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**RESULTS OF THE MARCH 4-6, 2014  
BOILER COMPLIANCE TESTS ON THE  
NO. 1 AND NO. 2 BOILERS AT THE POTLATCH  
LAND & LUMBER FACILITY IN GWINN MICHIGAN**  
Permit No. MI-ROP-N5940-2013

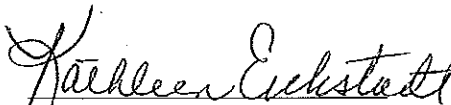
Submitted to:

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

Attention:

Lauren Lueneburg

Reviewed by:

  
Kathleen Eickstadt  
Source Testing Coordinator

Report Number 14-33009(Boilers)  
April 15, 2014  
KE/kce

## ABBREVIATIONS

ACFM	actual cubic feet per minute
cc (ml)	cubic centimeter (milliliter)
DSCFM	dry standard cubic foot of dry gas per minute
DSML	dry standard milliliter
DEG-F (°F)	degrees Fahrenheit
DIA.	Diameter
FT/SEC	feet per second
g	gram
GPM	gallons per minute
GR/ACF	grains per actual cubic foot
GR/DSCF	grains per dry standard cubic foot
g/dscm	grams per dry standard meter
HP	horsepower
HRS	hours
IN.	inches
IN.HG.	inches of mercury
IN.WC.	inches of water
LB	pound
LB/DSCF	pounds per dry standard cubic foot
LB/HR	pounds per hour
LB/10 <sup>6</sup> BTU	pounds per million British Thermal Units heat input
LB/MMBTU	pounds per million British Thermal Units heat input
MW	megawatt
mg/dscm	milligrams per dry standard cubic meter
ug/dscm	micrograms per dry standard cubic meter
microns (um)	micrometer
MIN.	minutes
ng	nanograms
PM	particulate matter
PPH	pounds per hour
PPM	parts per million
ppmC	parts per million carbon
ppm,d	parts per million, dry
ppm,w	parts per million, wet
ppt	parts per trillion
PSI	pounds per square inch
SQ.FT.	square feet
TPD	tons per day
ug	micrograms
v/v	percent by volume
w/w	percent by weight

Standard conditions are defined as 68 °F (20 °C) and 29.92 IN. of mercury pressure

MAY 1 2 2014

**AIR QUALITY DIV.****1 INTRODUCTION**

On March 4-6, 2014, Interpoll Laboratories personnel conducted emission compliance testing on Boilers No. 1 and No. 2 at the Potlatch Gwinn facility located in Gwinn, Michigan. On-site testing was performed by Mike Bonham and Ryan Lenski. Coordination between testing activities and plant operation was provided by Lauren Lueneburg of Potlatch. The test was witnessed by Nathaniel Hude, a representative of the Michigan DEQ.

Both Boilers were manufactured by Hurst and Welding Company and have a rated heat input of 28.7 MM Btu/hour. Particulate emissions are controlled by a Primary and Secondary Multiclone with Flyash injection.

Particulate evaluations were performed in accordance with EPA Methods 1 - 5, CFR Title 40, Part 60, Appendix A (revised July 1, 2013). 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.

Benzo (a) Pyrene sampling was conducted using an EPA Modified Method 5 (MM5) sampling train with purified XAD-2 resin in accordance with EPA Method 0010. A spike (2-component mixture of isotopically-labeled surrogates) was added to the top of the XAD-2 resin cartridge at the time the cartridges were packed. The pre-sample spikes provide an overall evaluation of the accuracy of sampling, recovery and analysis. A field-biased blank was collected by loading the entire sampling train, leak checking it and then recovering the sample in a manner identical to that used for the field samples. The contents of the Adsorbent Module, Container No. 1, Container No. 2, and Container No. 3 samples were extracted and combined to give a single extract for each flue gas sampling.

Carbon monoxide, oxygen and carbon dioxide concentrations were determined in accordance with Methods 3A, and 10. A slip stream of sample gas was withdrawn from the exhaust gas stream using test ports (provided by the plant) on the stack using a heat-traced probe and filter assembly. After passing through the filter, the gas passed through two condenser-type moisture removal systems operating in series.

