly below the PTI Limit.

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1 INTRODUCTION

RWDI USA LLC (RWDI) was retained by Packaging Corporation of America (PCA) to conduct carbon monoxide emissions testing from Boiler 4A at the PCA Filer City Mill location at 2246 Udell Street located in Filer City, Michigan. The testing program was completed on April 3rd, 2023, on EUBOILER4A for Carbon Monoxide (CO), carbon dioxide (CO_2), and Oxygen (O_2).

The carbon monoxide emissions testing was conducted in to fulfill the requirements of the Michigan Department of Environment, Great Lakes, and Energy (EGLE) Permit No. 209-18A.

During the review of the data, RWDI noticed and communicated with the State of Michigan Department of Environment, Great Lakes and Energy (EGLE) regarding a perceived anomaly with the moisture data from Test 1 in comparison to Test 2 and 3 as well as previous testing at the facility. In order to evaluate the data, RWDI completed a comparison of the calculated emission rates using three (3) methods:

1) Calculation of CO emission rate in lb/hr using data as measured;
2) Calculation of CO emission rate in lb/hr using the average moisture data from Test 2 and Test 3 applied to Test 1 to estimate flow rate;
3) Calculation of CO emission rate in lb/hr using techniques from USEPA Method 19.

1.1 Location and Dates of Testing

The Test Program was completed on April 3rd, 2024 at the PCA's Filer City Mill in Filer City, Michigan.

1.2 Purpose of Testing

The emissions test program is required by EGLE Permit No. 209-18A and compared the emission rate of CO to the PTI Limit of 22.7 lb/hr.

1.3 Description of Source

Boiler 4A is a Babcock and Wilcox unit utilized to provide steam for various mill processes and for electrical generation. The boiler can be fired with natural gas or biogas. The boiler has a maximum heat input rating of 227 MMBTU/hr.

1.4 Personnel Involved in Testing

Table 1.4.1: Testing Personnel

Personnel (Title & Email)	Affiliation	Phone Number
Zebadiah Jones Environmental Manager Zebjones@packagingcorporation.com	**Packaging Corporation of America** 2246 Udell Street Filer City, MI 49634	(231) 723-9951 ext. 1455
Lindsey Wells Senior Environmental Quality Analyst WellsL8@Michigan.gov	**State of Michigan Department of Environment, Great Lakes and Energy (EGLE)**	(517) 282-2345
Daniel J Droste Air Quality Analyst Drosted3@Michigan.gov	**State of Michigan Department of Environment, Great Lakes and Energy (EGLE)**	(989) 225-6052
Brad Bergeron Technical Director Brad.Bergeron@rwdi.com	**RWDI USA LLC** 2239 Star Court Rochester Hills, MI 48309	(248) 234-3885
Steve Smith Project Manager Steve.Smith@rwdi.com		(971) 940-5038
Ben Durham Senior Field Technician Ben.Durham@rwdi.com		(734) 474-1731
Kate Strang Field Technician Kate.Strang@rwdi.com		(518) 257-0117
Cade Smith Field Technician Cade.Smith@rwdi.com		(734) 552-7270

2 SUMMARY OF RESULTS

2.1 Operating Data

Operational data collected during the testing includes:

- Total Heat Input (MMBTU/hr)
- F-Factor (DSCF/MMBTU)

2.2 Applicable Permit

3 PERMIT NO. 209-18A SOURCE DESCRIPTION

3.1 Description of Process and Emission Control Equipment

Boiler 4A is a Babcock and Wilcox unit utilized to provide steam for various mill processes and for electrical generation. The boiler can be fired with natural gas or biogas. The boiler has a maximum heat input rating of 227 MMBTU/hr. The boiler is fitted with low-NOx burners.

3.2 Process Flow Sheet or Diagram

The boiler has a single outlet. A process flow diagram can be provided if requested. A schematic of the sampling location is provided in **Figure 4**.

3.3 Type and Quantity of Raw and Finished Materials

Boiler 4A is fired by natural gas.

3.4 Normal Rated Capacity of Process

Boiler 4A has a rated capacity of 227 MMBTU/hr or 150,000 pounds of steam. Process data is provided in **Appendix B**.

4 SAMPLING AND ANALYTICAL PROCEDURES

The following test methods were referenced in the test program.

