Background Report Reference

AP-42 Section Number: 10.6.1

Background Report Section: 4

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Title: Results Of The June 16, 1994 Particulate Emission Enginering Test On The No. 1 And No. 2 Lines At The Louisiana-Pacific Corp. Facility Located In Hayward, Wisconsin

Interpoll Laboratories, Inc.

July 1994

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RESULTS OF THE JUNE 16, 1994
PARTICULATE EMISSION ENGINEERING TEST
ON THE NO. 1 AND NO. 2 LINES
AT THE LOUISIANA-PACIFIC CORPORATION FACILITY
LOCATED IN HAYWARD, WISCONSIN

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PACE Project No.: 940614.401
Report Date: July 18, 1994

Field sampling was performed by and personnel under my direct supervision.

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Table of Contents

EXECUTIVE SUMMARY

PACE Incorporated was contracted by Louisiana-Pacific Corporation to perform particulate emissions testing on the Line 1 and Line 2 dryers and EFB outlets at the Louisiana-Pacific facility located in Hayward, Wisconsin. This series of tests was performed on June 16,1994.

Test Results Summary

Line 1

	Test 1		Test 2	
	EFB Outlet	Core Dryer Outlet	EFB Outlet	Surface Dryer Outlet
ACFM	95200	46200	93000	49300
DSCFM	50900	25300	51100	24200
Average Flue Gas Moisture Content (%v/v)	26.7	21.8	25.7	29.7
Average Flue Gas Temp. (°F)	242	246	235	247
Particulate Concentration (GR/DSCF)	0.108	0.201	0.094	0.301
Particulate Emission Factor (LB/KLB of Wet Flue Gas)	0.17	0.32	0.15	0.45
Particulate Removal Efficiency (%)		46.9		66.7

Line 2

	Test 1		Test 2	
	EFB Outlet	Core Dryer Outlet	EFB Outlet	Surface Dryer Outlet
ACFM	102600	50500	105800	56000
DSCFM	58200	29500	60600	31200
Average Flue Gas Moisture Content (%v/v)	22.5	18.2	21.7	22.5
Average Flue Gas Temp. (°F)	221	220	222	218
Particulate Concentration (GR/DSCF)	0.075	0.248	0.067	0.237
Particulate Emission Factor (LB/KLB of Wet Flue Gas)	0.12	0.41	0.11	0.38
Particulate Removal Efficiency (%)		70.7		71.1

INTRODUCTION

PACE, Incorporated personnel conducted particulate emission engineering testing on the line 1 and line 2 dryers and EFB outlets at the Louisiana-Pacific facility located in Hayward, Wisconsin. On-site testing was performed by a four member team consisting of M. Loftus, J. Pederson, K. Lattery and M. Wilson. Coordination between plant operations and testing activities was provided by Del Salquist of Louisiana-Pacific through direct contact with the test team leader. Testing was not witnessed by any representative with the Wisconsin Department of Natural Resources. The dryer outlet tests consisted of one independent one-hour samplings for particulate with concurrent integrated gas sampling for Orsat analyses. The EFB outlet tests consisted of two independent one-hour samplings for particulate with concurrent integrated gas samplings for Orsat analysis. An additional one-hour sampling (Test 3 Run 1) for particulate was performed on the EFB outlets and the sample was given to Del Salquist for independent constituent analysis.

The objectives of this project were to quantify particulate emissions and rate the amount going through the EFB.

Results are summarized in the next section followed by descriptions of the process under investigation and test methods. All supporting data are included in subsequent appendices.

RESULTS SUMMARY

Results of particulate determinations and gas composition are summarized in Tables 1-4.

Testing on Line 1 originally began on June 15,1994. Problems were encountered with the process on Line 1 which resulted in re-testing on June 16th. After testing the Surface dryer on Line 1 process problems delayed the start of the testing on the Core dryer for 3 hours. A sample train power loss during the Core dryer test caused the static pressure of the duct to pull the filter off the holder. The test was ended 51.9 minutes into the run.

The test on the Line 2 Surface dryer lasted only 36 minutes, because the filter plugged on the dryer outlet. Both tests on the Line 2 EFB outlet were performed from the top port. the angle of the bottom port made it impossible to insert the probe into the duct.

No other problems were encountered in the sampling or analyses of emissions samples. On this and after complete review of the test results, we believe that the values reported herein are an accurate representation of the source conditions at the time of the test.

SUMMARY OF THE RESULTS

Louisiana - Pacific Corporation
Hayward, Wisconsin
PACE Project No. 940614.401

PACE Incorporated
June 22, 1994

TABLE 1
SUMMARY OF THE RESULTS

Line No. 1 EFB Outlet

Parameter	**Run 2**	**Run 2**	**Average**
Date of Run	6/16/94	6/16/94	
Time of Run	1135-1235	737-837	
Concurrently tested with	Core Dryer	Surface Dryer	
Volumetric Flow Rate			
ACFM	95200	93000	94100
DSCFM	50900	51100	51000
Gas Temperature (°F)	242	235	238
Gas Moisture Content (%v/v)	26.7	25.7	26.2
Gas Composition (%v/v,Dry)			
CO2	3.8	4.0	3.9
O2	17.0	16.9	17.0
N2	79.2	79.1	79.2
Isokinetic Variation (%)	105.1	105.1	
Particulate Emission Rate (LB/HR) *	47.2	41.2	44.2
Particulate Concentration *			
GR/ACF	0.058	0.052	0.055
GR/DSCF	0.108	0.094	0.101
Particulate Emission Factor *			
LB/KLB of Wet Flue Gas	0.17	0.15	0.16

*Dry catch plus organic and inorganic/residual wet catch

Louisiana - Pacific Corporation
Hayward, Wisconsin
PACE Project No. 940614.401

PACE Incorporated
June 22, 1994

TABLE 2
SUMMARY OF THE RESULTS

Line No. 1 Dryers

Parameter	Core Dryer	Surface Dryer
Date of Run	6/16/94	6/16/94
Time of Run	1135-1327	735-836
Volumetric Flow Rate		
ACFM	46200	49300
DSCFM	25300	24200
Gas Temperature (°F)	246	247
Gas Moisture Content (%v/v)	21.8	29.7
Gas Composition (%v/v,Dry)		
CO2	3.8	4.0
O2	17.0	16.9
N2	79.2	79.1
Isokinetic Variation (%)	89.1	107.7
Particulate Emission Rate (LB/HR)*	43.7	62.4
Particulate Concentration*		
GR/ACF	0.110	0.148
GR/DSCF	0.201	0.301
Particulate Emission Factor*		
LB/KLB of Wet Flue Gas	0.32	0.45

Louisiana - Pacific Corporation
Hayward, Wisconsin
PACE Project No. 940614.401

PACE Incorporated
June 22, 1994

TABLE 3
SUMMARY OF THE RESULTS

Line No. 2 EFB Outlet

Parameter	**Run 1**	**Run 1**	**Average**
Date of Run	6/16/94	6/16/94	
Time of Run	1537-1637	1739-1818	
Concurrently tested with	Core Dryer	Surface Dryer	
Volumetric Flow Rate			
ACFM	102600	105800	104200
DSCFM	58200	60600	59400
Gas Temperature (°F)	221	222	221
Gas Moisture Content (%v/v)	22.5	21.7	22.1
Gas Composition (%v/v,Dry)			
CO2	2.2	2.8	2.5
O2	18.8	18.2	18.5
N2	79.0	79.0	79.0
Isokinetic Variation (%)	98.1	97.6	
Particulate Emission Rate (LB/HR) *	37.2	34.7	36.0
Particulate Concentration *			
GR/ACF	0.042	0.038	0.040
GR/DSCF	0.075	0.067	0.071
Particulate Emission Factor			
LB/KLB of Wet Flue Gas	0.12	0.11	0.11