The particulate-free dry gas was then transported to the analyzers with the excess exhausted to the atmosphere through a calibrated orifice which was used to ensure that the flow from the stack exceeds the requirements of the analyzers. A heat-traced Teflon line was used to transport the sample gas from the filter holder outlet to the analyzer inlet. The analog response of each analyzer was recorded with a computer data logger and backed up with a strip chart recorder. The O<sub>2</sub>, CO<sub>2</sub>, and CO analyzers were calibrated with EPA Protocol I gases. The instruments were calibrated before and after each run as per EPA Method 3A and 10.

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 tables. An overview of all results is presented in the table below:

1(a) Emission Unit Tested	1(b) Limitation Basis	1(c) Pollutant and Emission Limit	1(d) Test Result
Boiler No. 1	R336.1205	<b>Carbon Monoxide</b> 0.50 lb/MMBtu 14.35 Lbs/Hr.	0.04 lb/MMBtu 1.36 Lbs/Hr
	R336.1225	<b>Benzo (a) Pyrene</b> 9.7 ug/dscm 0.0006 Lbs/Hr.	< 0.29 ug/dscm < 0.000006 Lbs/Hr.
	R336.1331	<b>Particulate</b> 0.20 lb/MMBtu 5.7 Lbs/Hr.	0.09 lb/MMBtu 2.6 Lbs/Hr.
Boiler No. 2	R336.1205	<b>Carbon Monoxide</b> 0.50 lb/MMBtu 14.35 Lbs/Hr.	0.03 lb/MMBtu 0.73 Lbs/Hr
	R336.1225	<b>Benzo (a) Pyrene</b> 9.7 ug/dscm 0.0006 Lbs/Hr.	< 0.31 ug/dscm < 0.000007 Lbs/Hr.
	R336.1331	<b>Particulate</b> 0.20 lb/MMBtu 5.7 Lbs/Hr.	0.14 lb/MMBtu 3.9 Lbs/Hr.

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 3 Summary of the Results of the March 4, 2014 Particulate Emission Compliance Test on EUWoodBoiler 1 at the Potlatch Land & Lumber Facility in Gwinn, Michigan.

Item		Run 1	Run 2	Run 3	Average
Date of test		03-04-14	03-04-14	03-04-14	
Time (Start/Finish)	(Hrs)	1300 / 1505	1345 / 1749	1855 / 2100	
Volumetric Flow					
Actual	(ACFM)	11855	11576	11761	11731
Standard	(DSCFM)	5766	5815	5884	5822
Gas Temperature	(°F)	360	353	352	355
Moisture Content	(%v/v)	21.58	19.72	20.13	20.48
Gas Composition	(%v/v, dry)				
Carbon Dioxide		15.61	15.76	15.68	15.68
Oxygen		4.98	4.88	4.97	4.94
Nitrogen		79.41	79.36	79.35	79.37
Isokinetic Variation	(%)	100.7	98.1	100.2	99.7
<b>Particulate Results</b>					
<i>Dry Catch Only</i>					
Concentration - Actual	(GR/ACF)	0.01728	0.02328	0.03671	0.02576
Concentration - Standard	(GR/DSCF)	0.03554	0.04634	0.07340	0.05176
Emission Rate	(LB/HR)	1.756	2.310	3.701	2.589
Emission Factor	(LB/MMBTU)	0.062	0.080	0.127	0.090

Test 4 Summary of the Results of the March 5, 2014 Benzo(a)Pyrene Emission Compliance Test on EUWoodBoiler1 at the Potlatch Land & Lumber Facility in Gwinn, Michigan.