- **Method 1**: Sample and Velocity Traverses for Stationary Sources
- **Method 2**: Determination of Stack Gas Velocity and Volumetric Flowrate
- **Method 3A**: Determination of Molecular Weight of Dry Stack Gases (instrumental)
- **Method 4**: Determination of Moisture Content in Stack Gases
- **Method 10**: Determination of Carbon Monoxide from Stationary Sources

4.1 Stack Velocity, Temperature, and Volumetric Flow Rate

The exhaust velocities and flow rates were determined following USEPA Method 2, "Determination of Stack Gas Velocity and Volumetric Flow Rate (Type S Pitot Tube)". Velocity measurements were taken with a pre-calibrated S-Type pitot tube and incline manometer or digital manometer. Volumetric flow rates were determined following the equal area method as outlined in USEPA Method 2. Temperature measurements were made simultaneously with the velocity measurements and were conducted using a chromel-alumel type "k" thermocouple in conjunction with a calibrated digital temperature indicator.

The dry molecular weight of the stack gas was determined following calculations outlined in USEPA Method 3A, "Gas Analysis for the Determination of Dry Molecular Weight".

Stack moisture content was determined through direct condensation and according to USEPA Method 4, "Determination of Moisture Content of Stack Gases". A schematic of the Method 1 to 4 sampling train is provided in **Figures 1 & 3**. A total of three (3) 30-minute tests were conducted.

4.2 Sampling for Carbon Monoxide (CO), Oxygen (O_2) and Carbon Dioxide (CO_2)

Three (3) 60-minute tests were performed on EUBOILER4A. CO concentrations were determined utilizing RWDI's continuous emissions monitoring (CEM) system following USEPA Method 10. O_2 and CO_2 were measured continuously as per Method 3A. Prior to testing, a 3-point analyzer calibration error check was conducted using USEPA protocol gases. The calibration error check was performed by introducing zero, mid, and high-level calibration gases directly into the analyzer. The calibration error check was performed to confirm that the analyzer response is within ±2% of the certified calibration gas introduced. Prior to each test run, a system-bias test was performed where known concentrations of calibration gases were introduced at the probe tip to measure if the analyzers response was within ±5% of the introduced calibration gas concentrations. At the conclusion of each test run a system-bias check was performed to evaluate the percent drift from pre and post-test system bias checks. The system bias checks were used to confirm that the analyzer did not drift greater than ±3% throughout a test run.

Zero and upscale calibration checks were conducted both before and after each test run to quantify measurement system calibration drift and sampling system bias. Upscale is either the mid- or high-range gas, whichever most closely approximates the flue gas level. During these checks, the calibration gases were introduced into the sampling system at the probe outlet so that the calibration gases were analyzed in the same manner as the flue gas samples.

A gas sample was continuously extracted from the stack and delivered to a series of gas analyzers, which measure the pollutant or diluent concentrations in the gas. The analyzers were calibrated on-site using EPA Protocol No. 1 certified calibration mixtures. The probe tip was equipped with a sintered stainless-steel filter for particulate removal. The end of the probe was connected to a heated Teflon sample line, which delivered the sample gases from the stack to the CEM system. The heated sample line was set to maintain the gas temperature above 250°F to prevent condensation of stack gas moisture within the line.

Before entering the analyzers, the gas sample passed directly into a refrigerated condenser, which cooled the gas to approximately 35°F to remove the stack gas moisture. After passing through the condenser, the dry gas entered a Teflon-head diaphragm pump and a flow control panel, which delivered the gas in series to the O_2, CO_2 and CO analyzers. Each of these analyzers measured the respective gas concentrations on a dry volumetric basis.

Figure 2 illustrates USEPA Method 3A and 10 sampling system.

4.3 Gas Dilution System

Calibration gas was mixed using an Environics 4040 Gas Dilution System. The mass flow controllers are factory calibrated using a primary flow standard traceable to the United States National Institute of Standards and Technology (NIST). Each flow controller utilizes an 11-point calibration table with linear interpolation, to increase accuracy and reduce flow controller nonlinearity. The calibration is done yearly, and the record is included in **Appendix C.** A multi-point EPA Method 205 check was conducted in the field prior to testing to ensure accurate gas-mixtures. The gas dilution system consists of calibrated orifices or mass flow controllers and dilutes a high-level calibration gas to within ±2% of predicted values. The gas divider is capable of diluting gases at set increments and was evaluated for accuracy in the field in accordance with US EPA Method 205 "*Verification of Gas Dilution Systems for Field Instrument Calibrations*". The gas divider dilutions were measured to evaluate that the responses are within ±2% of predicted values. In addition, a certified mid-level calibration gas within ±10% of one of the tested dilution gases was introduced into an analyzer to ensure the response of the gas calibration was within ±2% of gas divider dilution concentration.

