Relative Accuracy Test Audit and Pollutant Removal Efficiency of the Dryer RTO and Press Biofilter

Weyerhaeuser Company
4111 West Four Mile Road
Grayling, Michigan

State Registration No. B7302
Renewable Operating Permit MI-ROP-B7302-2010A

Prepared for
Weyerhaeuser Company
Grayling, Michigan

Bureau Veritas Project No. 11014-000197.00

December 16, 2014

Move Forward with Confidence

Bureau Veritas North America, Inc.
22345 Roethel Drive
Novi, Michigan 48375
248.344.2661
www.us.bureauveritas.com/hse

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: Weyerhaeuser | County: Crawford

Source Address: 4111 West Four Mile Road | City: Grayling

AQD Source ID (SRN): B7302 | RO Permit No.: MI-ROP-B7302-2010 | RO Permit Section No.: C and D

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 10/28/2014 To 10/30/2014

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

RATA and Destruction Efficiency report for new CEMS and control device media at FGDryers and EUPRESSLINE. Testing was done in accordance with the approved test plan submitted 9/18/2014. The facility operated in compliance with permit conditions and at maximum routine operating conditions for the facility.

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, and that any observed, documented or known instances of noncompliance have been reported as deviations, including situations where a different or no monitoring method is specified by the RO Permit.

Rina Allen	Plant Manager	989-348-3401
Name of Responsible Official (print or type)	Title	Phone Number
Rina Allen		12/12/14
Signature of Responsible Official		Date

* Photocopy this form as needed.

EQP 5736 (8/99)

Executive Summary

Weyerhaeuser Company retained Bureau Veritas North America, Inc. to conduct compliance air emissions testing for the press biofilter and dryer regenerative thermal oxidizer (RTO) sources at the Weyerhaeuser Company facility located at 4111 West Four Mile Road in Grayling, Crawford County, Michigan. The objectives of the testing were to:

- Measure the relative accuracy of the recently installed volatile organic compound (VOC) continuous emission monitoring system (CEMS) at the Press Biofilter.
- Evaluate the formaldehyde removal efficiency of the Press Biofilter.
- Measure the relative accuracy of the recently installed carbon monoxide (CO) and VOC CEMS at the Dryer RTO.
- Evaluate the total hydrocarbon (THC) destruction efficiency of the Dryer RTO.
- Re-establish the minimum operating temperature of 1,422°F on the Dryer RTO during the THC destruction efficiency testing.

The purpose of the testing was to evaluate the accuracy of the CEMS required by 40 CFR Part 60, Appendix F, "Quality Assurance Procedures" and as incorporated in Michigan Department of Environmental Quality (MDEQ) Renewable Operating Permit MI-ROP-B7302-2010a, effective April 20, 2010. Testing for the pollutant removal efficiency was performed as a requirement of permit conditions because the control device media has recently been replaced.

The testing was completed in accordance with United States Environmental Protection Agency (USEPA) Reference Methods 1 through 4, 10, 25A, 320, and Performance Specifications 4, 6 and 8. The testing was conducted on October 28, 29, and 30, 2014 and consisted of three 60-minute test runs at each source for pollutant removal efficiency testing. A minimum of nine 21-minute test runs were performed at the outlet of the press biofilter and dryer RTO to measure volumetric flowrate and VOC concentrations to evaluate CEMS relative accuracy. Carbon monoxide concentrations and mass emission rates were measured at the outlet of the dryer RTO to evaluate the CO CEMS relative accuracy.

Detailed results are presented in Tables 1 through 5 after the Tables Tab of this report. The results of the testing are summarized in the following tables.

Removal Efficiency Testing Results Compared to Permit Emission Limits

Date (2014)	Source ID	Parameter	Units	Average Result	Emission Limit
Oct 28	EUPRESSLINE (Biofilter)	Formaldehyde removal efficiency	%	97.8	≥90
Oct 30	FGDRYERS (RTO)	THC destruction efficiency	%	92	≥90
		Average operating temperature	°F	1,422	NA

RTO: regenerative thermal oxidizer
THC: total hydrocarbon
NA: not applicable

The formaldehyde and THC measurements demonstrate the press biofilter and dryer RTO are operating within allowable limits.