Item		Run 1	Run 2	Run 3	Average
Date of test		03-05-14	03-05-14	03-05-14	
Time runs were done	(Hrs)	0745 / 0926	1010 / 1115	1220 / 1327	
Volumetric Flow					
Actual	(ACFM)	11372	11090	11256	11239
Standard	(DSCFM)	5855	5965	5774	5864
Gas Temperature	(°F)	351	353	355	353
Moisture Content	(%v/v)	18.93	15.10	18.87	17.63
Gas Composition	(%v/v, dry)				
Carbon Dioxide		15.44	15.22	14.96	15.21
Oxygen		4.94	5.39	5.72	5.35
Nitrogen		79.62	79.39	79.32	79.44
Isokinetic Variation	(%)	97.8	95.0	98.4	97.1
<b>Benzo (a) Pyrene Results</b>					
	(Total ug)	< 0.30	< 0.30	< 0.30	< 0.30
	(ug/dscm)	< 0.292	< 0.296	< 0.295	< 0.294
	(LB/HR)	< 0.000006	< 0.000007	< 0.000006	< 0.000006

Test 5 Summary of the Results of the March 4, 2014, Carbon Monoxide Emission Compliance Test on EUWoodBoiler 1 at the Potlatch Land & Lumber Facility in Gwinn, Michigan.

Item		Run 1	Run 2	Run 3	Average
Date of test		03-04-14	03-04-14	03-04-14	
Time runs were done	(Hrs)	1300 / 1505	1651 / 1750	1855 / 1954	
Volumetric Flow					
Actual	(ACFM)	11,852	11,573	11,758	11,728
Standard	(DSCFM)	5,767	5,816	5,885	5,823
Gas Temperature	(°F)	360	353	352	355.32
Moisture Content	(%v/v)	21.59	19.73	20.14	20.48
Gas Composition (%v/v, dry)					
Carbon Dioxide		15.61	15.76	15.68	15.68
Oxygen		4.98	4.88	4.97	4.95
Nitrogen		79.41	79.36	79.35	79.37
<b>Analytical Results</b>					
CO					
Concentration - ppm, w	(ppm, w)	48.498	43.792	35.016	42.44
Concentration - ppm, dr	(ppm, d)	61.849	54.555	43.846	53.42
Emission Rate	(LB/MMBTU)	0.052	0.046	0.037	0.04
Emission Rate	(LB/HR)	1.56	1.38	1.13	1.36



Test 6 Summary of the Results of the March 5-6, 2014 Particulate Emission Compliance Test on EUWoodBoiler 2 at the Potlatch Land & Lumber Facility in Gwinn, Michigan.

Item		Run 1	Run 2	Run 3	Average
Date of test		03-05-14	03-05-14	03-06-14	
Time (Start/Finish)	(Hrs)	1520 / 1724	1810 / 2014	0800 / 1004	
Volumetric Flow					
Actual	(ACFM)	12008	12309	11847	12054
Standard	(DSCFM)	6199	6300	6102	6200
Gas Temperature	(°F)	350	345	348	348
Moisture Content	(%v/v)	18.93	20.14	18.92	19.33
Gas Composition (%v/v, dry)					
Carbon Dioxide		14.32	15.17	13.78	14.42
Oxygen		6.25	5.59	6.62	6.15
Nitrogen		79.43	79.24	79.60	79.42
Isokinetic Variation	(%)	98.8	101.2	98.6	99.5
<b>Particulate Results</b>					
<i>Dry Catch Only</i>					
Concentration - Actual	(GR/ACF)	0.04131	0.04209	0.03061	0.03800
Concentration - Standard	(GR/DSCF)	0.08004	0.08226	0.05923	0.07384
Emission Rate	(LB/HR)	4.252	4.441	3.097	3.930
Emission Factor	(LB/MMBTU)	0.151	0.148	0.114	0.138

Test 7 Summary of the Results of the March 6, 2014, Carbon Monoxide Emission Compliance Test on EUWoodBoiler 2 at the Potlatch Land & Lumber Facility in Gwinn, Michigan.

