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AIR QUALITY DIV.

**RESULTS OF THE JULY 8, 2014
AIR EMISSION COMPLIANCE TEST ON THE
PRESS RCO STACK AT THE
LOUISIANA PACIFIC OSB PLANT
SAGOLA, MICHIGAN**

Submitted to:

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Attention:

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Reviewed by:



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1 INTRODUCTION

On July 8, 2014 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 Mike Bonham and Jim Thoma. Coordination between testing activities and plant operation was provided by Hans Baij of Louisiana Pacific Corp. Testing was witnessed by Joel Asher 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 Huntington Environmental Systems Inc., eight 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 a multiclone dust collector and an Electrified Filter Bed (EFB) fluidized gravel bed 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, 2013). 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 O₂, CO₂, NO_x, 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.

The analytical procedure for formaldehyde is incorporated by reference from the NCASI chilled impinger technique. The method utilizes the acetylacetone colorimetric technique. Note that this requires a UV spectrophotometer capable of yielding absorbance values at 412nm. Refer to NCASI Method CI/WP 98.01 for details.

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>
<u>PRESS RCO STACK</u>		
PM-10		
<i>DRY CATCH ONLY</i>(GR/DSCF)	N/A	0.0003
.....(LB/HR)	N/A	0.22
<i>DRY+M202 WET CATCH</i>(GR/DSCF)	N/A	0.0012
.....(LB/HR)	N/A	0.80
.....(LB/TFP)	0.072	0.024
Carbon Monoxide		
..... (ppm,d)	N/A	12.82
.....(LB/HR)	N/A	4.42
.....(LB/TFP)	0.51	0.13
VOC's¹		
.....(ppmC,w)	N/A	11.46
.....(LBC/HR)	3.44	1.76
Formaldehyde		
..... (ppm,d)	N/A	3.23
.....(LB/HR)	5.91	1.19
NOx		
..... (ppm,d)	N/A	13.81
.....(LB/HR)	43.0	7.81

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.

¹ Corrected for methane.

Test 1 Summary of the July 8, 2014 PM10 Emission Compliance Test on the
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		07-08-14	07-08-14	07-08-14	
Time Start	(Hrs)	0855	1055	1300	
Time Finish	(Hrs)	1028	1228	1427	
Volumetric Flow					
Actual	(ACFM)	108544	109435	108784	108921
Standard	(DSCFM)	78462	79612	78727	78934
Gas Temperature	(°F)	204	202	201	202
Moisture Content	(%v/v)	3.92	3.61	4.31	4
Gas Composition	(%v/v, dry)				
Carbon Dioxide		0.30	0.31	0.02	0.21
Oxygen		20.81	20.81	20.60	20.74
Nitrogen		78.89	78.88	79.38	79.05
Volume Through Gas Meter	(DSCF)	33.60	37.36	36.04	36
Isokinetic Variation	(%)	91.9	99.9	102.3	98
PM10 Results (EPA Method 201A & 202)					
<i>Filterable-Dry Catch Only</i>					
Sample Mass (Filter & rinse)	(g)	0.0009	0.0007	0.0006	
Concentration - Actual	(GR/ACF)	0.00030	0.00021	0.00019	<u>0.00023</u>
Concentration - Standard	(GR/DSCF)	0.00041	0.00029	0.00026	<u>0.00032</u>
Emission Rate	(LB/HR)	0.278	0.197	0.173	<u>0.21600</u>
<i>Organic CPM</i>					
Sample Mass	(g)	0.0010	0.0013	0.0002	
Concentration - Actual	(GR/ACF)	0.00033	0.00039	0.00006	<u>0.00026</u>
Concentration - Standard	(GR/DSCF)	0.00046	0.00054	0.00009	<u>0.00036</u>
Emission Rate	(LB/HR)	0.309	0.366	0.058	<u>0.24433</u>
<i>Inorganic CPM</i>					
Sample Mass	(g)	0.0012	0.0014	0.0009	
Concentration - Actual	(GR/ACF)	0.00040	0.00042	0.00028	<u>0.00037</u>
Concentration - Standard	(GR/DSCF)	0.00055	0.00058	0.00039	<u>0.00050</u>
Emission Rate	(LB/HR)	0.371	0.394	0.260	<u>0.34167</u>
<i>PM10 (Dry + Organic + Inorganic)</i>					
Sample Mass	(g)	0.0031	0.0034	0.0017	
Concentration - Actual	(GR/ACF)	0.00103	0.00102	0.00053	<u>0.00086</u>
Concentration - Standard	(GR/DSCF)	0.00142	0.00140	0.00073	<u>0.00119</u>
Emission Rate	(LB/HR)	0.958	0.958	0.491	<u>0.80233</u>
	(LB/TFP)	0.029	0.029	0.015	0.024
TFP		33	33	33	

Test 3 Summary of the Results of the July 8, 2014, Oxides of Nitrogen, Carbon Monoxide and VOC Emission Compliance Test on the Press RCO Stack at the Louisiana Pacific Facility located near Sagola, Michigan.

