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**AIR QUALITY DIVISION**

**RESULTS OF THE JUNE 19, 2018  
AIR EMISSION COMPLIANCE TEST ON THE  
PRESS RCO STACK AT THE  
LOUISIANA PACIFIC OSB PLANT  
SAGOLA, MICHIGAN**

Submitted to:

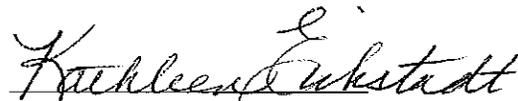
**LOUISIANA PACIFIC CORPORATION**

N8504 Highway M-95  
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Attention:

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Reviewed by:



Kathleen Eickstadt

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Source Testing

Report Number 18-36838

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**AIR QUALITY DIVISION**

**1 INTRODUCTION**

On June 19, 2018 Interpoll Laboratories personnel conducted air emission compliance testing on the Press RCO at the Louisiana Pacific Corporation (LP) OSB Plant Located in Sagola, Michigan. On-site testing was performed by Trent Johnson and Ryan Schuth. Coordination between testing activities and plant operation was provided by Rich Menard of Louisiana Pacific Corp. Testing was witnessed by David Patterson and Sydney Bruestle of the Michigan Department of Environmental Quality.

The Sagola plant operates three TSI single pass dryers fired with Model 230 FYR Coen Inner Air Heater primary burners each coupled with Duel Air Zone DAZ-24 register burners, a press and one GEKA thermal oil heater. Dryer emissions are controlled by three parallel Geoenergy WESP's and a MEGTEC two-cell RTO. Press emissions are ducted to a Huntington Environmental Systems Inc., five cell RCO prior to exhaust to the atmosphere. The Geka bark burning thermal oil heater emissions are controlled by dry ESP particulate removal system.

Excluding the heat from the dryers, the thermal oil system provides a majority of the heat necessary for the waferboard production. The hogged bark fuels the thermal oil burner, which heats the thermal oil to an approximate temperature of 440°F - 500°F. Thermal oil is circulated through the press, the piping which surrounds the bulk wax storage tanks, and the heat exchangers. Heat exchangers are used to transfer heat from the thermal oil to water. Heated water is used to provide heat for the plant, space heaters, and log conditioning ponds.

PM-10 sampling was conducted in accordance with EPA Method 201A. An Interpoll Labs sampling train which meets or exceeds specifications in the above-cited reference was used to extract PM-10 samples by means of a PM-10 cyclone and a stainless steel probe. The cyclone used in this work meets or exceeds the specifications of Method 201A. Velocity pressure measurements were made prior to and during, each run to determine the proper dwell times at each traverse point. Condensable particulate was collected in the back half of the Method 201A sampling train and analyzed in accordance with EPA Method 202.

Carbon monoxide, oxides of nitrogen, oxygen and carbon dioxide concentrations were determined in accordance with Methods 10, 7E and 3A, CFR Title 40, Part 60, Appendix A (revised

July 1, 2017). 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.

VOC concentrations were determined instrumentally in accordance with EPA Method 25A using a heated flame ionization detector (HFID) calibrated against propane in air standards. The THC concentration was continuously monitored by extracting a slipstream of exhaust gas by means of a heated probe and filter holder. 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. The O<sub>2</sub>, CO<sub>2</sub>, NO<sub>x</sub>, THC and CO analyzers were calibrated with EPA Protocol I gases. The instruments were calibrated before and after each run as per EPA Method 3A, 7E, 10 and 25A.

Formaldehyde sampling was conducted using EPA Method 320 (FTIR). The on-line gas analysis was performed using a MKS MultiGas 2030 FTIR based analyzer. The MKS MultiGas 2030 FTIR has a fixed gas cell path length of 5.11 Meters and the detector was cooled by the use of liquid nitrogen. The gas was transported to the FTIR analyzer through a heat traced Teflon line originating from the manifold system described above. Three one-hour runs were conducted for each test condition. A leak-check was performed prior to and following the test on the sampling the system and was found to be acceptable. The Method 320 Data is contained in Appendix J. A dynamic spike was performed according to the guidelines spelled out in EPA Method 320. This was done using a compressed gas cylinder with certified quantities of acetaldehyde and sulfur hexafluoride. This data can be found in Appendix K.

Testing on the Press RCO Stack was conducted from two test ports oriented at 90 degrees on the stack. These test ports are located 5.5 stack diameters downstream and 4.3 stack diameters upstream of the nearest flow disturbances. A 12-point traverse was used to collect representative PM-10 samples. Formaldehyde sampling was conducted using a single-point traverse.