4.4 CO Emission Rate Calculation (US EPA Methods 19):

USEPA Method 19, "Determination of Sulfur Dioxide Removal Efficiency and Particulate Matter, Sulfur Dioxide and Nitrogen Oxide Emission Rates," was used to calculate CO emission factors based on Oxygen concentrations and appropriate F-factors. Equation 19-1 from the method was used. Table 19-1 was used to determine the conversion factor for concentration (7.256×10^{-8} for CO). Table 19-2 was used for the F-Factor (natural gas 8,710 dscf/10^6 BTU).

$E = (7.256 \times 10^{-8}) \times C_d \times F_d \times ((20.9/(20.9-\%O_{2d}))$ for CO

Where:

E = Pollutant Emission Rate (lb./10^6 BTU)

C_d = Pollutant Concentration, Dry Basis (ppm)

F_d = Fuel Factor, Dry Basis (dscf/10^6 BTU)

$\%O_{2d}$ = Oxygen Concentration, Dry Basis (%)

4.5 Description of Recovery and Analytical Procedures

There were no samples to recover during this test program.

4.6 Sampling Port Description

The sampling ports for EUBOILER4A meet USEPA 1 requirements. USEPA Method 1 data collected on the source can be found in **Appendix D**. A diagram of the EUBOILER4A stack is shown in **Figure 4**.

4.7 Internal Quality Assurance

Quality control procedures specific to the CEMS includes linearity checks to determine the instrument performance and reproducibility prior to its use in the testing program. Regular performance checks on the analyzers were also carried out during the testing program by performing zero and span calibration checks using EPA Protocol 1 gas standards. Sample system bias checks were also conducted. These checks were used to verify the ongoing precision of the monitor and sampling system over time. Pollutant-free nitrogen was introduced to perform the zero checks, followed by a known calibration (span) gas into the monitor. The response of the monitor to pollutant-free air and the corresponding sensitivity to the span gas was be recorded regularly during the tests. These records can be found in **Appendix A.**

5 TEST RESULTS AND DISCUSSSION

During the review of the data, RWDI noticed and communicated with the State of Michigan Department of Environment, Great Lakes and Energy (EGLE) regarding a perceived anomaly with the moisture data from Test 1 in comparison to Test 2 and 3 as well as previous testing at the facility. In order to evaluate the data, RWDI completed a comparison of the calculated emission rates using three (3) methods:

1) Calculation of CO emission rate in lb/hr using data as measured;
2) Calculation of CO emission rate in lb/hr using the average moisture data from Test 2 and Test 3 applied to Test 1 to estimate flow rate;
3) Calculation of CO emission rate in lb/hr using techniques from USEPA Method 19.

Table 5.1: Average Emission Rate – EUBOILER4A

Parameter	EUBOILER4A
Carbon Monoxide Emission Rate (as measured)	1.42 lb/hr
Carbon Monoxide Emission Rate (Moisture data from Test 2 and 3 used for Test 1)	1.49 lb/hr
Carbon Monoxide Emission Rate (as measured) (based on USEPA Method 19)	1.44 lb/hr

Detailed results can be found in **Appendix A**. Calibration documentation can be found in **Appendix C**.

5.1 Process Conditions During Testing

EUBOILER4A was running under normal operating conditions during testing.

5.2 Maintenance Performed in The Last Three Months

Normal general maintenance to the boiler was completed.

5.3 Re-Test

This was not a re-test.

5.4 Audit Samples

This test did not require any audit samples.

5.5 Process Data

Process data can be found in **Appendix B**.

5.6 Calibration Data

Calibration data can be found in **Appendix C**.

5.7 Field Notes

Field notes can be found in **Appendix D.**

5.8 Example Calculations

Example calculations can be found in **Appendix E**.