*Dry catch plus organic and inorganic/residual wet catch

TABLE 4
SUMMARY OF THE RESULTS

Line No. 2 Dryers

Parameter	Core Dryer Outlet	Surface Outlet
Date of Run	6/16/94	6/16/94
Time of Run	1537-1638	1737-1814
Volumetric Flow Rate		
ACFM	50500	56000
DSCFM	29500	31200
Gas Temperature (°F)	220	218
Gas Moisture Content (%v/v)	18.2	22.5
Gas Composition (%v/v,Dry)		
CO2	3.6	3.0
O2	17.6	18.0
N2	78.8	79.0
Isokinetic Variation (%)	96.3	101.4
Particulate Emission Rate (LB/HR) *	62.7	63.4
Particulate Concentration *		
GR/ACF	0.145	0.132
GR/DSCF	0.248	0.237
Particulate Emission Factor *		
LB/KLB of Wet Flue Gas	0.41	0.38

*Dry catch plus organic and inorganic/residual wet catch

RESULTS OF ORSAT AND MOISTURE DETERMINATIONS

Louisiana - Pacific Corporation
Hayward, Wisconsin
PACE Project No. 940614.401

PACE Incorporated
June 22, 1994

TABLE 5
RESULTS OF ORSAT AND MOISTURE DETERMINATIONS

Line No. 1 EFB Outlet

Parameter	**Run 2**	**Run 2**
Date of Run	6/16/94	6/16/94
Time of Run	1135-1235	737-837
ORSAT (%v/v)		
Dry Basis		
Carbon Dioxide	3.80	4.00
Oxygen	17.00	16.90
Carbon Monoxide*	*	*
Nitrogen	79.20	79.10
WetBasis		
Carbon Dioxide	2.78	2.97
Oxygen	12.45	12.56
Carbon Monoxide*	*	*
Nitrogen	58.02	58.81
Portable Oxygen Monitor Result		
Time Weighted Average (%O2)		16.6
Moisture Collected (ml)	323.0	306.0
Moisture Content (%v/v)	26.75	25.65
Molecular Weight of Flue Gas (lb/lb-mole)		
Dry	29.29	29.32
Wet	26.27	26.41

*Carbon monoxide was not measured, assumed concentrations less than 0.01%.

Louisiana - Pacific Corporation
Hayward, Wisconsin
PACE Project No. 940614.401

PACE Incorporated
June 22, 1994

TABLE 6
RESULTS OF ORSAT AND MOISTURE DETERMINATIONS

Line No. 1 Dryers

Parameter	Core Dryer	Surface Dryer
Date of Run	6/16/94	6/16/94
Time of Run	1135-1327	735-836
ORSAT (%v/v)		
Dry Basis		
Carbon Dioxide	3.80	4.00
Oxygen	17.00	16.90
Carbon Monoxide*	*	*
Nitrogen	79.20	79.10
WetBasis		
Carbon Dioxide	2.97	2.81
Oxygen	13.30	11.87
Carbon Monoxide*	*	*
Nitrogen	61.97	55.58
Portable Oxygen Monitor Result		
Time Weighted Average (%O2)	#DIV/0!	#DIV/0!
Moisture Collected (ml)	160.0	312.0
Moisture Content (%v/v)	21.76	29.74
Molecular Weight of Flue Gas (lb/lb-mole)		
Dry	29.29	29.32
Wet	26.83	25.95
Fo	1.026	1.000

*Carbon monoxide was not measured, assumed concentrations less than 0.01%.

TABLE 7
RESULTS OF ORSAT AND MOISTURE DETERMINATIONS

Line No. 2 EFB Outlet

Parameter	**Run 1**	**Run 1**
Date of Run	6/16/94	6/16/94
Time of Run	1537-1637	1739-1818
ORSAT (%v/v)		
Dry Basis		
Carbon Dioxide	2.20	2.80
Oxygen	18.80	18.20
Carbon Monoxide*	•	•
Nitrogen	79.00	79.00
WetBasis		
Carbon Dioxide	1.70	2.19
Oxygen	14.56	14.25
Carbon Monoxide*	*	*
Nitrogen	61.19	61.86
Moisture Collected (ml)	284.0	182.0
Moisture Content (%v/v)	22.55	21.70
Molecular Weight of Flue Gas (lb/lb-mole)		
Dry	29.10	29.18
Wet	26.60	26.75

*Carbon monoxide was not measured, assumed concentrations less than 0.01%.

Louisiana - Pacific Corporation
Hayward, Wisconsin
PACE Project No. 940614.401

PACE Incorporated
June 22, 1994

TABLE 8
RESULTS OF ORSAT AND MOISTURE DETERMINATIONS

Line No. 2 Dryers

Parameter	Core Dryer Outlet	Surface Outlet
Date of Run	6/16/94	6/16/94
Time of Run	1537-1638	1737-1814
ORSAT (%v/v)		
Dry Basis		
Carbon Dioxide	3.60	3.00
Oxygen	17.60	18.00
Carbon Monoxide*	•	•
Nitrogen	78.80	79.00
WetBasis		
Carbon Dioxide	2.94	2.32
Oxygen	14.39	13.95
Carbon Monoxide*	•	•
Nitrogen	64.43	61.22
Portable Oxygen Monitor Result		
Time Weighted Average (%O2)	17.6	18.1
Moisture Collected (ml)	185.0	161.0
Moisture Content (%v/v)	18.24	22.50
Molecular Weight of Flue Gas (lb/lb-mole)		
Dry	29.28	29.20
Wet	27.22	26.68

*Carbon monoxide was not measured, assumed concentrations less than 0.01%.

RESULTS OF PARTICULATE LOADING DETERMINATIONS

Louisiana - Pacific Corporation
Hayward, Wisconsin
PACE Project No. 940614.401

PACE Incorporated
June 22, 1994

TABLE 9
RESULTS OF PARTICULATE LOADING DETERMINATIONS

Line No. 1 EFB Outlet

Parameter	**Run 2**	**Run 2**	
Date of Run	6/16/94	6/16/94	
Time of Run	1135-1235	737-837	
Sample Duration (Min.)	60.0	60.0	
Average Flue Gas Temperature (°F)	242.0	234.8	
Moisture Content of Flue Gas (%v/v)	26.75	25.65	
Particulate Collected (Mg)*			
Wet Catch	129.0	101.9	
Dry Catch	162.9	152.4	
Total	291.9	254.3	
Volumetric Flow Rate			
ACFM	95170	93030	
SCFM	69550	68690	
DSCFM	50950	51070	
Sample Volume (Cubic Feet)			
Meter Conditions	45.12	44.16	
Dry Standard	41.64	41.74	
Isokinetic Variation (%)	105.1	105.1	
Particulate Concentration*			
Wet Catch, GR/DSCF	0.048	0.038	0.043
Dry Catch, GR/DSCF	0.060	0.056	0.058
Total, GR/DSCF	0.108	0.094	0.101
Particulate Emission Rate*			
Total, LB/HR	47.24	41.15	44.20
		wet	18.82
		dry	25.38