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 important results of the emission compliance test are summarized in the following tables. An overview of all results is presented below:

<u>PARAMETER</u>	<u>LIMIT</u>	<u>MEASURED</u>
<b><u>PRESS RCO STACK</u></b>		
<b>PM-10</b>		
<i>DRY CATCH ONLY</i> .....(GR/DSCF)	N/A	0.00035
.....(LB/HR)	N/A	0.24
<i>DRY+M202 WET CATCH</i> .....(GR/DSCF)	N/A	0.0019
.....(LB/HR)	N/A	1.35
.....(LB/TFP)	0.072	0.039
<b>Carbon Monoxide</b>		
..... (ppm,d)	N/A	14.42
.....(LB/HR)	N/A	5.13
..... (LB/TFP)	0.51	0.15
<b>VOC's<sup>1</sup></b>		
.....(ppmC,d)	N/A	14.5
.....(LBC/HR)	3.44	1.88
<b>Formaldehyde</b>		
..... (ppm,d)	N/A	4.69
.....(LB/HR)	5.91	1.79
<b>NOx</b>		
..... (ppm,d)	N/A	15.44
.....(LB/HR)	43.0	9.01

No difficulties were encountered in the field by Interpoll Labs or in the laboratory evaluation 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.

<sup>1</sup> Corrected for methane.

Test 1 Summary of the June 19, 2018, PM10 Emission Test on the  
Press RCO Stack at the LP Corporation Facility Located in Sagola, MI.

Item		Run 1	Run 2	Run 3	Average
Date of test		06-19-18	06-19-18	06-19-18	
Time Start	(Hrs)	0830	1030	1242	
Time Finish	(Hrs)	1000	1221	1415	
Volumetric Flow					
Actual	(ACFM)	109,683	110,480	110,923	110,362
Standard	(SCFM)	84,041	84,343	84,659	84,348
Standard	(DSCFM)	81,430	81,503	81,620	81,518
Gas Temperature	(°F)	199	202	202	201
Moisture Content	(%v/v)	3.11	3.37	3.59	3.35
Gas Composition (%v/v, dry)					
Carbon Dioxide		0.24	0.19	0.19	0.21
Oxygen		20.21	20.24	20.24	20.23
Nitrogen		79.55	79.57	79.57	79.56
Volume Though Gas Meter	(DSCF)	34.85	35.19	35.20	35.08
EPA F-Factor (Dry, O2)	(DSCF/mmBtu)	8710	8710	8710	
Isokinetic Variation	(%)	94.1	93.2	93.0	93.4
<b>PM10 Results (EPA Method 201A &amp; 202)</b>					
<i>Filterable-Dry Catch Only</i>					
Sample Mass (Filter & rinse)	(g)	0.0007	0.0008	0.0009	
Concentration - Actual	(GR/ACF)	0.00023	0.00025	0.00028	0.0003
Concentration - Standard	(GR/DSCF)	0.00031	0.00034	0.00039	0.00035
Emission Rate	(LB/HR)	0.216	0.239	0.270	0.242
<i>Organic CPM</i>					
Sample Mass	(g)	0.0018	0.0015	0.0020	
Concentration - Actual	(GR/ACF)	0.00059	0.00049	0.00065	0.0006
Concentration - Standard	(GR/DSCF)	0.00080	0.00066	0.00088	0.00078
Emission Rate	(LB/HR)	0.556	0.460	0.613	0.543
<i>Inorganic CPM</i>					
Sample Mass	(g)	0.0025	0.0015	0.0015	
Concentration - Actual	(GR/ACF)	0.00082	0.00049	0.00048	0.0006
Concentration - Standard	(GR/DSCF)	0.00111	0.00066	0.00066	0.00081
Emission Rate	(LB/HR)	0.773	0.460	0.460	0.564
<i>PM10 (Dry + Organic + Inorganic)</i>					
Sample Mass	(g)	0.0050	0.0038	0.0044	
Concentration - Actual	(GR/ACF)	0.00164	0.00122	0.00141	0.0014
Concentration - Standard	(GR/DSCF)	0.00221	0.00166	0.00192	0.00193
Emission Rate	(LB/HR)	1.545	1.158	1.343	1.349
	(LB/TFP)	0.047	0.032	0.038	0.039
<b>Notes</b>					
TFP		33.2	36.5	34.9	

Test 2 Summary of the June 19, 2018 Oxides of Nitrogen (Nox), Carbon Monoxide and VOC's Test on the Press RCO Source at the Louisiana Pacific Facility located in Sagola, Michigan.