Relative Accuracy Test Audit Results Compared to Permit Emission Limits

Date (2014)	Parameter	Unit	Average Reference Method (RM) Result	Average CEMS Result	Difference between CEMS and RM	Relative Accuracy (RA) (%)	Performance Specification
EUPRESSLINE (Biofilter)							
Oct 28	VOC	lb/hr as carbon	10.87	11.47	-0.60	9.7	≤20% RA
FGDRYERS (RTO)							
Oct 29	VOC	lb/hr as carbon	7.47	6.25	1.22	9.5	≤10% RA
Oct 29	CO	lb/hr	62.94	64.79	-1.85	0.8	≤10% RA

CEMS: continuous emission monitoring system
lb/hour: pound per hour
RTO: regenerative thermal oxidizer
VOC: volatile organic compound
CO: carbon monoxide

The VOC and CO measurements demonstrate the facility's CEMS are operating within allowable relative accuracy limits.

1.0 Introduction

Weyerhaeuser Company retained Bureau Veritas North America, Inc. to conduct compliance air emissions testing for the press biofilter and dryer regenerative thermal oxidizer (RTO) sources at the Weyerhaeuser Company facility located at 4111 West Four Mile Road in Grayling, Crawford County, Michigan. The objectives of the testing were to:

- Measure the relative accuracy of the recently installed volatile organic compound (VOC) continuous emission monitoring system (CEMS) at the Press Biofilter.
- Evaluate the formaldehyde removal efficiency of the Press Biofilter.
- Measure the relative accuracy of the recently installed carbon monoxide (CO) and VOC CEMS at the Dryer RTO.
- Evaluate the total hydrocarbon (THC) destruction efficiency of the Dryer RTO.
- Re-establish the minimum operating temperature of 1,422°F on the Dryer RTO during the THC destruction efficiency testing.

The purpose of the testing was to evaluate the accuracy of the CEMS required by 40 CFR Part 60, Appendix F, "Quality Assurance Procedures" and as incorporated in Michigan Department of Environmental Quality (MDEQ) Renewable Operating Permit MI-ROP-B7302-2010a, effective April 20, 2010. Testing for the pollutant removal efficiency was performed as a requirement of permit conditions because the control device media has recently been replaced.

Relative Accuracy (RA) means the absolute mean difference between the gas concentration, flow, or emission rate measured by the monitor and the value measured using the reference method (RM), plus the 2.5%-error confidence coefficient of a series of tests, divided by the mean of the RM test runs:

$$RA = 100\frac{\overline{|(C_{RM} - C_m)|} + t_{\alpha,n-1}\left(\frac{S_d}{\sqrt{n}}\right)}{\overline{C_{RM}}}$$

where:

RA	=	% relative accuracy
C_{RM}	=	parameter measured by reference method
Cm	=	parameter measured by CEMS or CERMS (i.e., the monitor)
$\overline{\lvert C_{RM} - C_m \rvert}$	=	absolute value of mean of the differences between C_{RM} and C_m for the valid test runs
$\overline{C_{RM}}$	=	mean of test run parameter measured by reference method (mean of RM test runs)
$t_{\alpha,n-1}$	=	t value with $\alpha = 0.025$, which is a confidence level of 97.5%

S_d = standard deviation of the differences between C_{RM} and C_m
n = number of measurements (i.e., test runs)

The confidence coefficient (CC) is:

$$CC = t_{\alpha,n-1}\left(\frac{S_d}{\sqrt{n}}\right)$$

The 2.5%-error confidence coefficient is calculated using a t value corresponding to the 97.5% confidence level.

The testing was conducted October 28 through 30, 2014. The testing was completed in accordance with United States Environmental Protection Agency (USEPA) Reference Methods 1 through 4, 10, 25A, 320, and Performance Specifications 4, 6 and 8.

1.1 Summary of Test Program

The Weyerhaeuser Company facility manufactures oriented-strand board (OSB) comprised of dry wood strands (flakes), resin, and wax pressed under high temperature and pressure. Air emissions were monitored from the biofilter and regenerative thermal oxidizer (RTO) sources.