*Dry catch plus organic and inorganic/residual wet catch

Louisiana - Pacific Corporation
Hayward, Wisconsin
PACE Project No. 940614.401

PACE Incorporated
June 22, 1994

TABLE 10
RESULTS OF PARTICULATE LOADING DETERMINATIONS

Line No. 1 Dryers

Parameter	Core Dryer	Surface Dryer
Date of Run	6/16/94	6/16/94
Time of Run	1135-1327	735-836
Sample Duration (Min.)	54.0	60.0
Average Flue Gas Temperature (°F)	245.9	247.4
Moisture Content of Flue Gas (%v/v)	21.76	29.74
Particulate Collected (Mg)*		
Wet Catch	87.1	156.3
Dry Catch	266.0	520.9
Total	353.1	677.2
Volumetric Flow Rate		
ACFM	46220	49300
SCFM	32380	34400
DSCFM	25340	24170
Sample Volume (Cubic Feet)		
Meter Conditions	29.65	36.66
Dry Standard	27.08	34.70
Isokinetic Variation (%)	89.1	107.7
Particulate Concentration*		
Wet Catch, GR/DSCF	0.050	0.070
Dry Catch, GR/DSCF	0.152	0.232
Total, GR/DSCF	0.201	0.301
Particulate Emission Rate*		
Total, LB/HR	43.69	62.40
	B 1/2 10.87	14.51
	F 1/2 32.82	47.89

*Dry catch plus organic/residual wet catch

Louisiana - Pacific Corporation
Hayward, Wisconsin
PACE Project No. 940614.401

PACE Incorporated
June 22, 1994

TABLE 11
RESULTS OF PARTICULATE LOADING DETERMINATIONS

Line No. 2 EFB Outlet

Parameter	**Run 1**	**Run 1**	
Date of Run	6/16/94	6/16/94	
Time of Run	1537-1637	1739-1818	
Sample Duration (Min.)	60.0	39.0	
Average Flue Gas Temperature (°F)	220.8	222.0	
Moisture Content of Flue Gas (%v/v)	22.55	21.70	
Particulate Collected (Mg)*			
Wet Catch	82.3	60.2	
Dry Catch	139.6	73.8	
Total	221.9	134.0	
Volumetric Flow Rate			
ACFM	102570	105800	104185
SCFM	75150	77370	
DSCFM	58200	60590	59395
Sample Volume (Cubic Feet)			
Meter Conditions	50.34	33.76	
Dry Standard	45.92	30.92	
Isokinetic Variation (%)	98.1	97.6	
Particulate Concentration*			
Wet Catch, GR/DSCF	0.028	0.030	0.029
Dry Catch, GR/DSCF	0.047	0.037	0.042
Total, GR/DSCF	0.075	0.067	0.071
Particulate Emission Rate*			
Total, LB/HR	37.20	34.73	35.97 TSP
			21.28 F½
			14.69 B½

*Dry catch plus organic and inorganic/residual wet catch

Louisiana - Pacific Corporation
Hayward, Wisconsin
PACE Project No. 940614.401

PACE Incorporated
June 22, 1994

TABLE 12
RESULTS OF PARTICULATE LOADING DETERMINATIONS

Line No. 2 Dryers

Parameter	Core Dryer Outlet	Surface Outlet
Date of Run	6/16/94	6/16/94
Time of Run	1537-1638	1737-1814
Sample Duration (Min.)	60.0	36.0
Average Flue Gas Temperature (°F)	219.6	217.7
Moisture Content of Flue Gas (%v/v)	18.24	22.50
Particulate Collected (Mg)*		
Wet Catch	154.6	112.3
Dry Catch	473.3	289.2
Total	627.9	401.5
Volumetric Flow Rate		
ACFM	50530	56000
SCFM	36020	40230
DSCFM	29450	31180
Sample Volume (Cubic Feet)		
Meter Conditions	43.15	28.89
Dry Standard	39.03	26.10
Isokinetic Variation (%)	96.3	101.4
Particulate Concentration*		
Wet Catch, GR/DSCF	0.061	0.066
Dry Catch, GR/DSCF	0.187	0.171
Total, GR/DSCF	0.248	0.237
Particulate Emission Rate*		
Total, LB/HR	62.67	63.44
	B 1/2 15.91	17.67
	F 1/2 47.26	45.77

*Dry catch plus organic and inorganic/residual wet catch

RESULTS OF PRELIMINARY SOURCE DETERMINATIONS

TABLE 13
RESULTS OF AIR FLOW DETERMINATIONS

Line No. 1

Parameter	Surface Dryer Outlet	Core Dryer Outlet	EFB Outlet
Date of Run	6/15/94	6/15/94	6/15/94
Time of Measurement	1530	1111	1244
Number of Sampling Ports	1	2	1
Number of Points Sampled	10	20	12
Barometric Pressure (In. Hg)	28.63	28.63	28.63
Static Pressure (In. WC)	-9.10	-8.10	6.00
Absolute Flue Gas Pressure (In. Hg)	27.96	28.03	29.07
Average Flue Gas Temperature (F)	232	245	235
Average Moisture Content (%v/v)	30.0	21.1	23.3
Dry Molecular Wt. of Gas (lb/lb-mole)	29.3	29.3	29.3
Flue Gas Average Velocity (FPS)	89.40	78.43	66.08
Duct Dimension (Inches)	42.0	42.0	65.3
Duct Cross-sectional Area (Sq. Ft.)	9.62	9.62	23.22
Volumetric Flow Rate			
ACFM	51,600	45,270	92,060
SCFM	36,790	31,770	67,950
DSCFM	25,770	25,060	52,110

TABLE 14
RESULTS OF AIR FLOW DETERMINATIONS

Line No. 2

	Surface Dryer Outlet	EFB Outlet
Date of Run	6/16/94	6/16/94
Time of Measurement	1445	1520
Number of Sampling Ports	2	1
Number of Points Sampled	12	12
Barometric Pressure (In. Hg)	28.63	28.63
Static Pressure (In. WC)	-16.00	6
Absolute Flue Gas Pressure (In. Hg)	27.45	29.07
Average Flue Gas Temperature (F)	220	225
Average Moisture Content (%v/v)	24	25
Flue Gas Average Velocity (Feet/Second)	88.37	71.36
Duct Dimension (Inches)	41.75	65.25
Duct Cross-sectional Area (Square Feet)	9.51	23.22
Volumetric Flow Rate		
ACFM	50410	99420
SCFM	35910	74460
DSCFM	27300	55840

TEST PROCEDURES SUMMARY

Testing on the Line 1 EFB outlet was performed from 2 test ports oriented at 90 degrees, approximately 3.0 duct diameters downstream of the nearest flow disturbance and 1.1 duct diameters upstream of the RTO. The duct dimension at this point was verified on-site and measures 65.25 inches in diameter. A 24 point traverse was used to extract representative flue gas samples. Each point was sampled 2.5 minutes for a run duration of 60 minutes. Test port and traverse point locations are displayed in Figures 1 and 3.