Item		Run 1	Run 2	Run 3	Average
Date of test		03-06-14	03-06-14	03-06-14	
Time runs were done	(Hrs)	1107 / 1212	1315 / 1420	1505 / 1610	
Volumetric Flow					
Actual	(ACFM)	11,788	11,653	12,113	11,851
Standard	(DSCFM)	6,306	6,226	6,480	6,338
Gas Temperature	(°F)	345	342	342	342.95
Moisture Content	(%v/v)	16.52	16.89	16.77	16.73
Gas Composition	(%v/v, dry)				
Carbon Dioxide		14.01	13.84	13.28	13.71
Oxygen		6.69	6.72	7.24	6.88
Nitrogen		79.30	79.44	79.48	79.41
<b>Analytical Results</b>					
CO					
Concentration - ppm, w	(ppm, w)	11.005	24.450	30.133	21.86
Concentration - ppm, dr	(ppm, d)	13.182	29.421	36.204	26.27
Emission Rate	(LB/MMBTU)	0.012	0.028	0.036	0.03
Emission Rate	(LB/HR)	0.36	0.80	1.02	0.73

Test 8 Summary of the Results of the March 6, 2014 Benzo(a)Pyrene Emission Compliance Test on EUWoodBoiler 2 at the Potlatch Land & Lumber Facility in Gwinn, Michigan.

Item	Run 1	Run 2	Run 3	Average			
Date of test	03-06-14	03-06-14	03-06-14				
Time runs were done (Hrs)	1107 / 1212	1315 / 1421	1505 / 1610				
Volumetric Flow							
Actual (ACFM)	11412	11282	11726	11473			
Standard (DSCFM)	6079	6002	6247	6109			
Gas Temperature (°F)	345	342	342	343			
Moisture Content (%v/v)	16.59	16.97	16.84	16.80			
Gas Composition (%v/v, dry)							
Carbon Dioxide	14.01	13.84	13.28	13.71			
Oxygen	6.69	6.72	7.24	6.88			
Nitrogen	79.30	79.44	79.48	79.41			
Isokinetic Variation (%)	97.4	100.0	98.9	98.8			
<b>Benzo (a) Pyrene Results</b>							
(Total ug) <	0.3	<	0.3	<	0.3	<	0.3
(ug/dscm) <	0.313	<	0.309	<	0.301	<	0.308
(LB/HR) <	0.000007	<	0.000007	<	0.000007	<	0.000007

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.

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3.1 Results of Gas Composition and Moisture Determinations

Test Number 3  
 No. 1 Boiler (EU1)

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

Date of Run		Run 1 03-04-14	Run 2 03-04-14	Run 3 03-04-14
<b>Dry basis</b>				
Carbon Dioxide.....	( % )	15.61	15.76	15.68
Oxygen.....	( % )	4.98	4.88	4.97
Nitrogen.....	( % )	79.41	79.36	79.35
<b>Wet basis (Orsat)</b>				
Carbon Dioxide.....	( % )	12.24	12.65	12.52
Oxygen.....	( % )	3.91	3.92	3.97
Nitrogen.....	( % )	62.27	63.71	63.38
Water Vapor.....		21.58	19.72	20.13
Dry Molecular Weight.....	(g/gmole)	30.70	30.72	30.71
Wet Molecular Weight.....	(g/gmole)	27.96	28.21	28.15
Specific Gravity.....		0.966	0.974	0.972
Water Mass Flow.....	(lb/hr)	4453	4007	4159
Fo.....		1.020	1.016	1.016

Test Number 4  
 No. 1 Boiler

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

	Run 1	Run 2	Run 3
<b>Date of Run</b>	03-05-14	03-05-14	03-05-14
<b>Dry basis (Orsat)</b>			
Carbon Dioxide.....	15.44	15.22	14.96
Oxygen.....	4.94	5.39	5.72
Nitrogen.....	79.62	79.39	79.32
<b>Wet basis (Orsat)</b>			
Carbon Dioxide.....	12.52	12.92	12.14
Oxygen.....	4.00	4.58	4.64
Nitrogen.....	64.55	67.40	64.35
Water Vapor.....	18.93	15.10	18.87
Dry Molecular Weight.....	30.67	30.65	30.62
Wet Molecular Weight.....	28.27	28.74	28.24
Specific Gravity.....	0.977	0.993	0.976
Water Mass Flow.....	3836	2974	3765
Fo.....	1.034	1.019	1.015

