Interpoll Laboratories, Inc
4500 Ball Road N.E.
Circle Pines, Minnesota 55014-1819

TEL: (763) 786-6020
FAX: (763) 786-7854

RESULTS OF THE OCTOBER 3, 2017 BOILER COMPLIANCE TEST ON THE NO. 2 BOILER AT THE POTLATCH FACILITY IN GWINN, MICHIGAN

Permit No. MI-ROP-N5940-2013a

Submitted to:

POTLATCH LAND AND LUMBER
GWINN SAWMILL
650 A Avenue
Gwinn, Michigan 49841

Attention:

Tom Mosher

Reviewed by:

Kathleen Eickstadt

Kathleen Eickstadt
Source Testing Coordinator

Report Number 17-36296
October 23, 2017
DVH

1 INTRODUCTION

On October 3, 2017, Interpoll Laboratories personnel conducted emission compliance testing on Boiler No. 2 at the Potlatch Gwinn facility located in Gwinn, Michigan. On-site testing was performed by Aaron Wilson and Josh VanOverbeke. Coordination between testing activities and plant operation was provided by Tom Mosher of Potlatch. The test was not witnessed by a representative of the Michigan DEQ.

The No. 2 Boiler was manufactured by Hurst and Welding Company and has a rated heat input of 28.7 MM Btu/hour. Particulate emissions are controlled by a Primary and Secondary Multiclone.

Particulate evaluations were performed in accordance with EPA Methods 1 - 5, CFR Title 40, Part 60, Appendix A (revised July 1, 2017). Previous data collected at this test site was used to select the appropriate nozzle diameter required for isokinetic sample withdrawal. An Interpoll Labs sampling train, which meets or exceeds specifications in the above-cited reference, was used to extract particulate samples by means of a heated glass-lined probe.

An integrated flue gas sample was extracted using a specially designed gas sampling system. Integrated flue gas samples were collected in 44-liter Tedlar bags housed in a protective aluminum container. After sampling was complete, the bags were sealed and returned to the laboratory for gas composition analysis. Prior to sampling, the Tedlar bags are leak-checked at 15 IN.HG. vacuum with an in-line rotameter. Bags with any detectable in-leakage are discarded.

The important results of the test are summarized in Section 2. Detailed results are presented in Section 3. Field data and all other supporting information are presented in the appendices.

2 SUMMARY AND DISCUSSION

The air emission results are summarized in the following table. An overview of all results is presented below:

1(a) Emission Unit Tested	1(b) Limitation Basis	1(c) Pollutant and Emission Limit	1(d) Test Result
No. 2 Boiler Stack	R336.1331	**Particulate** 0.2 lb/MMBtu 5.7 lbs/hr. 25.1 tons/yr	**Particulate** 0.12 lb/MMBtu 3.22 Lbs/Hr. 14.1 tons/yr

No difficulties were encountered in the field by Interpoll Labs or in the laboratory analysis of the samples, which were conducted by Interpoll Labs. On the basis of these facts and a complete review of the data and results, it is our opinion that the results reported herein are accurate and closely reflect the actual values, which existed at the time the test was performed.

Test 1 Summary of the Results of the October 3, 2017, Particulate Emission Compliance Test on the No. 2 Boiler Stack (EU2) at the Potlatch Facility Located in Gwinn, MI.

Item		Run 1	Run 2	Run 3	Average
Date of test		10-03-17	10-03-17	10-03-17	
Time (Start/Finish)	(Hrs)	0900 / 1001	1044 / 1145	1300 / 1401	
Volumetric Flow					
Actual	(ACFM)	9,501	10,111	9,941	9,851
Standard	(SCFM)	6,117	6,469	6,353	6,313
Dry Standard	(DSCFM)	5,011	5,234	5,002	5,082
Gas Temperature	(°F)	330	335	336	333
Moisture Content	(%v/v)	18.08	19.08	21.26	19.48
Gas Composition	(%v/v, dry)				
Carbon Dioxide		16.22	15.92	16.36	16.17
Oxygen		3.92	4.11	3.74	3.92
Nitrogen		79.86	79.97	79.90	79.91
Sample Volume	(dscf)	34.07	35.89	34.76	34.90
Isokinetic Variation	(%)	100.0	100.8	102.2	101.0
Particulate Results-EPA Method 5					
Dry Catch Only					
Sample Mass (Nozzle, PW, Filter)	(g)	0.1287	0.1787	0.1947	
Concentration - Actual	(GR/ACF)	0.03074	0.03977	0.04348	0.03799
Concentration - Actual	(MG/ACM)	70.344	91.003	99.488	86.94517
Concentration - Standard	(GR/DSCF)	0.05829	0.07684	0.08643	0.07385
Emission Rate	(LB/HR)	2.503	3.447	3.705	3.218
Emission Factor	(LB/MMBTU)	0.095	0.126	0.139	0.120

3 RESULTS

The results of all field and laboratory evaluations are presented in this section. Gas composition is presented first followed by the computer printout of the particulate results. Preliminary measurements including test port locations are given in the appendices.