The testing was completed in accordance with United States Environmental Protection Agency (USEPA) Reference Methods 1 through 4, 10, 25A, 320, and Performance Specifications 4, 6 and 8. The testing was conducted on October 28 through 30, 2014 and consisted of three 60-minute test runs at each source for removal efficiency testing. A minimum of nine 21-minute test runs were performed at the outlet of the press biofilter and dryer RTO to measure volumetric flowrate and VOC concentrations to evaluate CEMS relative accuracy. Carbon monoxide concentrations and mass emission rates were measured at the outlet of the dryer RTO to evaluate the CO CEMS relative accuracy.

1.2 Purpose of Testing

The testing was performed to evaluate the formaldehyde removal efficiency of the Press Biofilter, THC destruction efficiency of the Dryer RTO, and accuracy of the VOC and CO continuous emission monitors as required by 40 CFR Part 60, Appendix F, "Quality Assurance Procedures" and MDEQ Renewable Operating Permit MI-ROP-B7302-2010a, effective April 20, 2010. The specific objectives of the testing were:

Press Biofilter

- Measure the relative accuracy of the recently installed VOC CEMS against the reference methods at the Press Biofilter. In accordance with 40 CFR 60, Appendix F, the RATA was calculated in units of the applicable emissions standard, VOC lb/hr as carbon. The allowable

relative accuracy based on Performance Specification 6 (continuous emission rate monitoring systems) is no greater than 20 percent of the mean value of the RM's test data in terms of the units of the emission standard, or 10 percent of the applicable standard (19.5 lb/hr as carbon).

- Evaluate the formaldehyde removal efficiency of the Press Biofilter. The permit requires 90% reduction of formaldehyde as measured from the humidifier inlet to the biofilter outlet.

Dryer RTO

- Measure the relative accuracy of the recently installed CO and VOC CEMS at the Dryer RTO against the reference methods. In accordance with 40 CFR 60, Appendix F, the RATA was calculated in units of the applicable emissions standard, lb VOC/hr as carbon and lb CO/hr. The allowable relative accuracy based on Performance Specification 6 is no greater than 20 percent of the mean value of the RM's test data in terms of the units of the emission standard, or 10 percent of the applicable standard (18.6 lb VOC/hr as carbon; 147.3 lb CO/hr).

- Evaluate the THC destruction efficiency of the Dryer RTO. The permit requires 90% reduction of total HAP entering the RTO, measured as THC (as carbon).

- Re-establish the minimum operating temperature of 1,422°F on the Dryer RTO during the THC destruction efficiency testing.

1.3 Contact Information

Contact information is listed in Table 1-1. Mr. Thomas Schmelter, Senior Project Manager with Bureau Veritas led the emission testing program. Ms. Faith Dandois, Environmental, Health, and Safety Coordinator, with Weyerhaeuser Company provided process coordination and arranged for facility operating parameters to be recorded. The testing was witnessed by Mr. Tom Gasloli, Environmental Quality Analyst with the MDEQ.

Table 1-1
Contact Persons

Permitee	Emission Testing Company
Weyerhaeuser Company 4111 West Four Mile Road Grayling, Michigan 49738 Telephone 989.348.3475 Facsimile 989.348.8226	Bureau Veritas North America, Inc. 22345 Roethel Drive Novi, Michigan 48375 Telephone 248.344.1770 Facsimile 248.344.2656
Faith Dandois Environmental, Health, and Safety Coordinator Telephone 989.348.3414 faith.dandois@weyerhaeuser.com	Thomas Schmelter, QSTI Senior Project Manager Telephone 248.344.3003 thomas.schmelter@us.bureauveritas.com
Michigan Department of Environmental Quality	
MDEQ – Air Quality Division Technical Programs Unit 525 West Allegan Street Lansing, Michigan 48909-7760 Telephone 517.335.3082 Facsimile 517.241.3571	
Tom Gasloli Environmental Quality Analyst Telephone 517.284.6778 gaslolit@michigan.gov	

2.0 Source and Sampling Locations

2.1 Process Description

Weyerhaeuser Company manufactures oriented strand board (OSB) board at the facility in Grayling, Michigan. Wood logs are sorted by species and stored in the wood yard. Logs are transferred to heated vats to clean and thaw (in winter months) the wood. The wood logs are conveyed from the vats to a debarking machine that removes the outer layers of the logs. A strand machine shreds the logs into thin wood chips (flakes). The flakes are conveyed to a storage bin where they are pneumatically fed into four wood-fired dyers. The dryers remove moisture from the flakes to a product-specific content. The flakes exit the dryers and are sorted according to size using shaker screens.