Item		Run 1	Run 2	Run 3	Average
Date of test		07-08-14	07-08-14	07-08-14	
Time runs were done	(Hrs)	0855 / 0955	1055 / 1155	1300 / 1400	
Volumetric Flow					
Actual	(ACFM)	108,541	109,433	108,782	108,919
Standard	(DSCFM)	78,470	79,619	78,734	78,941
Gas Temperature	(°F)	204	202	201	202
Moisture Content	(%v/v)	3.91	3.60	4.30	3.94
Gas Composition	(%v/v, dry)				
Carbon Dioxide		0.30	0.31	0.02	0.21
Oxygen		20.81	20.81	20.60	20.74
Nitrogen		78.89	78.88	79.38	79.05
Analytical Results					
NOx					
Concentration - ppm, wet	(ppm, w)	14.734	13.088	11.974	13.27
Concentration - ppm, dry	(ppm, d)	15.334	13.577	12.512	13.81
Emission Rate	(LB/HR)	8.618	7.743	7.056	7.81
CO					
Concentration - ppm, wet	(ppm, w)	11.846	13.073	12.031	12.32
Concentration - ppm, dry	(ppm, d)	12.328	13.561	12.571	12.82
Emission Rate	(LB/HR)	4.219	4.709	4.317	4.42
	(LB/TFP)	0.128	0.143	0.131	0.134
VOC Outlet (method 25a)					
Concentration - ppm, wet	(TGNM ppm, w as C)	9.14	14.10	11.15	11.46
Concentration - ppm, dry	(TGNM ppm, d as C)	9.51	14.63	11.66	11.93
Emission Rate	(LB/HR)	1.39	2.18	1.71	1.76

TFP=33.0

Results of NCASI 98.01 Determinations

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Test Number 2
 Press RCO

		Run 1	Run 2	Run 3	Average
Date of Test		07-08-14	07-08-14	07-08-14	
Time of Runs					
	Start (Hrs)	0855	1055	1300	
	End (Hrs)	0955	1155	1400	
	Total (Min)	60	60	60	
Moisture Content	(%v/v)	3.91	3.60	4.30	
Volumetric Flow Rate	(DSCFM)	78,475	79,624	78,735	
Sample Volume	(DSL)	23.80	23.08	20.53	
		Duplicate		Spike	
		26.73	20.35		
Formaldehyde	(ppm,d)	3.15	3.39	3.30	3.23
	(LB/HR)	1.16	1.26	1.21	1.19
	(%)		10.44	70.92	

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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.

3.1 Results of Orsat and Moisture Determinations

Test Number 1
Press RCO

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

Date of Run	Run 1 07-08-14	Run 2 07-08-14	Run 3 07-08-14
Dry basis (Orsat)			
Carbon Dioxide.....	0.30	0.31	0.02
Oxygen.....	20.81	20.81	20.60
Nitrogen.....	78.89	78.88	79.38
Wet basis (Orsat)			
Carbon Dioxide.....	0.29	0.30	0.02
Oxygen.....	19.99	19.99	19.79
Nitrogen.....	75.79	76.10	75.88
Water Vapor.....	3.92	3.61	4.31
Dry Molecular Weight.....	28.88	28.88	28.83
Wet Molecular Weight.....	28.45	28.49	28.36
Specific Gravity.....	0.983	0.984	0.980
Water Mass Flow.....	8990	8373	9942

3.2 Results of PM-10 Determinations

Test Number 1**Press RCO****EPA Method 201A Sampling Data**

		Run 1	Run 2	Run 3
Date of Test		07-08-14	07-08-14	07-08-14
Time of Runs	(Hrs)	0855 / 1028	1055 / 1228	1300 / 1427
Static Pressure	(In. of WC)	-0.55	-0.55	-0.55
Cross Sectional Area	(Sq. ft)	31.50	31.50	31.50
Pitot Tube Coefficient		0.82	0.82	0.82
Water in Sample Gas				
Impingers	(g)	19.9	16.7	23.3
Desiccant	(g)	9.2	13.0	11.1
Total	(g)	29.1	29.7	34.4
Gas Meter Coefficient		1.0043	1.0043	1.0043
Barometric Pressure	(In. of Hg)	28.35	28.35	28.35
Avg. Orifice Pressure Drop	(In. of WC)	0.51	0.62	0.64
Avg. Gas Meter Temperature	(°F)	73.7	78.8	79.1
Volume Through Gas Meter				
Meter Conditions	(CF)	35.64	40.00	38.60
Standard Conditions	(DSCF)	33.60	37.36	36.04
Total Sampling Time	(Min.)	88.87	89.62	85.33
Nozzle Diameter	(In.)	0.174	0.174	0.174
Avg. Stack Gas Temperature	(°F)	204	202	201
Volumetric Flow Rate				
Actual	(ACFM)	108,544	109,435	108,784
Dry Standard	(DSCFM)	78,462	79,612	78,727
PM-10 cutpoint	(um)	10.67	9.98	9.82
PM-2.5 cutpoint	(um)	2.45	2.19	2.13
Isokinetic Variation	(%)	91.9	99.9	102.3

3.3 Results of NCASI 98.01 Sampling

Test Number
Press RCO

Results of NCAST 98.01 Sampling

		Run 1	Run 2	Run 3
Date of Test		07-08-14	07-08-14	07-08-14
Static Pressure	(In. WC)	-0.55	-0.55	-0.55
Cross Sectional Area	(Sq. ft)	31.50	31.50	31.50
Pitot Tube Coefficient		0.82	0.82	0.82
Gas Meter Coefficient		0.9675	0.9675	0.9675
Barometric Pressure	(In. Hg)	28.35	28.35	28.35
Avg. Sampling Rate	(cc/min)	396	384	341
Avg. Gas Meter Temperatu	(°F)	74	78	79
Volume Through Gas Meter				
Meter Conditions	(M ³)	0.0262	0.0256	0.0228
Meter Conditions	(Ft ³)	0.925	0.904	0.805
Standard Conditions	(DSCF)	0.839	0.813	0.723
Total Sampling Time	(Min.)	60	60	60
Avg. Stack Gas Temperatu	(°F)	204	202	201
Volumetric Flow Rate				
Actual	(ACFM)	108,534	109,426	108,782
Dry Standard	(DSCFM)	78,475	79,624	78,735