Testing on the Line 1 Core dryer outlet and Surface dryer outlet was performed from 2 test ports oriented at 90 degrees, approximately 5.0 duct diameters downstream of the nearest flow disturbance and 5.7 duct diameters upstream of the EFB. The duct dimension at this point was verified on-site and measures 42.0 inches in diameter. A 20 point traverse was used to extract representative flue gas samples. Each point was sampled 3.0 minutes for a run duration of 60 minutes. Test port and traverse point locations are displayed in Figures 1 and 4.

Testing on the Line 2 EFB outlet was performed from 1 test ports situated on the top of the duct, approximately 4.5 duct diameters downstream of the nearest flow disturbance and 2.9 duct diameters upstream of the RTO. The duct dimension at this point was verified on-site and measures 65.25 inches in diameter. A 12 point traverse was used to extract representative flue gas samples. Each point was sampled 5.0 minutes for a run duration of 60 minutes. Test port and traverse point locations are displayed in Figures 2 and 3.

Testing on the Line 2 Core dryer outlet and Surface dryer outlet was performed from 2 test ports oriented at 90 degrees, approximately 7.2 duct diameters downstream of the nearest flow disturbance and 3.2 duct diameters upstream of the EFB. The duct dimension at this point was verified on-site and measures 41.75 inches in diameter. A 12 point traverse was used to extract representative flue gas samples. Each point was sampled 5.0 minutes for a run duration of 60 minutes. Test port and traverse point locations are displayed in Figures 2 and 5.

TEST PROCEDURES SUMMARY (continued)

Testing on the Line 2 Surface dryer outlet was performed from 2 test ports oriented at 90 degrees, approximately 5.2 duct diameters downstream of the nearest flow disturbance and 3.5 duct diameters upstream of the EFB. The duct dimension at this point was verified on-site and measures 41.75 inches in diameter. A 20 point traverse was used to extract representative flue gas samples. Each point was sampled 3.0 minutes for a run duration of 36 minutes. Test port and traverse point locations are displayed in Figures 2 and 6.

Particulate testing was performed in accordance with EPA Methods 1 - 5, 40 CFR 60, Appendix A. A preliminary velocity traverse and moisture estimation were conducted so that an appropriate sampling nozzle required for isokinetic sample withdrawal could be selected. A PACE sampling train that meets or exceeds the specifications outlined in the above reference was used to collect particulate samples. A temperature controlled glass-lined sampling probe was used to extract flue gas samples and transport them to an all glass filter and cyclone assembly in a temperature controlled oven. The back half of the particulate sampling train consisted of a series of three glass impingers, each of the first two prepared with 100 mls of deionized water, followed by a desiccant packed drying column. In addition, integrated gas samples were collected concurrently with the three particulate runs so that gas composition (Orsat) could be determined. Gas samples were verified in the field with a portable oxygen analyzer to ensure that no leakage occurred between the site and the laboratory. The portable oxygen analyzer was also used to monitor the oxygen content of the flue gas throughout the test.

Air flow determinations were performed in accordance with EPA Method 2 using traverse point protocols specified by EPA Method 1, 40 CFR 60, Appendix A. Point velocity measurements were conducted using a S-Type pitot tube and a Neotronics Model EDM-1 Electronic Digital Manometer. Source gas moisture content was estimated using wet bulb/dry bulb temperature measurements.

