mostardi platt

Industrial Boiler Maximum Achievable Control Technology Test Report

Verso Corporation
Quinnesec Mill
Waste Fuel (Hog) Boiler Outlet Duct
Quinnesec, Michigan
June 21, 2016

Report Submittal Date
July 26, 2016

Project No. M162101A

888 Industrial Drive
Elmhurst, Illinois 60126
630-993-2100

DEQ

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION

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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: Verso Quinnesec LLC — County: DICKINSON

Source Address: W-6791 U.S. HIGHWAY 2 — City: NORWAY

AQD Source ID (SRN): B7192 — RO Permit No.: MI-ROP-B7192-2013 — RO Permit Section No.: 01

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 _____ To _____

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

40 CFR 63 Subpart DDDDD Waste Fuel Boiler Performance Test Report, June 2016

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.

Mike LaVerdiere	Mill Manager	906 779-3200
Name of Responsible Official (print or type)	Title	Phone Number

(For Mike LaVerdiere)

Signature of Responsible Official

8/15/16

Date

* Photocopy this form as needed.

EQP 5736 (Rev 9/01)

1.0 EXECUTIVE SUMMARY

MOSTARDI PLATT conducted an Industrial Boiler Maximum Achievable Control Technology (IB MACT) test program for Verso Corporation at the Quinnesec Mill on Waste Fuel (Hog) Boiler Outlet Duct on June 21, 2016. This report summarizes the results of the test program and test methods used.

Test location, test date, and test parameters are summarized below.

TEST INFORMATION		
Test Location	**Test Date**	**Test Parameters**
Waste Fuel (Hog) Boiler Outlet Duct	June 21, 2016	Filterable Particulate Matter (FPM), Hydrogen Chloride (HCl), Mercury (Hg), and Carbon Monoxide (CO)

The purpose of the test program was to evaluate the FPM, HCl, and Hg emissions against the IB MACT standards under the stoker/sloped grate wet biomass fuel category. Selected results of the test program are summarized below. A complete summary of emission test results follows the narrative portion of this report.

TEST RESULTS				
Test Location	**Test Date**	**Test Parameter**	**Emission Limit**	**Emission Rate**
Waste Fuel (Hog) Boiler Outlet Duct	6/21/16	FPM	0.037 lb/mmBtu (Heat Input)	0.0031 lb/mmBtu (Heat Input)
		HCl	0.022 lb/mmBtu (Heat Input)	0.0037 lb/mmBtu (Heat Input)
		Hg	0.0000057 lb/mmBtu (Heat Input)	0.0000011 lb/mmBtu (Heat Input)
		CO	1500 ppmvd @ 3 % O_2	207.5 ppmvd @ 3 % O_2

Heat input supplied by Verso Corporation was used to calculate the emissions on a lb/mmBtu basis. Plant operating data as provided by Verso Corporation is included in Appendix A.

The identifications of individuals associated with the test program are summarized below.

TEST PERSONNEL INFORMATION		
Location	**Address**	**Contact**
Test Facility	Verso Corporation U.S. Highway 2 Quinnesec, Michigan 49876	Ms. Mary Brunette (906) 779-3642 (phone) Mary.Brunette@versopaper.com
Testing Company Representative	Mostardi Platt 888 Industrial Drive Elmhurst, Illinois 60126	Mr. Tim Mei Project Manager (630) 993-2100 (phone) tmei@mp-mail.com

The test crew consisted of Messrs. D. Kossack, J. Kukla, K. Cadagin, and T. Mei of Mostardi Platt.

2.0 TEST METHODOLOGY

Emissions testing were conducted following the methods specified in 40 CFR, Part 60, Appendix A. Schematics of the test section diagram and sampling trains used are found in Appendix B and C, respectively. Calculation nomenclature and sample calculations are found in Appendix D. Sample analysis data are found in Appendix E. Copies of reference method data and field data sheets for each test run are included in Appendix F and G, respectively.

The following methodologies were used during the test program:

Method 1 Traverse Point Determination

Test measurement points were selected in accordance with Method 1. The characteristics of the measurement location are summarized below.

TEST POINT INFORMATION						
Location	Stack Diameter (Feet)	Stack Area (Square Feet)	Upstream Diameters	Downstream Diameters	Test Parameter	Number of Sampling Points
Waste Fuel (Hog) Boiler Outlet Duct	10.18	81.393	>0.5	>2.0	FPM, HCl	24
					CO	12 (Stratification)

Gaseous Stratification Test

A 12 point stratification test was performed prior to Run 1. The results were less than 10% difference and consequently three test points were used for the test program.