The fine flakes are collected and used as fuel in the dryers and RTOs. The larger flakes are conveyed to a blending area where wax and resins are added for adhesion purposes. The flakes are layered, at different angles for strength, onto an 8-foot-wide conveyor belt. The layered flakes are cut into 8-foot-by-24-foot sections and formed into mats. The mats are stacked and the press is used to heat and compact the flakes to form OSB. Depending on the thickness of the product (i.e., 7/16 or 3/8 inch) up to 16 mats can be compacted in less than 4 minutes. The OSB is cut, labeled, and prepared for shipment.

Operating parameters recorded during testing are included in Appendix E.

2.2 Control Equipment

As part of the manufacturing process, emissions are generated by wood debarking and stranding, conveyance, drying, binding and pressing, milling, and painting (sides of wood). Weyerhaeuser Company operates pollution control equipment to control the discharge of pollutants to the atmosphere. The biofilter, wet electrostatic precipitator (WESP), and RTOs control emissions from the drying and pressing operations.

CEMS installed on the biofilter and RTO exhaust stack are used to evaluate continuous compliance with permit limits.

2.2.1 Dryers and RTOs

North and south RTOs are used to control hazardous air pollutant (HAP) and VOC emissions from four wood-fired strand dryers and a Coen® burner. Emissions from each dryer and the Coen® burner exhaust to a combined single duct leading to a wet electrostatic precipitator

(WESP). The WESP is designed to remove particulate matter from the flue gas prior to incineration by two Salem® Engineering RTOs installed in June 1996.

At the RTOs, valves alternate the flow direction through each of the RTO chambers. Each chamber contains heat exchange media that alternately heats the emissions entering one combustion chamber and absorbs heat from the emissions exiting the other combustion chamber. Supplemental heat is supplied in the combustion chambers with a gas burner. An induced draft fan transports the emissions through the RTOs, which discharges to the atmosphere via the RTO stack (SVRTOSTACK).

The heat exchange media within the RTOs was replaced prior to testing.

2.2.2 Press and Biofilter

The biofilter controls VOC and HAP emissions from the press portion of emission unit EUPRESSLINE. The press heats and compacts alternating layers of fine and coarse wood strands and binders into the OSB. Emissions from the press are captured within the total building enclosure and directed to a humidifier and then to a two-chamber biofilter. The biofilter contains Douglas fir mulch and lime (pH balancer) that provide a microbial environment for pollutant removal. Treated emissions from the two biofilter chambers discharge to a single stack (SVBIOFILTER).

2.3 Flue Gas Sampling Locations

Figure 1 behind the Figures Tab of this report, depicts the Weyerhaeuser Company site and locations of the sources tested. Figures 2 through 5, behind the Figures Tab of this report, depict the press biofilter and dryer RTO sampling ports and traverse point locations. Descriptions of each source sampling location are presented in sections 2.3.1 through 2.3.4

2.3.1 Biofilter Inlet

Two sampling ports oriented at 90° to one another are located in a straight section of an 84-inch-internal-diameter duct. The ports are located:

- 12.1 feet (1.7 duct diameters) from the nearest downstream disturbance.
- 49.1 feet (7.01 duct diameters) from the nearest upstream disturbance.

The ports were accessible via grating above the control room housing the biofilter CEMS equipment.

Figure 2 in the Appendix depicts the biofilter inlet sampling ports and traverse point locations. A photograph of the biofilter inlet and outlet sampling locations is presented as Figure 2-1.