Louisiana Pacific Corporation

Hayward, Wisconsin

Line No. 1 Dryers & EFB Outlet

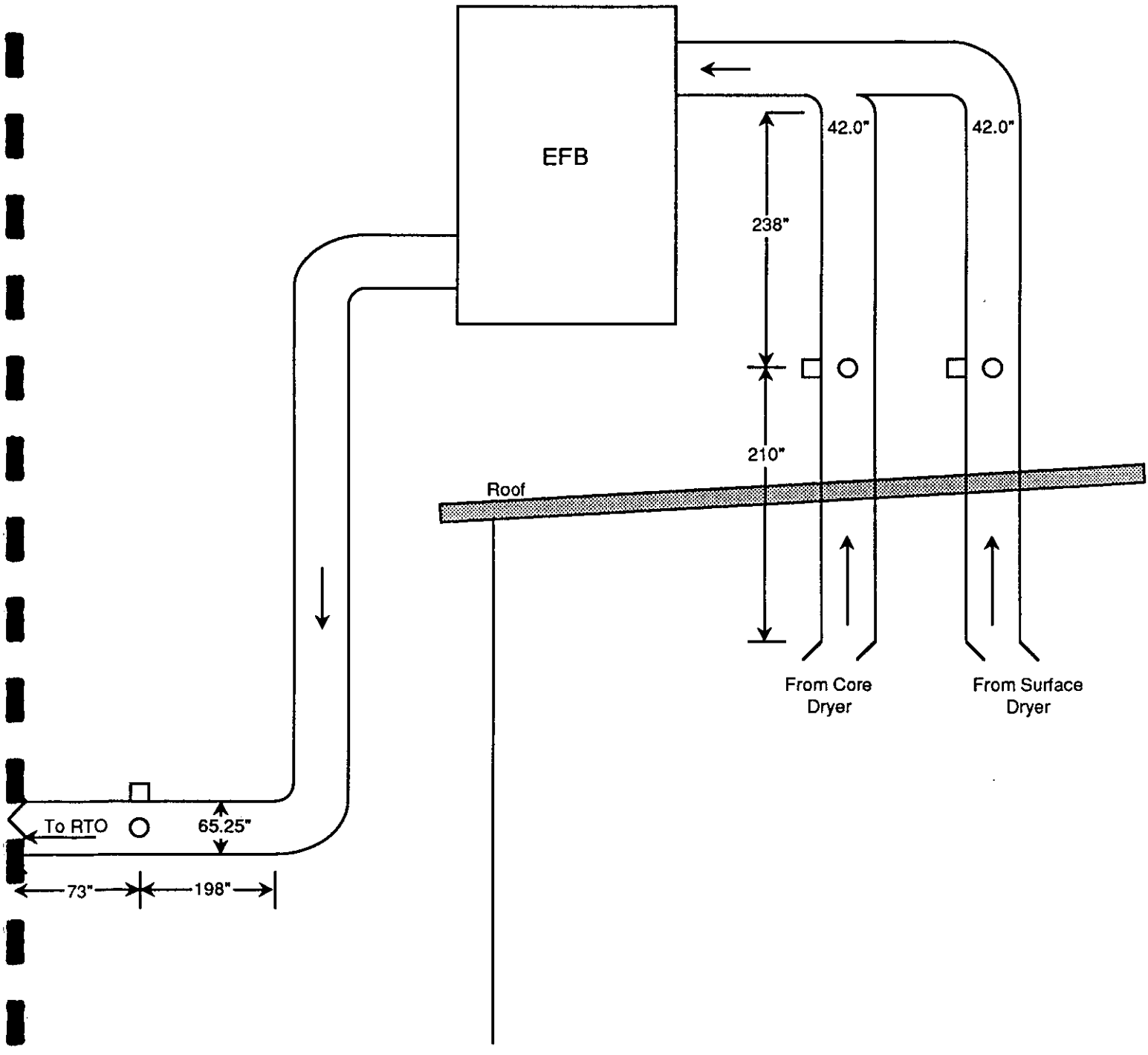


Figure 1

Louisiana Pacific Corporation

Hayward, Wisconsin

Line No. 2 Dryers & EFB Outlet

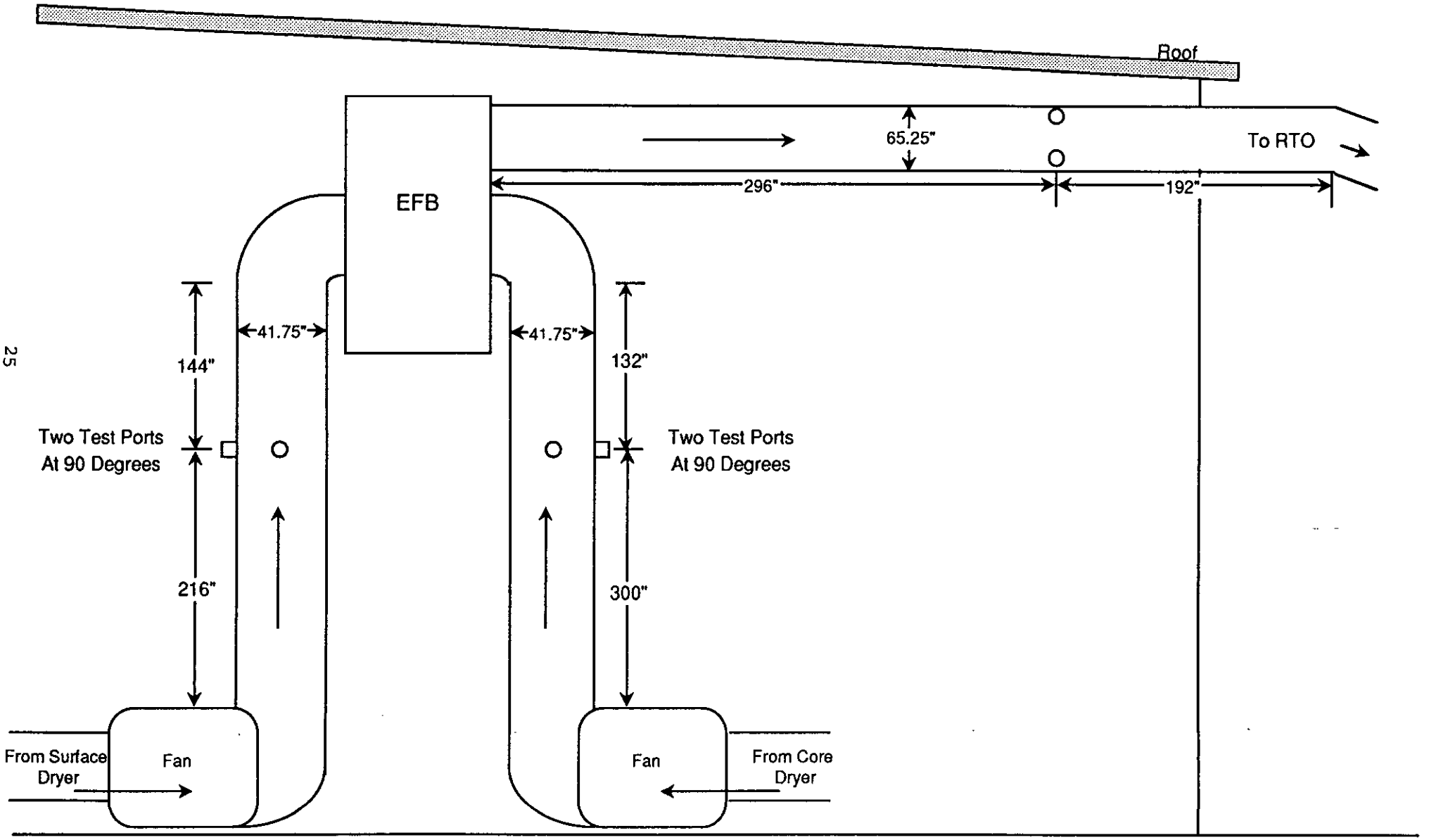
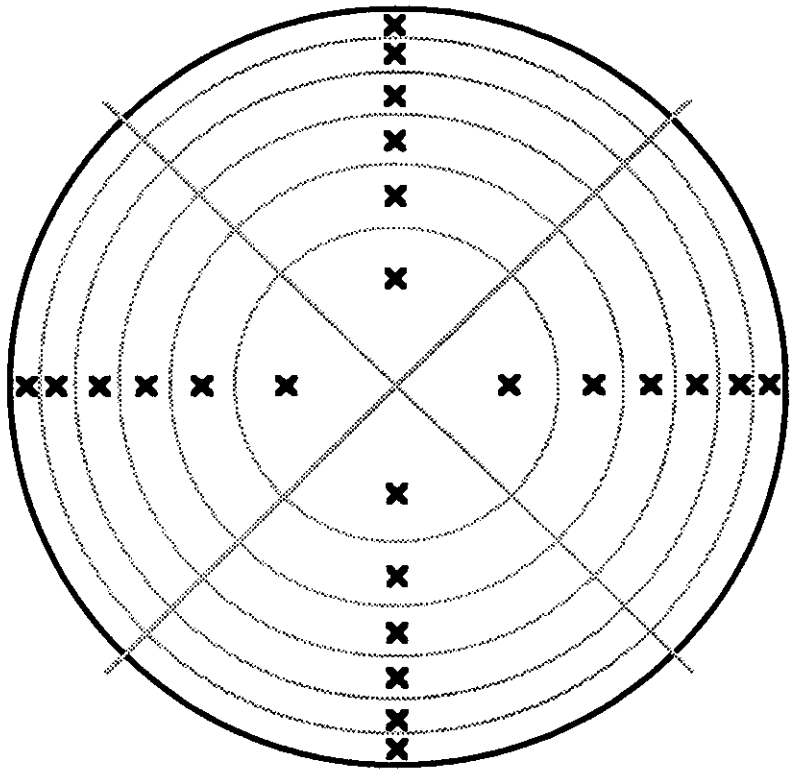


Figure 2

Louisiana-Pacific Corporation

Hayward, Wisconsin
Line No. 1 and Line No. 2
EFB Outlets

Location of Traverse Points



Number of Test Ports	2
Total Number of Traverse Points	24*
Number of Traverse Points Per Traverse	12
Duct Diameter (Inches)	65.25

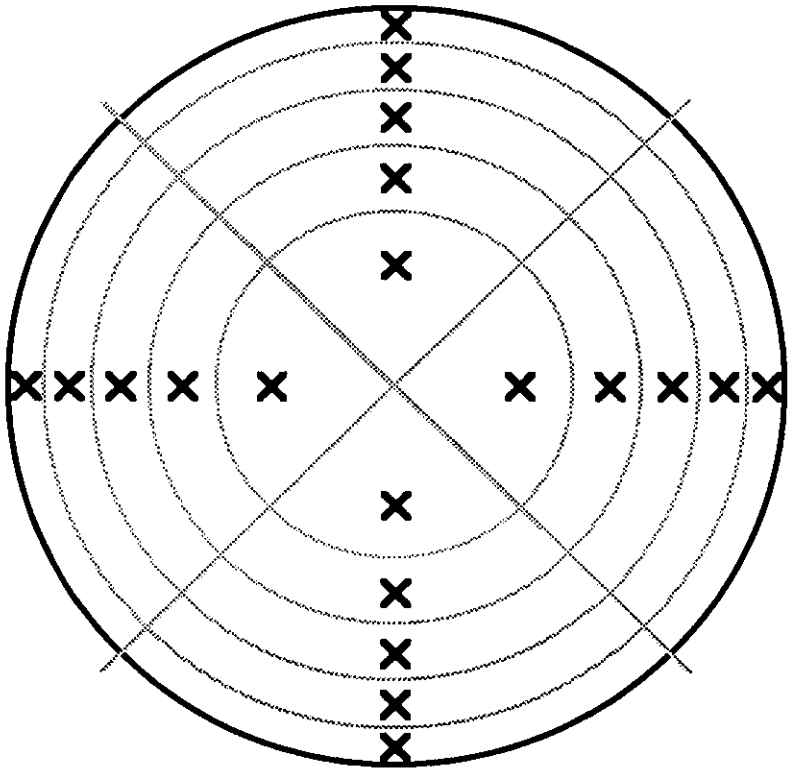
* The No. 2 Line utilized only 1 port with 12 points.