Method 2 Volumetric Flowrate Determination

Gas velocity was measured following Method 2, for purposes of calculating stack gas volumetric flow rate. An S-type pitot tube, differential pressure gauge, thermocouple and temperature readout were used to determine gas velocity at each sample point. All of the equipment used was calibrated in accordance with the specifications of the Method. Calibration data are presented in Appendix H.

Method 3A Oxygen (O_2)/Carbon Dioxide (CO_2) Determination

Stack gas molecular weight was determined in accordance with Method 3A, 40 CFR, Part 60, Appendix A. A Servomex analyzer was used to determine stack gas oxygen and carbon dioxide content and, by difference, nitrogen content. All of the equipment used was calibrated in accordance with the specifications of the Method. Calibration data are presented in Appendix H and gas cylinder certifications are presented in Appendix I.

Method 5 Filterable Particulate Matter (FPM) Determination

Stack gas FPM concentrations and emission rates were determined in accordance with USEPA Method 5, 40CFR60, Appendix A with filter and probe temperatures between 248 and 273 degrees Fahrenheit. An Environmental Supply Company, Inc. sampling train was used to sample stack gas at an isokinetic rate, as specified in the Method utilizing Pallflex TX40HI45 filters. Particulate matter in the sample probe was recovered using an acetone rinse. The probe wash and filter catch were analyzed by Mostardi Platt in accordance with the Method in the Elmhurst, Illinois laboratory. Sample analysis data are found in Appendix E. All of the equipment

used was calibrated in accordance with the specifications of the Method. Calibration data are presented in Appendix H.

Method 10 Carbon Monoxide (CO) Determination

Stack gas carbon monoxide concentrations and emission rates were determined in accordance with Method 10. A Thermo Scientific carbon monoxide analyzer was used to determine carbon monoxide concentrations, in the manner specified in the Method.

Stack gas was delivered to the analyzer via a Teflon® sampling line, heated to a minimum temperature of 250°F. Excess moisture in the stack gas was removed using a refrigerated condenser. The entire system was calibrated in accordance with the Method, using certified calibration gases introduced at the probe, before and after each test run.

A list of calibration gases used and the results of all calibration and other required quality assurance checks can be found in Appendix G. Copies of calibration gas certifications can be found in Appendix H.

Method 26A Hydrogen Chloride (HCl) Determination

Stack gas hydrogen chloride concentrations and emission rates were determined in accordance with Method 26A, 40CFR60, Appendix A in conjunction with the USEPA Method 5 sampling. An Environmental Supply Company sampling train was used to sample stack gas, in the manner specified in the Method utilizing Pallflex TX40HI45 filters. Analyses of the samples collected were conducted by Maxxam Analytics, Inc. of Mississauga, Ontario. Sample analysis data are found in Appendix F. All of the equipment used was calibrated in accordance with the specifications of the Method. Calibration data are presented in Appendix I.

Mercury Determination by Method 30B (Sorbent Trap Method)

Paired trains were utilized sampling three test points per test run.

Per Method 30B sampling, each sample was collected on the paired in-situ sorbent traps. A tube of silica was used to capture remaining moisture prior to the sample reaching the gas metering system.

The sample train used for this test program was designed by APEX, Inc. and meets all requirements for Method 30B sampling. Samples were analyzed onsite utilizing an Ohio Lumex, Inc. analyzer for total gaseous mercury. Mercury quality assurance and control data are found in Appendix J. All of the equipment used was calibrated in accordance with the specifications of the Method. Calibration data are presented in Appendix H.

3.0 TEST RESULTS SUMMARIES

Client: Verso Corporation
Facility: Quinnesec Mill
Test Location: Waste Fuel (HOG) Boiler Outlet Duct
Test Method: 5/26A

Source Condition	**Normal**	**Normal**	**Normal**	
Date	**6/21/16**	**6/21/16**	**6/21/16**	
Start Time	**7:55**	**10:30**	**12:55**	
End Time	**10:04**	**12:36**	**15:01**	
	Run 1	**Run 2**	**Run 3**	**Average**
Stack Conditions				
Average Gas Temperature, °F	206.3	209.0	209.3	208.2
Flue Gas Moisture, percent by volume	19.4%	19.2%	17.3%	18.6%
Average Flue Pressure, in. Hg	28.72	28.72	28.72	28.72
Gas Sample Volume, dscf	78.176	74.623	75.754	76.184
Average Gas Velocity, ft/sec	54.176	52.439	53.247	53.287
Gas Volumetric Flow Rate, acfm	227,537	220,242	223,639	223,806
Gas Volumetric Flow Rate, dscfm	139,529	134,790	140,080	138,133
Gas Volumetric Flow Rate, scfm	173,062	166,846	169,335	169,748
Average %CO_2 by volume, dry basis	14.3	14.2	14.4	14.3
Average %O_2 by volume, dry basis	5.8	5.9	5.8	5.8
Isokinetic Variance	99.9	98.7	96.4	98.3
Heat Input, mmBtu/hr	476.9	441.5	452.1	456.8
Filterable Particulate Matter (Method 5)				
grams collected	0.0069	0.0066	0.0042	0.0059
grains/acf	0.0008	0.0008	0.0005	0.0007
grains/dscf	0.0014	0.0014	0.0009	0.0012
lb/hr	1.629	1.577	1.027	1.411
lb/mmBtu (Heat Input)	0.0034	0.0036	0.0023	0.0031