2.3.2 Biofilter Outlet

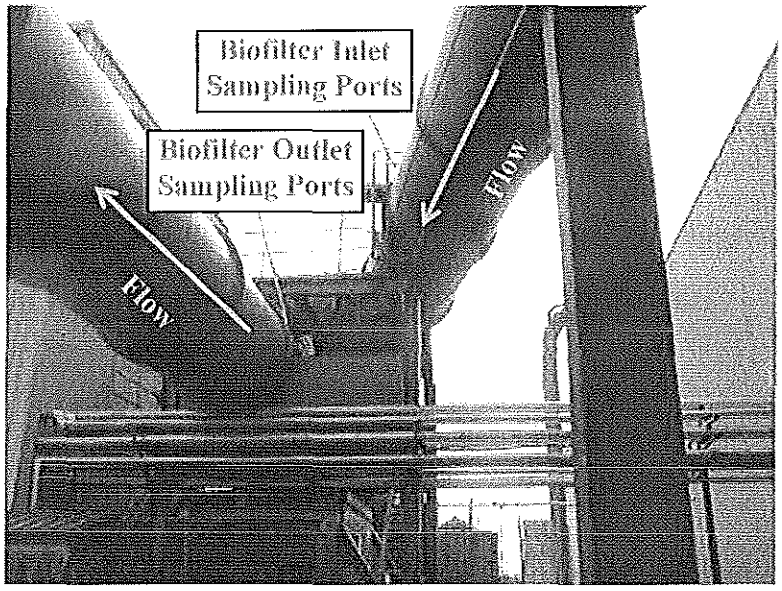
The biofilter exhaust was sampled in an 84-inch-internal-diameter duct that has two sampling ports. The outlet sampling ports are located:

- 70 feet (10 diameters) from the nearest disturbance upstream of the port.
- 60 feet (8.6 diameters) from the nearest disturbance downstream of the ports.

The ports were accessible via grating above the control room housing the biofilter CEMS equipment.

Figure 3 in the Appendix depicts the biofilter outlet sampling port and traverse point locations. A photograph of the biofilter outlet sampling location is presented below in Figure 2-1.

Figure 2-1. Biofilter Inlet and Outlet Sampling Locations



2.3.3 WESP Inlet/RTO Inlet

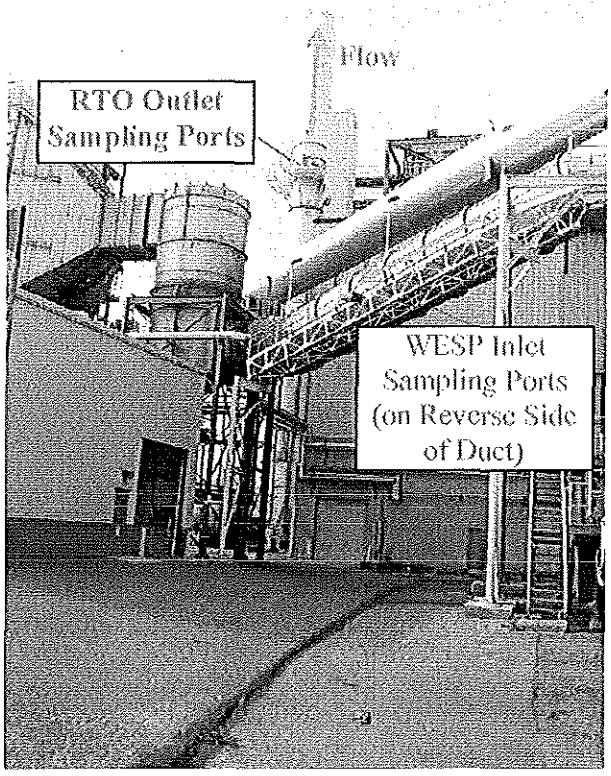
The combined dryer and Coen® burner emissions were sampled in the duct at the inlet to the WESP. This duct provides a single sampling location for these emissions prior to entering the WESP and RTOs. Two sampling ports orientated at 90° to one another are located in a straight section of duct that is 103 inches in internal diameter. The ports are accessible by man-lift and located:

- 32.8 feet (3.8 diameters) from the nearest upstream disturbance.
- 20.6 feet (2.4 diameters) from the nearest downstream disturbance.