5.9 Laboratory Data

There was no laboratory data from this testing program.

5.10 Test Plan and Approval Letter(s)

Copies of test plan and approval letters can be found in **Appendix F**.

6 CONCLUSIONS

The purpose of the study was to verify the carbon monoxide (CO) emission rate of EUBOILER4A as outlined within the State of Michigan Department of Environment, Great Lakes, and Energy (EGLE) Permit No. 209-18A. All CO levels were validated to be in compliance with the 22.7 lb/hr emission limit for CO.

TABLES

Table 1: Summary of Sampling Parameters and Methodology

Source Location	No. of Tests per Stack	Sampling Parameter	Sampling Method
EUBOILER4A	3	Sample Points	U.S. EPA [1] Method 1
	3	Velocity	U.S. EPA [1] Method 2
	3	Molecular Weight	U.S. EPA [1] Method 3A
	3	Moisture	U.S. EPA [1] Method 4
	3	Carbon Monoxide	U.S. EPA [1] Method 10

Notes:

[1] U.S. EPA - United States Environmental Protection Agency

Table 2: Sampling Summary - EUBOILER4

Test #	Sampling Date	Start Time	End Time
1	3-Apr-24	8:27	9:26
2		9:50	10:49
3		11:07	12:06

Table 3: Sampling Summary - Flow Characteristics - EUBOILER4A

E-Coat North TAR		Test 1 EUBOILER4A	Test 2 EUBOILER4A	Test 3 EUBOILER4A	TOTAL AVERAGE
Testing Date		3-Apr-24	3-Apr-24	3-Apr-24	-
Stack Temperature	°F	464	464	464	464
Moisture	%	27.5%	12.5%	15.8%	18.6%
Velocity	ft/s	49.8	45.7	49.4	48.3
Referenced Flow Rate	CFM	27,908	31,035	32,288	30,410

Notes:

[1] Referenced flow rate expressed as dry at 101.3 kPa, 68 °F, and Actual Oxygen

Table 4: EUBOILER4A CO Testing Summary

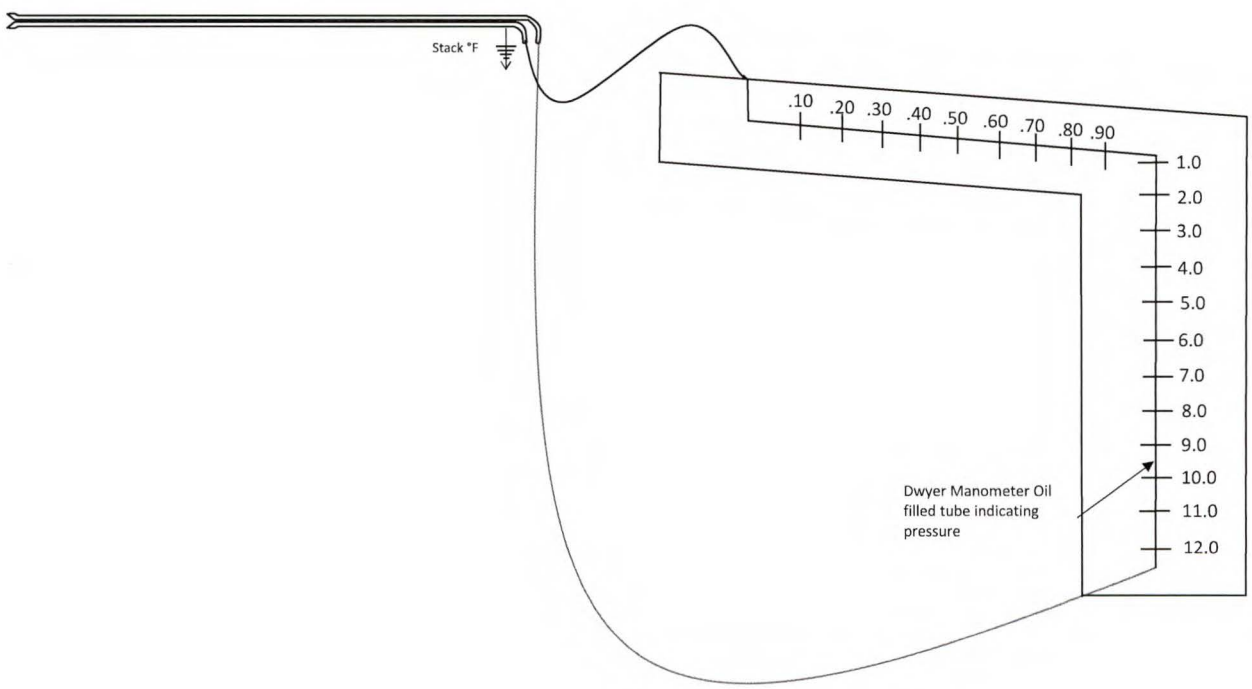
RWDI Project #2402350

							As Measured	Moisture from Test 2 and 3 Used for Test 1		US EPA Method 19	
Boiler 4A				O_2	CO	CO Emission Rate	CO Emission Rate	CO Emission Rate	Natural Gas Used	CO Emission Rate	
Test ID	Date	Start	End	%	ppm	lb/dscf	lb/hr	lb/hr	MMBTU	lb/hr	lb/MMBTU
1	2024-04-03	8:27	9:27	4.28	11.34	8.20E-07	1.37	1.58	168.1	1.52	0.0090
2	2024-04-03	9:50	10:50	4.30	10.93	7.91E-07	1.47	1.47	167.8	1.46	0.0087
3	2024-04-03	11:07	12:06	4.29	10.01	7.24E-07	1.40	1.40	169.9	1.35	0.0080
		Average		4.29	10.76	7.78E-07	1.42	1.49	168.6	1.44	0.0086
						Limit	22.7				

Flow Rate dry, ref (ft^3/min) as measured		Flow Rate dry, ref (ft^3/min) Adjusted	
		Average Moisture of Test 2 and 3 used of Test 1	
Test 1 =	27,908	*Test 1* =	32,106
Test 2 =	31,035	*Test 2* =	31,035
Test 3 =	32,288	*Test 3* =	32,288