Test Number 6  
 No. 2 Boiler (EU2)

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

Date of Run		Run 1 03-05-14	Run 2 03-05-14	Run 3 03-06-14
<b>Dry basis</b>				
Carbon Dioxide.....	( % )	14.32	15.17	13.78
Oxygen.....	( % )	6.25	5.59	6.62
Nitrogen.....	( % )	79.43	79.24	79.60
<b>Wet basis (Orsat)</b>				
Carbon Dioxide.....	( % )	11.61	12.11	11.17
Oxygen.....	( % )	5.07	4.46	5.37
Nitrogen.....	( % )	64.40	63.28	64.54
Water Vapor.....		18.93	20.14	18.92
Dry Molecular Weight.....	(g/gmole)	30.54	30.65	30.47
Wet Molecular Weight.....	(g/gmole)	28.17	28.10	28.11
Specific Gravity.....		0.973	0.971	0.971
Water Mass Flow.....	(lb/hr)	4061	4456	4007
Fo.....		1.023	1.009	1.036



Test Number 8  
 No. 2 Boiler

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

	Run 1	Run 2	Run 3
<b>Date of Run</b>	03-06-14	03-06-14	03-06-14
<b>Dry basis (Orsat)</b>			
Carbon Dioxide.....	14.01	13.84	13.28
Oxygen.....	6.69	6.72	7.24
Nitrogen.....	79.30	79.44	79.48
<b>Wet basis (Orsat)</b>			
Carbon Dioxide.....	11.69	11.49	11.04
Oxygen.....	5.58	5.58	6.02
Nitrogen.....	66.15	65.96	66.10
Water Vapor.....	16.59	16.97	16.84
Dry Molecular Weight.....	30.51	30.48	30.41
Wet Molecular Weight.....	28.43	28.37	28.32
Specific Gravity.....	0.982	0.980	0.978
Water Mass Flow.....	3392	3440	3547
Fo.....	1.014	1.025	1.029

### 3.2 Method 0010 Sampling Data

**Test Number 4**  
**No. 1 Boiler**

**Results of EPA Method 0010 Sampling and Analysis**

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		Run 1	Run 2	Run 3
Date of Test		03-05-14	03-05-14	03-05-14
Time of Runs	(Hrs)	0745 / 0926	1010 / 1115	1220 / 1327
Static Pressure	(In. of WC)	-0.20	-0.20	-0.20
Cross Sectional Area	(Sq. ft)	4.75	4.75	4.75
Pitot Tube Coefficient		0.84	0.84	0.84
Water in Sample Gas				
Impinger	(g)	169.6	111.3	155.1
Desiccant	(g)	10.0	23.7	22.0
Total	(g)	179.6	135.0	177.1
Gas Meter Coefficient		0.9962	0.9962	0.9962
Barometric Pressure	(In. of Hg)	29.20	29.20	29.20
Avg. Orifice Pressure Drop	(In. of WC)	1.19	1.17	1.20
Avg. Gas Meter Temperature	(°F)	51.7	56.1	64.6
Volume Through Gas Meter				
Meter Conditions	(CF)	36.05	35.90	36.60
Standard Conditions	(DSCF)	36.26	35.80	35.91
Total Sampling Time	(Min.)	60.00	60.00	60.00
Nozzle Diameter	(In.)	0.303	0.303	0.303
Avg. Stack Gas Temperature	(°F)	351	353	355
Volumetric Flow Rate				
Actual	(ACFM)	11,372	11,090	11,256
Dry Standard	(DSCFM)	5,855	5,965	5,774
Isokinetic Variation	(%)	97.8	95.0	98.4