Figure 4 in the appendix depicts the WESP (RTO) inlet sampling location. A photograph of the WESP Inlet/RTO inlet sampling locations is presented in Figure 2-2. (Figure 2-2 also depicts the RTO exhaust stack in the background.)

Figure 2-2. WESP Inlet and RTO Inlet Sampling Locations

Note: WESP Inlet and RTO Inlet (foreground). RTO exhaust stack (background).



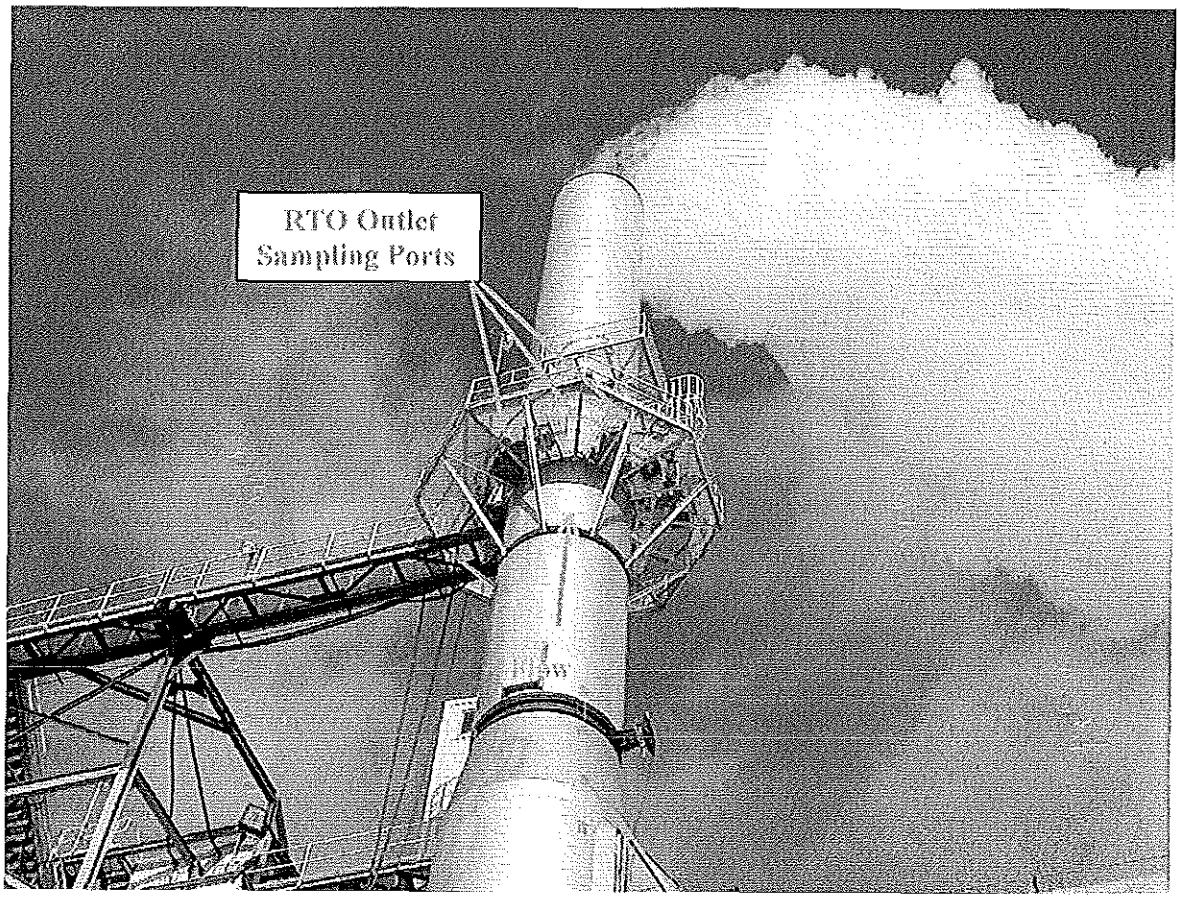
2.3.4 RTO Outlet

The RTOs exhaust to atmosphere through a vertical 105-inch-diameter exhaust stack equipped with four sampling ports. The ports are located:

- Approximately 30 feet (3.4 duct diameters) from the nearest upstream disturbance.
- Approximately 40 feet (4.6 duct diameters) from the nearest downstream disturbance (i.e., the stack exit).