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Average %O_2 by volume, dry basis	5.8	5.9	5.8	5.8
Isokinetic Variance	99.9	98.7	96.4	98.3
Heat Input, mmBtu/hr	476.9	441.5	452.1	456.8
Hydrogen Chloride (HCl) Emissions				
ug of sample collected	6600.00	12000.00	2300.00	6966.67
ppm	1.97	3.75	0.71	2.14
mg/dscm	2.98	5.68	1.07	3.24
lb/hr	1.558	2.867	0.563	1.663
lb/mmBtu (Heat Input)	0.0033	0.0065	0.0012	0.0037

Verso Corporation Quinnesec Mill Waste Fuel (HOG) Boiler Outlet Duct Gaseous Summary												
Test No.	Date	Start Time	End Time	CO ppmvd	CO_2 % (dry)	O_2 % (dry)	Moisture, BWS	Flowrate, DSCFM	CO lb/hr	Heat Input (MMBtu/hr)	Heat Input based CO lb/MMBtu	CO ppmvd @ 3% O_2
1	06/21/16	08:40	09:39	166.4	14.5	5.7	0.194	139,529	101.22	478.8	0.211	196.0
2	06/21/16	11:15	12:14	181.3	14.1	6.0	0.192	134,790	106.54	431.6	0.247	217.8
3	06/21/16	13:40	14:39	178.5	14.5	5.6	0.173	140,080	109.01	449.8	0.242	208.8
Average				175.4	14.4	5.8	0.186	138,133	105.59	453.4	0.234	207.5

Method 30B (Sorbent Trap) Mercury Test Results Summary
Verso Corporation
Quinnesec Mill
Waste Fuel (HOG) Boiler Outlet Duct

Test No.	Date	Start Time	End Time	V_m (standard L)	ng detected	ug/dscm	ug/wscm	lb/hr	lb/MMBtu (Heat Input)
1A	6/21/2016	8:40	9:40	90.380	99.9	1.105	0.891	0.0006	0.0000012
1B				90.266	94.6	1.048	0.845	0.0005	0.0000011
Average					**97.3**	**1.077**	**0.868**	**0.0006**	**0.0000012**
2A	6/21/2016	11:15	12:15	89.048	98.1	1.102	0.890	0.0006	0.0000013
2B				88.996	93.6	1.052	0.850	0.0005	0.0000012
Average					**95.9**	**1.077**	**0.870**	**0.0005**	**0.0000010**
3A	6/21/2016	13:40	14:40	89.011	94.1	1.057	0.874	0.0006	0.0000012
3B				89.030	94.5	1.061	0.878	0.0006	0.0000012
Average					**94.3**	**1.059**	**0.876**	**0.0006**	**0.0000010**

Emmisions Limit 0.0000057 lb/MMbtu (Heat Input)	ng detected	ug/dscm	ug/wscm	lb/hr	lb/MMBtu (Heat Input)
Average of Runs 1-3	**95.8**	**1.071**	**0.871**	**0.001**	**0.0000011**

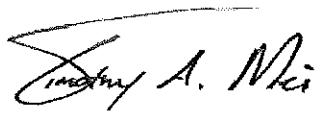
4.0 CERTIFICATION

MOSTARDI PLATT is pleased to have been of service to Verso Corporation. If you have any questions regarding this test report, please do not hesitate to contact us at 630-993-2100.

CERTIFICATION

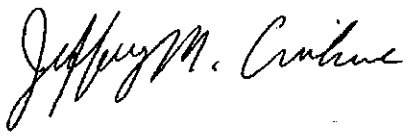
As project manager, I hereby certify that this test report represents a true and accurate summary of emissions test results and the methodologies employed to obtain those results, and the test program was performed in accordance with the methods specified in this test report.

MOSTARDI PLATT



Program Manager

Tim Mei



Quality Assurance

Jeffrey M. Crivlare