Test Number 8  
No. 2 Boiler**Results of EPA Method 0010 Sampling and Analysis**

		Run 1	Run 2	Run 3
Date of Test		03-06-14	03-06-14	03-06-14
Time of Runs	(Hrs)	1107 / 1212	1315 / 1421	1505 / 1610
Static Pressure	(In. of WC)	-0.35	-0.35	-0.35
Cross Sectional Area	(Sq. ft)	4.59	4.59	4.59
Pitot Tube Coefficient		0.84	0.84	0.84
Water in Sample Gas				
Impinger	(g)	134.4	138.7	143.3
Desiccant	(g)	8.4	9.7	8.0
Total	(g)	142.8	148.4	151.3
Gas Meter Coefficient		0.9962	0.9962	0.9962
Barometric Pressure	(In. of Hg)	29.15	29.15	29.15
Avg. Orifice Pressure Drop	(In. of WC)	1.04	1.09	1.17
Avg. Gas Meter Temperature	(°F)	54.1	62.0	62.7
Volume Through Gas Meter				
Meter Conditions	(CF)	33.89	34.80	35.85
Standard Conditions	(DSCF)	33.86	34.24	35.24
Total Sampling Time	(Min.)	60.00	60.00	60.00
Nozzle Diameter	(In.)	0.283	0.283	0.283
Avg. Stack Gas Temperature	(°F)	345	342	342
Volumetric Flow Rate				
Actual	(ACFM)	11,412	11,282	11,726
Dry Standard	(DSCFM)	6,079	6,002	6,247
Isokinetic Variation	(%)	97.4	100.0	98.9

### 3.3 Method 5 Sampling Data

**Test Number 3**  
**No. 1 Boiler (EU1)**

**Results of EPA Method 5 Sampling Data**

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		Run 1	Run 2	Run 3
Date of Test		03-04-14	03-04-14	03-04-14
Time of Runs	(Hrs)	1300 / 1505	1345 / 1749	1855 / 2100
Static Pressure	(In. of WC)	-0.20	-0.20	-0.20
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)	405.5	352.0	384.2
Desiccant	(g)	23.6	23.8	14.0
Total	(g)	429.1	375.8	398.2
Total Particulate Collected	(g)	0.1693	0.2166	0.3543
Gas Meter Coefficient		0.9962	0.9962	0.9962
Barometric Pressure	(In. of Hg)	28.85	28.85	28.85
Avg. Orifice Pressure Drop	In. of WC	1.26	1.22	1.30
Avg. Gas Meter Temperature	(°F)	61.2	62.9	62.2
Volume Through Gas Meter				
Meter Conditions	(CF)	75.33	74.15	76.46
Standard Conditions	(DSCF)	73.51	72.12	74.48
Total Sampling Time	(Min.)	120.00	120.00	120.00
Nozzle Diameter	(In.)	0.303	0.303	0.303
Avg. Stack Gas Temperature	(°F)	360	353	352
Volumetric Flow Rate				
Actual	(ACFM)	11,855	11,576	11,761
Dry Standard	(DSCFM)	5,766	5,815	5,884
Isokinetic Variation	(%)	100.7	98.1	100.2

**Test Number 6**  
**No. 2 Boiler (EU2)**

**Results of EPA Method 5 Sampling Data**

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		Run 1	Run 2	Run 3
Date of Test		03-05-14	03-05-14	03-06-14
Time of Runs	(Hrs)	1520 / 1724	1810 / 2014	0800 / 1004
Static Pressure	(In. of WC)	-0.43	-0.43	-0.43
Cross Sectional Area	(Sq. ft)	4.59	4.59	4.59
Pitot Tube Coefficient		0.84	0.84	0.84
Water in Sample Gas				
Impingers	(g)	339.9	372.7	326.2
Desiccant	(g)	6.9	16.3	15.0
Total	(g)	346.8	389.0	341.2
Total Particulate Collected	(g)	0.3633	0.3877	0.2637
Gas Meter Coefficient		0.9962	0.9962	0.9962
Barometric Pressure	(In. of Hg)	29.25	29.25	29.15
Avg. Orifice Pressure Drop	In. of WC)	1.14	1.23	1.06
Avg. Gas Meter Temperature	(°F)	67.0	64.7	44.9
Volume Through Gas Meter				
Meter Conditions	(CF)	71.60	74.00	67.53
Standard Conditions	(DSCF)	70.04	72.72	68.70
Total Sampling Time	(Min.)	120.00	120.00	120.00
Nozzle Diameter	(In.)	0.283	0.283	0.283
Avg. Stack Gas Temperature	(°F)	350	345	348
Volumetric Flow Rate				
Actual	(ACFM)	12,008	12,309	11,847
Dry Standard	(DSCFM)	6,199	6,300	6,102
Isokinetic Variation	(%)	98.8	101.2	98.6