The ports are accessible by elevator to the top floor of the Dryer Building and stairs to the SVRTOSTACK catwalk. Figure 5 in the Appendix depicts the RTO outlet sampling ports and traverse point locations. A photograph of the RTO outlet sampling location is presented in Figure 2-3.

Figure 2-3. RTO Outlet Sampling Location



2.4 Process Sampling Locations

Process sampling was not required during this test program. A process sample is a sample that is analyzed for operational parameters, such as calorific value of a fuel (e.g., natural gas, coal), organic compound content (e.g., paint coatings), or composition (e.g., polymers).

2.5 Continuous Emission Rate Monitoring Systems

Description and identification of the instrumentation operated by Weyerhaeuser Company to monitor source emission rates are presented in Sections 2.5.1 and 2.5.2.

2.5.1 Press Biofilter Outlet

The VOC monitor is a California Analytical Instruments, Inc., model 600 HFID serial number B05011. The system extracts sample gas through a heated sample probe and heated filter connected to the monitor by a heated sample line. The VOC analyzer measures total hydrocarbons using a flame ionization detector (FID). The VOC monitor operates on a single range/spans of 0 to100 parts per million (ppm).

The flowrate monitor is a Teledyne UltraFlow Model 150, serial number 1501355. The air flowrate is measured by ultrasonic methods. The flow monitoring system uses 20% oxygen and 0% carbon dioxide for the flowrate calculations.

2.5.2 Dryer RTO Outlet

The VOC monitor is a California Analytical Instruments, Inc., model 600 HFID serial number B05010. The system extracts sample gas through a heated sample probe and heated filter connected to the monitor by a heated sample line. The VOC analyzer measures total hydrocarbons using a FID. The VOC monitor operates on a dual range span: 0 to 100 ppm and 0 to 1,000 ppm.

The CO monitor is a California Analytical Instruments, Inc., model 601 serial number B06014-M. The system extracts sample gas through a heated sample probe and heated filter connected to the gas conditioning system by a heated sample line. Moisture in the sample is removed before the sample is analyzed. The CO analyzer measures carbon monoxide concentration by non-dispersive infrared analysis. The analyzer has a span of 0 to 500 ppm.

The flowrate monitor is a Teledyne UltraFlow Model 150, serial number 1501354. The air flowrate are measured by ultrasonic methods. The flowrate monitoring system uses 20% oxygen and 1% carbon dioxide for the flowrate calculations.

3.0 Summary and Discussion of Results

3.1 Objectives

The testing was performed to evaluate the formaldehyde removal efficiency of the press biofilter, THC destruction efficiency of the dryer RTO, and accuracy of the VOC and CO continuous emission monitors as required by 40 CFR Part 60, Appendix F, "Quality Assurance Procedures" and MDEQ Renewable Operating Permit MI-ROP-B7302-2010a, effective April 20, 2010. The specific objectives of the testing were:

Press Biofilter

- Measure the relative accuracy of the recently installed VOC CEMS against the reference methods at the Press Biofilter. In accordance with 40 CFR 60, Appendix F, the RATA was calculated in units of the applicable emissions standard, VOC lb/hr as carbon. The allowable relative accuracy based on Performance Specification 6 (continuous emission rate monitoring system) is no greater than 20 percent of the mean value of the RM's test data in terms of the units of the emission standard, or 10 percent of the applicable standard (19.5 lb/hr as carbon).

- Evaluate the formaldehyde removal efficiency of the Press Biofilter. The permit requires 90% reduction of formaldehyde as measured from the humidifier inlet to the biofilter outlet.