Item	Run 1	Run 2	Run 3	Average
Date of test	06-19-18	06-19-18	06-19-18	
Time runs were done (Hrs)	0830 / 1000	1030 / 1221	1242 / 1415	
Volumetric Flow				
Actual (ACFM)	109,683	110,481	110,923	110,362
Standard (DSCFM)	81,428	81,501	81,621	81,516
Gas Temperature (°F)	199	202	202	201
Moisture Content (%v/v)	3.11	3.37	3.59	3.36
Gas Composition (%v/v, dry)				
Carbon Dioxide	0.24	0.19	0.19	0.21
Oxygen	20.21	20.24	20.24	20.23
Nitrogen	79.55	79.57	79.57	79.56
<b>Results:</b>				
Oxides of Nitrogen (EPA Method 7E)				
Concentration (ppm, d)	15.69	15.13	15.49	15.44
Emission Rate (LB /HR)	9.15	8.84	9.06	9.01
Carbon Monoxide (EPA Method 10)				
Concentration (ppm, d)	15.21	13.28	14.78	14.42
Emission Rate (LB /HR)	5.40	4.72	5.26	5.13
Emission Rate (LB/TFP)	0.16	0.13	0.15	0.15
VOC (EPA Method 25a)				
Concentration (ppm Propane, d)	5.02	4.29	5.19	4.83
Concentration (TGNM ppm Propane, d)	4.29	3.52	4.49	4.10
Concentration (ppm Carbon, d)	15.06	12.87	15.56	14.50
Concentration (TGNM ppm Carbon, d)	12.86	10.57	13.46	12.30
Emission Rate (Lb x/Hr) (LB Carbon/HR)	2.30	1.96	2.37	2.21
Emission Rate (Lb x/Hr) (TGNM LB Carbon/HR)	1.96	1.61	2.06	1.88
Emission Rate (Lb x/Hr) (tons finished product/hr)	33.2	36.5	34.9	

Test 3 Summary of the Results of the June 19, 2018, Method 320 (VOC/HAP's) Emission Test on the Press RCO Stack at the Louisiana Pacific facility located in Sagola, Michigan.

Item			Run 1	Run 2	Run 3	Average
Date of test			06-19-18	06-19-18	06-19-18	
Time runs were done (Hrs)			0830 / 1000	1030 / 1221	1242 / 1415	
Volumetric Flow						
	Actual	(ACFM)	109,683	110,481	110,923	110,362
	Standard	(DSCFM)	81,428	81,501	81,621	81,517
Gas Temperature		(°F)	199	202	202	201
Moisture Content		(%v/v)	3.11	3.37	3.59	3.36
Gas Composition		(%v/v, dry)				
	Carbon Dioxide		0.24	0.19	0.19	0.21
	Oxygen		20.21	20.24	20.24	20.23
	Nitrogen		79.55	79.57	79.57	79.56
Formaldehyde						
	Concentration	(ppm, d )	4.75	4.47	4.85	4.69
	Concentration	(ppm, w )	4.61	4.32	4.67	4.53
	Emission Rate	(LB /HR)	1.808	1.704	1.848	1.787

### 3 RESULTS

The results of all field and laboratory evaluations are presented in this section. Orsat (gas composition) and moisture is presented first followed by the computer printout of the PM-10 results. Preliminary measurements including test port locations are given in the appendices.

The results have been calculated on a personal computer using programs written 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.

Test Number 1  
Press RCO

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

Date of Run	Run 1 06-19-18	Run 2 06-19-18	Run 3 06-19-18
<b>Dry basis (Orsat)</b>			
Carbon Dioxide.....	0.24	0.19	0.19
Oxygen.....	20.21	20.24	20.24
Nitrogen.....	79.55	79.57	79.57
<b>Wet basis (Orsat)</b>			
Carbon Dioxide.....	0.23	0.18	0.18
Oxygen.....	19.58	19.61	19.61
Nitrogen.....	77.08	76.84	76.61
Water Vapor.....	3.11	3.37	3.59
Dry Molecular Weight.....	28.85	28.84	28.84
Wet Molecular Weight.....	28.51	28.48	28.45
Specific Gravity.....	0.985	0.984	0.983
Water Mass Flow.....	7327	7968	8528

Test Number 1  
Press RCO

**EPA Method 201A Sampling Data**

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		Run 1	Run 2	Run 3
Date of Test		06-19-18	06-19-18	06-19-18
Time of Runs	(Hrs)	0830 / 1000	1030 / 1221	1242 / 1415
Static Pressure	(In. of WC)	-0.81	-0.81	-0.81
Cross Sectional Area	(Sq. ft)	31.50	31.50	31.50
Pitot Tube Coefficient		0.84	0.84	0.84
Water in Sample Gas				
Impingers	(g)	10.0	9.1	12.5
Desiccant	(g)	13.7	16.9	15.3
Total	(g)	23.7	26.0	27.8
Gas Meter Coefficient		1.0062	1.0062	1.0062
Barometric Pressure	(In. of Hg)	28.68	28.68	28.68
Avg. Orifice Pressure Drop	(In. of WC)	0.59	0.59	0.59
Avg. Gas Meter Temperature	(°F)	78.6	81.0	80.2
Volume Through Gas Meter				
Meter Conditions	(CF)	36.80	37.32	37.28
Standard Conditions	(DSCF)	34.85	35.19	35.20
Total Sampling Time	(Min.)	88.75	90.43	90.49
Nozzle Diameter	(In.)	0.172	0.172	0.172
Avg. Stack Gas Temperature	(°F)	199	202	202
Volumetric Flow Rate				
Actual	(ACFM)	109,683	110,480	110,923
Standard	(SCFM)	84,041	84,343	84,659
Dry Standard	(DSCFM)	81,430	81,503	81,620
PM-10 cutpoint	(um)	10.52	10.56	10.54
PM-2.5 cutpoint	(um)	2.37	2.39	2.39
Isokinetic Variation	(%)	94.1	93.2	93.0

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