Figure 3

Louisiana-Pacific Corporation

Hayward, Wisconsin
Line No. 1 Core Dryer and
Surface Dryer Outlets

Location of Traverse Points



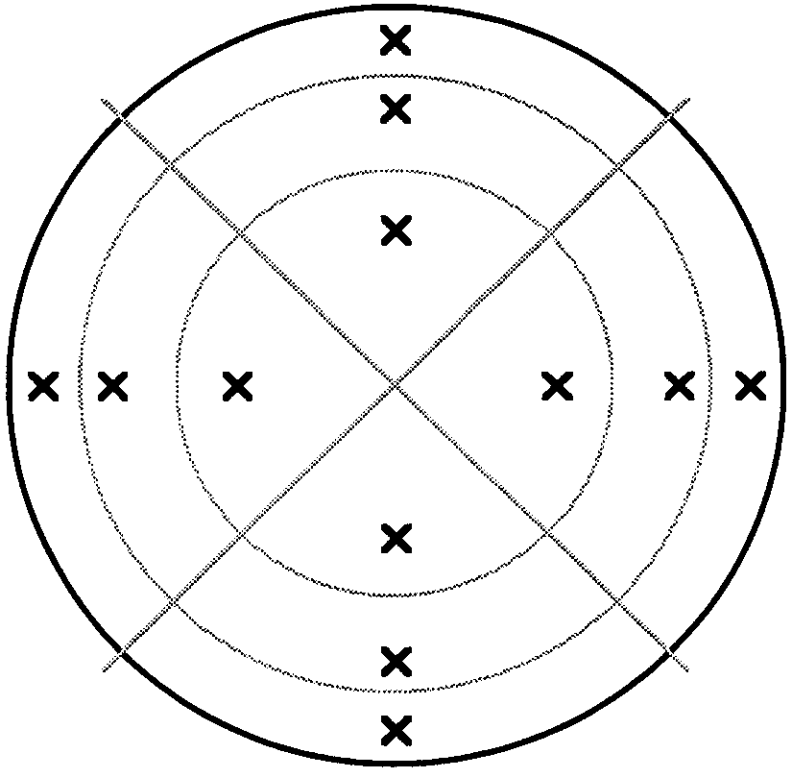
Number of Test Ports	2
Total Number of Traverse Points	20
Number of Traverse Points Per Traverse	10
Duct Diameter (Inches)	42.0

Figure 4

Louisiana-Pacific Corporation

Hayward, Wisconsin
Line No. 2 Core Dryer Outlet

Location of Traverse Points



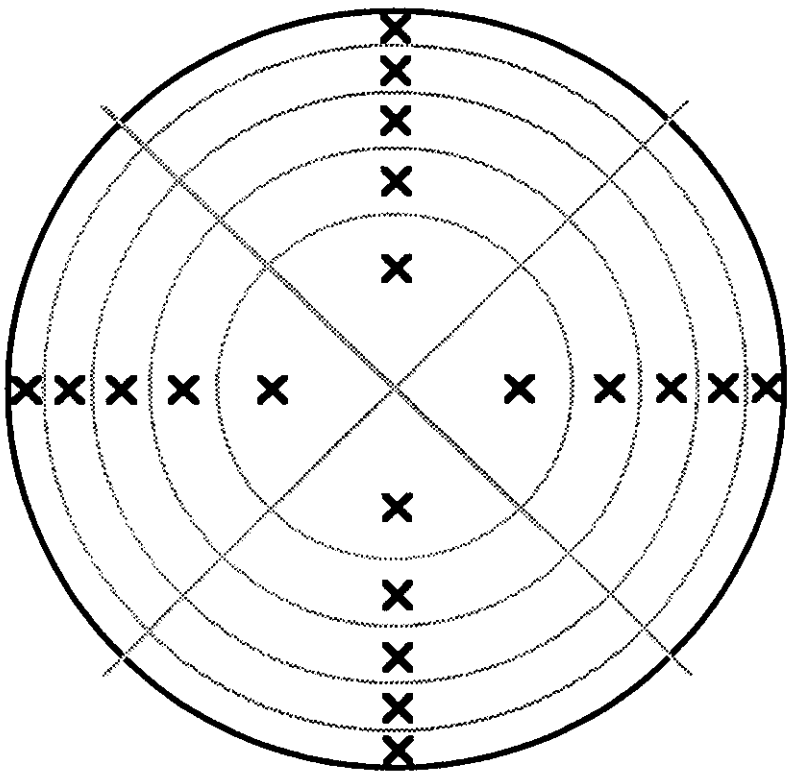
Number of Test Ports	2
Total Number of Traverse Points	12
Number of Traverse Points Per Traverse	6
Duct Diameter (Inches)	41.75

Figure 5

Louisiana-Pacific Corporation

Hayward, Wisconsin
Line No. 2 Surface Dryer Outlet

Location of Traverse Points



Number of Test Ports	2
Total Number of Traverse Points	20
Number of Traverse Points Per Traverse	10
Duct Diameter (Inches)	41.75

Figure 6

APPENDIX A

Field Data Sheets and Notes

EPA METHODS 2-5 FIELD DATA SHEETS

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EPA Method 2 Field Data Sheet

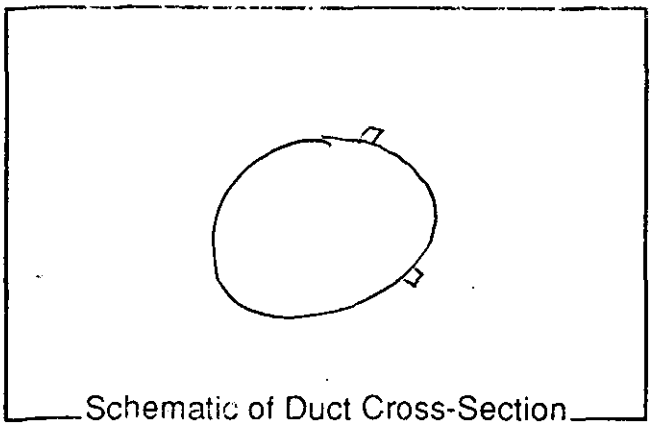
Project L.P. Hayward
Test Location EFB Outlet
Date 6/15/94 Test 1 Run ____
Operators JEP MEW
Barometric Pressure 28.55 Inches Hg
Static Pressure 6.0 Inches H_2O
Pitot Leak Check - Positive ____ Negative ____