Dryer RTOs

- Measure the relative accuracy of the recently installed CO and VOC CEMS against the reference methods at the Dryer RTO. In accordance with 40 CFR 60, Appendix F, the RATA was calculated in units of the applicable emissions standard, lb VOC/hr as carbon and lb CO/hr. The allowable relative accuracy based on Performance Specification 6 is no greater than 20 percent of the mean value of the RM's test data in terms of the units of the emission standard, or 10 percent of the applicable standard (18.6 lb VOC/hr as carbon; 147.3 lb CO/hr).

- Evaluate the THC destruction efficiency of the Dryer RTO. The permit requires 90% reduction of total HAP entering the RTO, measured as THC (as carbon).

- Re-establish the minimum operating temperature of 1,422°F on the Dryer RTO during the THC destruction efficiency testing.

3.2 Test Matrix

The emission testing was conducted to evaluate the objectives in Section 3.1. Table 3-1 presents the sampling and analytical test matrix.

Table 3-1
Test Matrix

Sampling Location	No. of Runs	Sample/Type of Pollutant	Sampling Method	Sampling Organization	Test Time (min)	Analytical Method	Analytical Lab
Inlet of Biofilter	3 3	Flowrate Formaldehyde	M1-4 M320	Bureau Veritas Prism	≥5 60	Pitot tube FTIR	Bureau Veritas Prism
Outlet of Biofilter	3 3 12 12	Flowrate Formaldehyde Flowrate VOC	M1-4 M320 M1-4 M25A	Bureau Veritas Prism	≥5 60 ≥5 21	Pitot tube FTIR Pitot tube FID	Bureau Veritas Prism
Inlet of WESP/ RTO	3 3	Flowrate VOC	M1-4 M25A	Bureau Veritas	≥5 60	Pitot tube, FID	Bureau Veritas
Outlet of RTO	3 3 12 12 12	Flowrate VOC Flowrate VOC CO	M1-4 M25A M1-4 M25A M10	Bureau Veritas	≥5 60 ≥5 21 21	Pitot tube FID Pitot tube FID Infrared	Bureau Veritas Prism

Flowrate: volumetric flowrate, molecular weight, and moisture determination
CO: carbon monoxide
Infrared: non-dispersive infrared analyzer
FID: flame ionization detector
FTIR: Fourier Transform-Infrared spectrometry

3.3 Field Test Changes and Issues

Field test changes were not required to complete the emission testing.

3.4 Results

The results of the testing are compared to the applicable emission limits in Tables 3-2 and 3-3. Detailed results are presented in Tables 1 through 5 after the Tables Tab of this report. Graphs

of the measured formaldehyde, VOC, and CO concentrations are presented after the Graphs Tab of this report. Sample calculations are presented in Appendix B.

Table 3-2
Control Efficiency Testing Results
Compared to Permit Emission Limits

Date (2014)	Source ID	Parameter	Units	Average Result	Emission Limit
Oct 28	EUPRESSLINE (Biofilter)	Formaldehyde removal efficiency	%	97.8	≥90
Oct 30	FGDRYERS (RTO)	THC destruction efficiency	%	92	≥90
		Average operating temperature	°F	1,422	NA

RTO: regenerative thermal oxidizer
THC: total hydrocarbon
NA: not applicable

The formaldehyde and THC measurements demonstrate that the biofilter and RTO are operating within allowable limits.

Table 3-3
Relative Accuracy Test Audit Results
Compared to Permit Emission Limits

Date (2014)	Parameter	Unit	Average Reference Method (RM) Results	Average CEMS Result	Difference between CEMS and RM	Relative Accuracy (RA) (%)	Performance Specification
EUPRESSLINE (Biofilter)							
Oct 28	VOC	lb/hr as carbon	10.87	11.47	-0.60	9.7	≤20% RA
FGDRYERS (RTO)							
Oct 29	VOC	lb/hr as carbon	7.47	6.25	1.22	9.5	≤10% RA
Oct 29	CO	lb/hr	62.94	64.79	-1.85	0.8	≤10% RA

CEMS: continuous emission monitoring system
lb/hour: pound per hour
RTO: regenerative thermal oxidizer
VOC: volatile organic compound
CO: carbon monoxide

The VOC and CO measurements demonstrate the CEMS are operating within allowable relative accuracy limits.