dscf = dry standard cubic foot

FIGURES



USEPA Method 2

Packaging Corporation of America

Filer City Mill

Boiler 4A

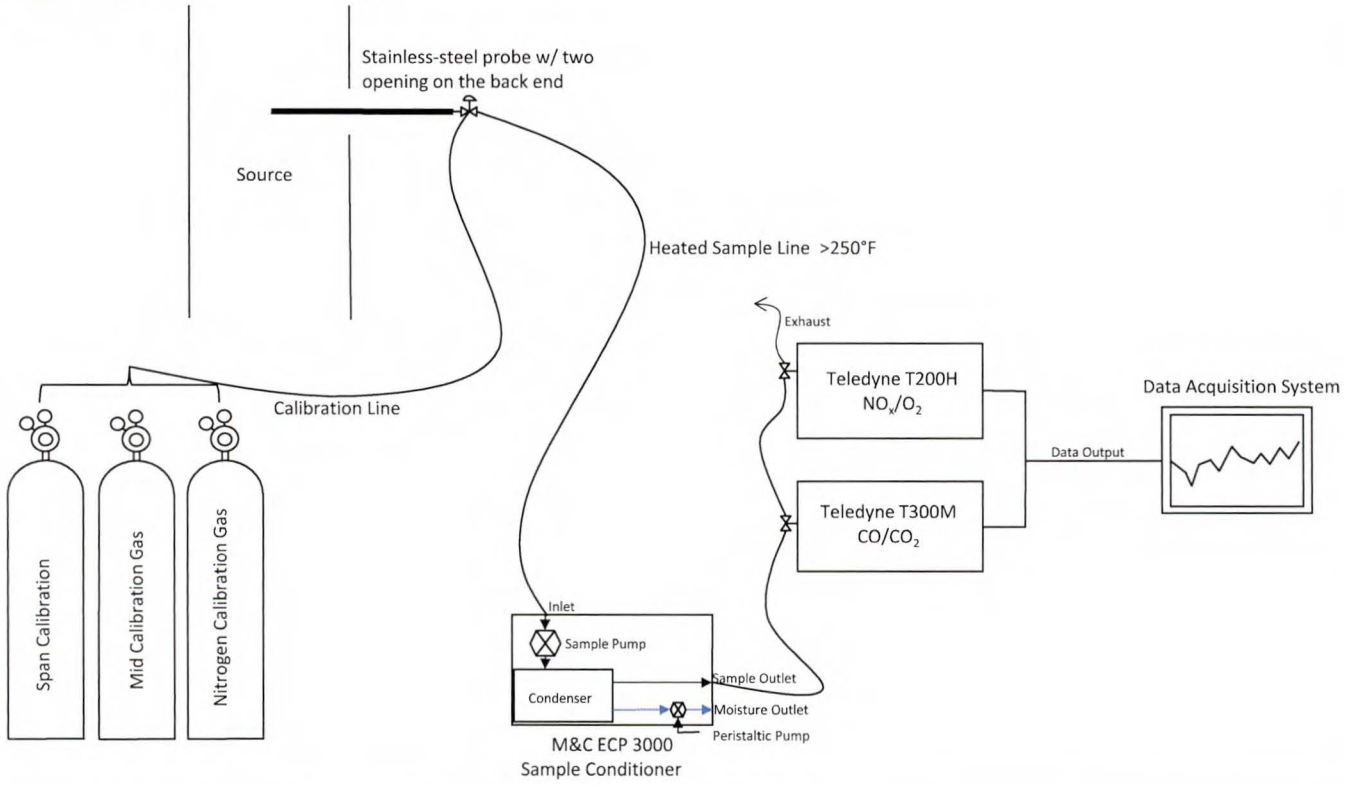
Filer City, MI

Project #2402350

Figure No. 1

Date: April 3, 2024

Figure No. 2: USEPA Method 3A and 10 Schematic



USEPA Method 3A and 10

Packaging Corporation of America

Filer City Mill

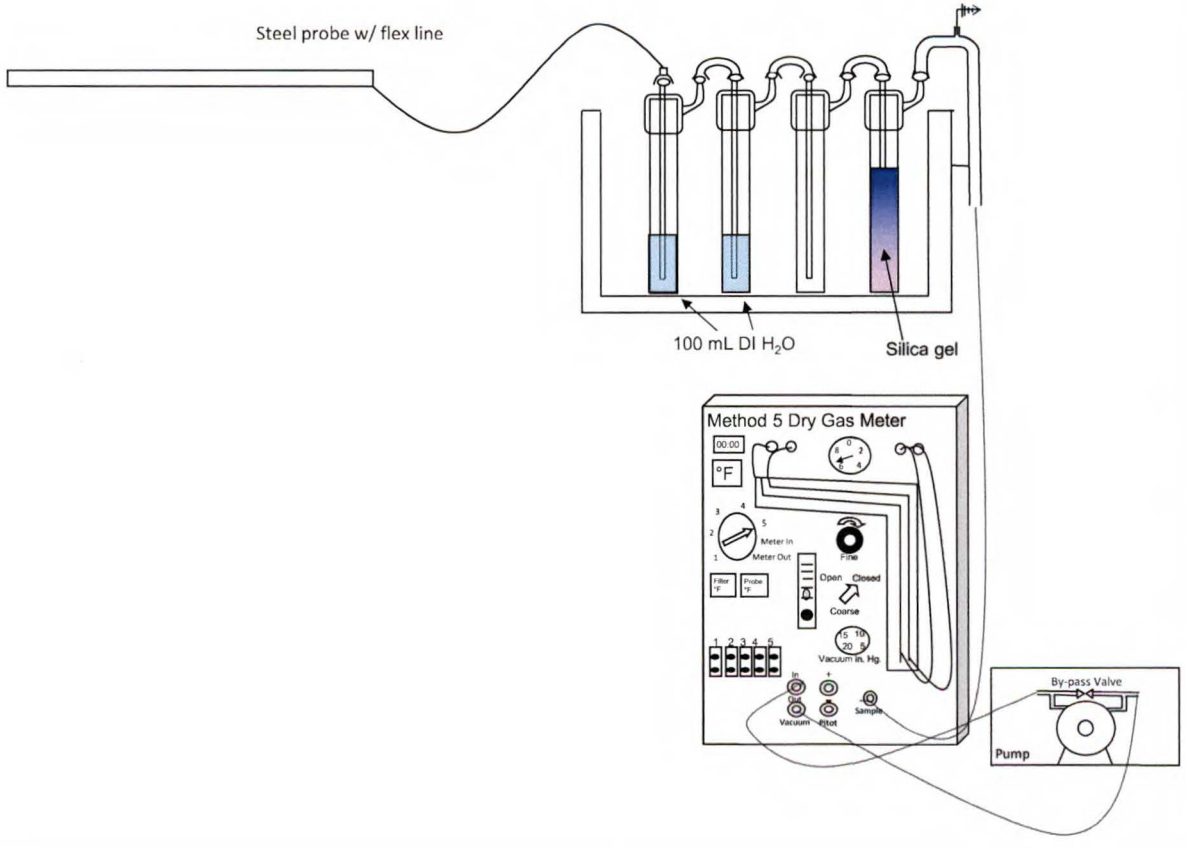
Boiler 4A

Filer City, MI

Project# 2402350

Date: April 3, 2024