Pitot Tube No. 8 C_p .842
Pressure Measurement Device Oil Manometer
Duct Dimensions 65.25 Inches
Port Length 6.25 Inches
Temp. - Dry Bulb 235 °F, Wet Bulb 150 °F
Moisture Content 22 %
320P Oxygen Concentration 19 %
Time of Measurement 1244 (24 Hr. Clock)

Traverse Point Identification				Cyclonic Flow Yaw Angle	Velocity Head ΔP Inches H_2O	Stack Temperature °F
Point Number	% Of Diameter	Inches From: Wall	Inches From: Port			
A 1		1.39	7.64	°	.80	
2		4.37	10.62	°	.86	
3		7.71	13.96	°	1.65	
4		11.57	17.82	°	1.60	
5		16.31	22.56	°	1.60	
6		23.21	29.46	°	.94	
7		42.04	48.29	°	.89	
8		48.94	55.19	°	.88	
9		53.68	59.93	°	.87	
10		57.54	63.79	°	1.02	
11		60.88	~~61~~ 67.13	°	1.10	
12		63.86	70.11	°	.95	
B 1				°	.	
2				°	.	
3				°	.	
4				°	.	
5				°	.	
6				°	.	
7				°	.	
8				°	.	
9				°	.	
10				°	.	
11				°	.	
12				°	.	

Ave ΔP .947

.227 1/4"



Schematic of Duct Cross-Section

Computer Data Summary:

Stack Pressure ____ Inches Hg
Duct Area ____ Square Feet
Molecular Weight - M_d ____
Molecular Weight - M_s ____
Avg. Duct Temperature ____ °F
Average $\sqrt{\Delta P}$ ____
Flue Gas Velocity ____ Feet/Sec.
Volumetric Flow Rate:
ACFM ____
DSCFM ____

AS 102

AIR SAMPLING DEPARTMENT

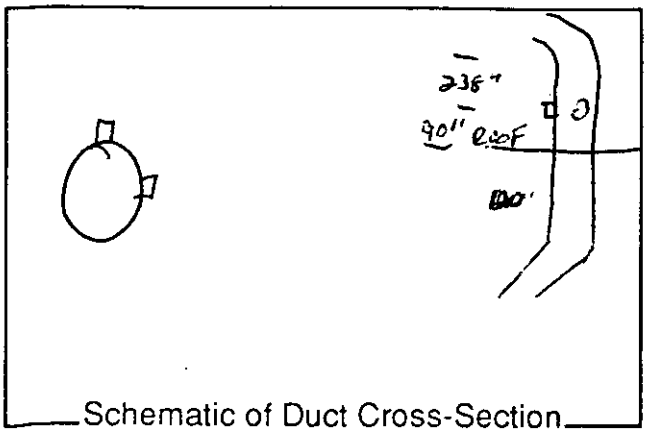
EPA Method 2 Field Data Sheet
Multiple Determinations

Project LP HAYWARD
Test Location Line 1 ~~coredryer outlet~~ Both
Date 6-15-94 Test 1 Run ____
Operators MSL KJL
Pitot Tube No. 2 C_p .535
Both Duct Dimensions 42.0 Inches
Both Port Length 8.0 Inches
Pitot Leak Check - Positive OK Negative OK

	Run 1	Run 2	Run 3 (surface dryer)	Run 4
Bar. Press.-In. Hg	28.53 →		28.55	
Stat. Press.- In.WC	-8.1 →		-9.1	
Temp.-Dry Bulb-°F	245 →		232	
Temp.-Wet Bulb-°F	146 →		157	
Moist. Content-%	21 →		27.3	
320P Oxygen-%	19 →		17	
Time of Meas.	1111 →		1530	

Traverse Point I.D.			Cyclonic Flow Yaw ∠	Velocity Head - Inches H_2O				Stack Temperature - °F			
Point No.	Inches From: Wall	Port		Run 1 ΔP	Run 2 ΔP	Run 3 (surface dryer) ΔP	Run 4 ΔP	Run 1 Temp.	Run 2 Temp.	Run 3 Temp.	Run 4 Temp.
A 1	1.08	9.08		1.05	.85	1.05					
2	3.43	11.43		1.05	1.10	1.50					
3	615	1415		1.10	1.10	1.60					
4	950	1750		1.10	1.10	1.55					
5	1436	2236		1.15	1.10	1.55					
6	2764	3564		1.25	1.25	1.55					
7	3250	4050		1.45	1.40	1.80					
8	3585	4385		1.55	1.50	2.00					
9	3857	4657		1.60	1.60	2.20					
10	4092	4892		1.65	1.60	2.15					
B 1				1.00	.85						
2				1.20	1.30						
3				1.35	1.30						
4				1.30	1.30						
5				1.35	1.30						
6				1.30	1.30						
7				1.50	1.40						
8				1.55	1.50						
9				1.65	1.60						
10				1.65	1.60						
					1.30						
					.216						
					3/16						

1.3



Schematic of Duct Cross-Section

Computer Data Summary: surface dryer				
PC-6 Output	Run 1	Run 2	Run 3	Run 4
Stack Pres. - In. Hg				
Duct Area - Sq. Ft.				
Mole. Weight - M_d				
Mole. Weight - M_s				
Avg. Temp. - °F				
Average $\sqrt{\Delta P}$				
Gas Vel. - Ft./Sec.				
ACFM				
DSCFM				

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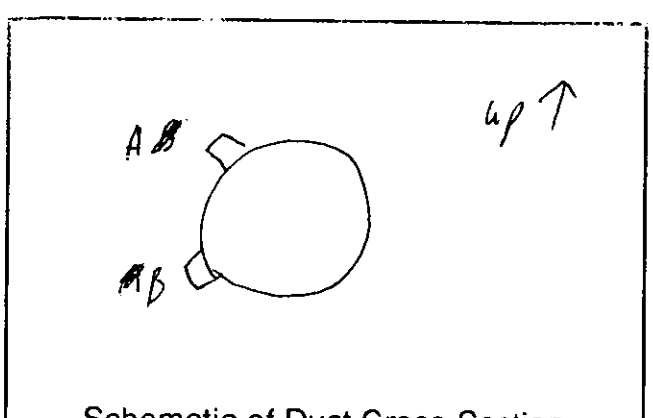
EPA Method 2 Field Data Sheet

Project L. P. Hayward
Test Location Line 2 EFB Outlet
Date 6-16-94 Test 1 Run ____
Operators JEP MEW
Barometric Pressure 28.63 Inches Hg
Static Pressure -5 Inches H_2O
Pitot Leak Check - Positive ok Negative ok

Pitot Tube No. 24 Cp .843
Pressure Measurement Device 0-1 Magnahelic
Duct Dimensions ~~60.~~ 65.25 Inches
Port Length ~~0~~ 14.75 Inches
Temp. - Dry Bulb 225 °F, Wet Bulb 148 °F
Moisture Content 25 %
320P Oxygen Concentration 17 %
Time of Measurement 1520 (24 Hr. Clock)

Traverse Point Identification				Cyclonic Flow Yaw Angle	Velocity Head ΔP Inches H_2O	Stack Temperature °F
Point Number	% Of Diameter	Inches From: Wall	Inches From: Port			
A 12		1.34	~~7.34~~ 16.14	°	.95	
11		4.37	~~10.37~~ 19.12	°	.86	
10		7.71	~~13.71~~ 22.46	°	1.02	
9		11.57	~~17.57~~ 26.32	°	1.10	
8		16.31	~~22.31~~ 31.06	°	1.15	
7		23.21	~~29.21~~ 37.96	°	1.20	
6		42.04	~~48.04~~ 56.79	°	1.05	
5		48.94	~~54.94~~ 63.69	°	1.05	
4		53.64	~~59.64~~ 68.43	°	1.20	
3		57.54	~~63.54~~ 72.29	°	1.20	
2		60.88	~~66.88~~ 75.63	°	1.25	
1		63.86	~~69.86~~ 78.61	°	1.85	
B 12				°	.	
11				°	.	
10				°	.	
9				°	.	
8				°	.	
7				°	.	
6				°	.	
5				°	.	
4				°	.	
3				°	.	
2				°	.	
1				°	.	