The results have been calculated on a personal computer using Microsoft Excel spreadsheets specifically for source testing calculations. EPA-published equations have been used as the basis of the calculation techniques in these programs. The emission rates have been calculated using the product of the concentration times flow method.

3.1 Results of Gas Composition and Moisture Determinations

Interpoll Laboratories Report Number 17-36296
Potlatch / Gwinn
Gwinn, MI

Test Number 1
No. 2 Boiler (EU2)

Results of Gas Composition and Moisture Analyses --- Methods 3A and 4 (% v/v)

		Run 1	Run 2	Run 3
Date of Run		10-03-17	10-03-17	10-03-17
Dry basis				
Carbon Dioxide.....	(%)	16.22	15.92	16.36
Oxygen.....	(%)	3.92	4.11	3.74
Nitrogen.....	(%)	79.86	79.97	79.90
Wet basis				
Carbon Dioxide.....	(%)	13.29	12.88	12.88
Oxygen.....	(%)	3.21	3.33	2.94
Nitrogen.....	(%)	65.42	64.71	62.91
Water Vapor.....		18.08	19.08	21.26
Dry Molecular Weight.....	(g/gmole)	30.75	30.71	30.77
Wet Molecular Weight.....	(g/gmole)	28.45	28.29	28.05
Specific Gravity.....		0.983	0.977	0.969
Water Mass Flow.....	(lb/hr)	3104	3462	3788
Fo.....		1.047	1.055	1.049

3.2 Results of the Particulate Observations

Test Number 1
No. 2 Boiler (EU2)

Results of EPA Method 5 Sampling Data

		Run 1	Run 2	Run 3
Date of Test		10-03-17	10-03-17	10-03-17
Time of Runs	(Hrs)	0900 / 1001	1044 / 1145	1300 / 1401
Static Pressure	(In. of WC)	-0.35	-0.35	-0.35
Cross Sectional Area	(Sq. ft)	4.75	4.75	4.75
Pitot Tube Coefficient		0.84	0.84	0.84
Water in Sample Gas				
Impingers	(g)	144.3	167.0	183.9
Desiccant	(g)	15.2	12.5	15.2
Total	(g)	159.5	179.5	199.1
Gas Meter Coefficient		1.0020	1.0020	1.0020
Barometric Pressure	(In. of Hg)	28.84	28.84	28.84
Avg. Orifice Pressure Drop	(In. of WC)	1.10	1.23	1.14
Avg. Gas Meter Temperature	(°F)	73.8	76.2	76.3
Volume Through Gas Meter				
Meter Conditions	(CF)	35.57	37.63	36.46
Standard Conditions	(DSCF)	34.07	35.89	34.76
Total Sampling Time	(Min.)	60.00	60.00	60.00
Nozzle Diameter	(In.)	0.314	0.314	0.314
Avg. Stack Gas Temperature	(°F)	330	335	336
Volumetric Flow Rate				
Actual	(ACFM)	9,501	10,111	9,941
Dry Standard	(DSCFM)	5,011	5,234	5,002
Isokinetic Variation	(%)	100.0	100.8	102.2

4 RESULTS OF FUEL ANALYSIS

INTERPOLL LABORATORIES, INC.
Fuel Laboratory
(763) 786-6020

Date: 10/23/2017

Client: POTLATCH/GWINN

Laboratory Log Number: 36296-09-11

Sample Collected: 10/3/2017

Sample Received: 10/4/2017

Source: NO. 2 BOILER (EU2)

Sample Identification: TEST 1, RUNS 1-3, WOOD COMPOSITE

Proximate Analysis WT %

Parameter	ASTM Method	Moisture & Ash Free	Moisture Free	As Received
Moisture, Total	E871			38.7
Ash	D1102		1.70	1.04
Volatile Matter	E872	75.1	73.8	45.3
Fixed Carbon (calculation)	E870	24.9	24.5	15.0
Sulfur	E775	< 0.055	< 0.054	< 0.033
Heating Value, Btu/LB.	E711	9220	9063	5560

Utimate Analysis WT %

Parameter	ASTM Method	Moisture & Ash Free	Moisture Free	As Received*
Moisture, Total	E871			38.7
Ash	D1102		1.70	1.04
Sulfur	E775	< 0.055	< 0.054	< 0.033
Carbon	D5373	53.6	52.7	32.3
Hydrogen	D5373	5.65	5.55	3.40
Nitrogen	D5373	0.362	0.356	0.218
Oxygen (Calculated)	E870	40.4	39.7	24.3
Total		100.0	100.0	100.0
F-Factor (DSCF/mmBtu)		9119	9119	9119

* As received H and O values do not include water

Respectfully submitted,

Gregg W. Holman, Manager
Chemistry Department

GWH/cg