Figure No. 3 USEPA Method 4



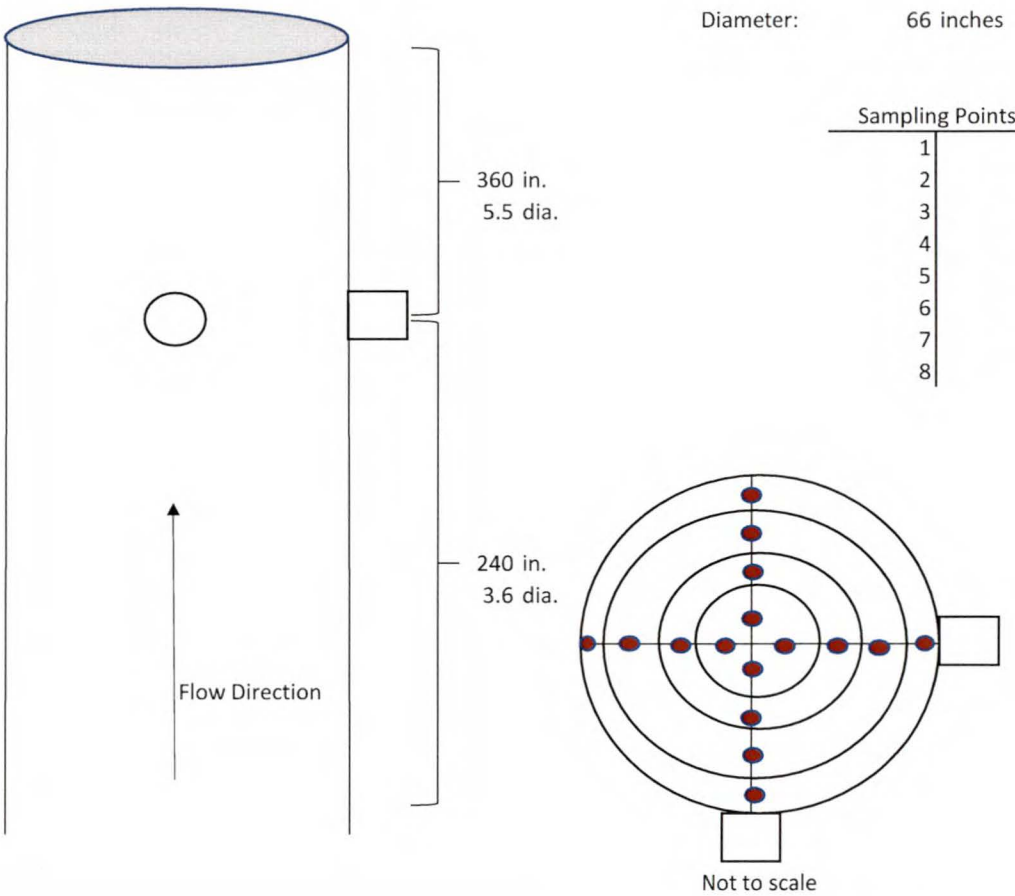
USEPA Method 4

Packaging Corporation of America
Filer City Mill
Boiler 4A
Filer City, MI

Project # 2402350

Date: April 3, 2024

Figure No. #4 Boiler 4A Stack Diagram



Diameter: 66 inches

Sampling Points	(in.)
1	2.11
2	6.93
3	12.80
4	21.32
5	44.68
6	53.20
7	59.07
8	63.89

EUBOILER4A
PCA
Filer City Mill
Filer City, MI

Date:
3-Apr-24

RWDI USA LLC
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