INTERPOLL LABORATORIES, INC.

Fuel Laboratory

(763) 786-6020

Date: 4/4/2014  
 Client: POTLATCH/GWINN  
 Laboratory Log Number: 33009-72-74  
 Sample Collected: 3/4/2014  
 Sample Received: 3/7/2014  
 Source: NO. 1 BOILER (EU1)  
 Sample Identification: TEST 3, RUNS 1-3, WOOD COMPOSITE

Proximate Analysis WT %

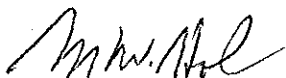
Parameter	ASTM Method	Moisture & Ash Free	Moisture Free	As Received
Moisture, Total	E871			43.4
Ash	D1102		0.912	0.516
Volatile Matter	E872	74.6	73.9	41.8
Fixed Carbon (calculation)	E870	25.4	25.1	14.2
Sulfur	E775	< 0.054	< 0.053	< 0.030
Heating Value, Btu/LB.	E711	9206	9122	5159

Ultimate Analysis WT %

Parameter	ASTM Method	Moisture & Ash Free	Moisture Free	As Received*
Moisture, Total	E871			43.4
Ash	D1102		0.912	0.516
Sulfur	E775	< 0.054	< 0.053	< 0.030
Carbon	D5373	52.6	52.2	29.5
Hydrogen	D5373	5.26	5.21	2.95
Nitrogen	D5373	0.249	0.246	0.139
Oxygen (Calculated)	E870	41.8	41.4	23.4
Total		100.0	100.0	100.0
F-Factor (DSCF/mmBtu)		8747	8747	8747

\* As received H and O values do not include water

Respectfully submitted,



Gregg W. Holman, Manager  
 Chemistry Department

GWH/cg

INTERPOLL LABORATORIES, INC.

Fuel Laboratory  
(763) 786-6020

Date: 4/4/2014  
 Client: POTLATCH/GWINN  
 Laboratory Log Number: 33009-81-83  
 Sample Collected: 3/5/2014  
 Sample Received: 3/7/2014  
 Source: NO. 2 BOILER (EU2)  
 Sample Identification: TEST 6, RUNS 1-3, WOOD COMPOSITE

Proximate Analysis WT %

Parameter	ASTM Method	Moisture & Ash Free	Moisture Free	As Received
Moisture, Total	E871			41.4
Ash	D1102		0.983	0.576
Volatile Matter	E872	78.2	77.5	45.4
Fixed Carbon (calculation)	E870	21.8	21.5	12.6
Sulfur	E775	< 0.053	< 0.052	< 0.030
Heating Value, Btu/LB.	E711	9028	8939	5239

Ultimate Analysis WT %

Parameter	ASTM Method	Moisture & Ash Free	Moisture Free	As Received*
Moisture, Total	E871			41.4
Ash	D1102		0.983	0.576
Sulfur	E775	< 0.053	< 0.052	< 0.030
Carbon	D5373	50.8	50.3	29.5
Hydrogen	D5373	5.71	5.66	3.32
Nitrogen	D5373	0.157	0.155	0.0908
Oxygen (Calculated)	E870	43.2	42.8	25.1
Total		100.0	100.0	100.0
F-Factor (DSCF/mmBtu)		8722	8722	8722

\* As received H and O values do not include water

Respectfully submitted,



Gregg W. Holman, Manager  
Chemistry Department