Avg Cp 1.00
Cp .224
1/4



Schematic of Duct Cross-Section

Computer Data Summary:

Stack Pressure ____ Inches Hg
Duct Area ____ Square Feet
Molecular Weight - M_d ____
Molecular Weight - M_s ____
Avg. Duct Temperature ____ °F
Average $\sqrt{\Delta P}$ ____
Flue Gas Velocity ____ Feet/Sec.
Volumetric Flow Rate:
ACFM ____
DSCFM ____

pace.

AIR SAMPLING DEPARTMENT

EPA Method 2 Field Data Sheet

Project LP HAYWARD
Test Location Line 2 coredryer out
Date 6-16-94 Test 1 Run
Operators MSL KJL
Barometric Pressure 28.63 Inches Hg
Static Pressure -16.8 core Inches H_2O
Pitot Leak Check - Positive OK Negative OK

Pitot Tube No. 2 C_p 835
Pressure Measurement Device 0.2 inclined
Duct Dimensions 41.25 Inches
Port Length 4.25 Inches
Temp. - Dry Bulb 220 °F, Wet Bulb 150 °F
Moisture Content 24 %
320P Oxygen Concentration 17 %
Time of Measurement 1445 (24 Hr. Clock)

Traverse Point Identification				Cyclonic Flow Yaw Angle	Velocity Head ΔP Inches H_2O	Stack Temperature ° F
Point Number	% Of Diameter	Inches From: Wall	Inches From: Port			
A 1		1.82	6.07	°	1.40	
2		611	1036	°	2.05	
3		1235	1660	°	1.70	
4		2940	3365	°	1.40	
5		3564	3989	°	1.70	
6		3993	4418	°	1.80	
B 1				°	.98	
2				°	1.25	1.67
3				°	1.30	203
4				°	1.80	3/16
5				°	2.20	
6				°	2.40	
A 1		107	532	°	.	
2		341	766	°	.	
3		611	1036	°	.	
4		944	1369	°	.	
5		1427	1852	°	.	
6		2748	3173	°	.	
B 7		3231	3656	°	.	
8		3564	3989	°	.	
9		3834	4259	°	.	
10		4068	4493	°	.	
				°	.	
				°	.	

Schematic of Duct Cross-Section

Computer Data Summary:

Stack Pressure _____ Inches Hg
Duct Area _____ Square Feet
Molecular Weight - M_d _____
Molecular Weight - M_s _____
Avg. Duct Temperature _____ ° F
Average $\sqrt{\Delta P}$ _____
Flue Gas Velocity _____ Feet/Sec.
Volumetric Flow Rate:
ACFM _____
DSCFM _____

AIR SAMPLING DEPARTMENT

Field Computer Summary

Project Name: L.P. Hayward Operator JEP
Sampling Location: EFB Outlet
Date of Test: 6/15/94
Test Number: 1

Initialization Parameters

Change meter before run		1,0044
Meter Coef. - ∂	=	~~1.0067~~
Orif. Coef. - ΔH@	=	~~2.039~~
Pitot Coef. - C_p	=	.842
Nozzle Dia. - D_n	=	.239
Bar. Pres. - P_b	=	28.55 / 28.63
Time/Point - ΔT	=	2.5
Moisture Content	=	22
% Oxygen	=	19
Meter Temp. - t_m	=	90
Static Pres. - P_g	=	6

Run Specific Input Parameters

	Core Test 1 Run 1	Surface Test 3 Run 3 (Null)	Surface Test 2 Run 2	Core Test 1 Run 2
1,684 V/O	203.60	226.40	253.60	298.00
No. Of Points	24	24	~~24~~ 12	12
MC	22		24	25
6/16/94 V/F	225.37	253.15	297.76	343.12
Grams H_2O	108	175	306	323
Run Time	30	32.5	60	60
1-Rnd/2-Rect	65.25	65.25	65.25	65.25
Diameter(Ins.)				
Length(Ins.)				
Width(Ins.)				

End Of Run Summary

	Run 1	Run 2	Run 3	Run 4
Avg. √ΔP	0.994	0.997	0.974	0.989
Avg. ΔH	1.693	1.671	1.514	1.546
Avg. t_s	238.50	239.42	234.83	242.00
Avg. t_m	96.63	86.00	78.96	92.08
Standard Vol.	19.88	24.90	41.74	41.64
Moist. Content	20.37	24.86	25.65	26.75
Avg. Gas Vel.	69.14	69.34	67.70	69.21
% Isokinetic	96.71	107.66	103.35	103.40
ACFM	96329	96613	94316	96425
DSCFM	54476	51484	50201	50052

AS 100 G

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EPA Method 5 Field Data Sheet

Project L.P. Maywood — Train No. B4 CM7 P2 — Pitot Tube No. 8 — C_p .842

Sample Location Lin 1 EFB outlet — Meter Coef. ∂ 1.0044 — Bar. Pres. 28.55 Ins. Hg

Date 6-05-94 — Test 3 — Run 1 — Orifice Coef. ΔH@ 1.655 — Static Pres. 6 Ins. H_2O

Operators JEP MEW — Nozzle No. 3-2 D_n .235 — Estimated MC 22 %

Sampling Train Leak Checks: Pretest 0.0 @ 15 Ins. Hg; Posttest 0.0 @ 10 Ins. Hg; Pitot - Positive 0.0 Negative 0.0

Point No.	Time ΔT	Meter Vol. V_m Cubic Feet	Velocity Head - ΔP Inches WC	Orifice Meter - ΔH Inches WC	Desired ΔV_m	Desired V_m	Vacuum Inches Hg	Stack Temp. °F	Sampling Train Temperatures - °F: Filter	Probe	Impinger Outlet	Meter Inlet	Meter Outlet	320 P Oxygen Percent	
	(1748)	(226.40)													
A 12	2.5	228.44	1.02	1.75	2.01	841	7.4	239	230	257	61	82	85		
11	5	230.44	1.05	1.75	199	041	7.5	241		258	61	82	87		
10	7.5	232.46	1.04	1.74	199	240	7.5	240	231	249	61	82	88		
9	10	234.40	.96	1.61	191	431	7.0	240		245	61	82	88	19.6	O2 Analyzer not working all over the place
8	12.5	236.40	.99	1.66	194	625	7.0	246	240	243	61	82	89		
7	15	238.24	.93	1.56	189	814	7.5	239		246	61	82	90	10.0	
6	17.5	240.13	1.00	1.68	196	004	8.2	239	243	246	61	82	90	13.6	
5	20	242.18	1.00	1.85	205	215	8.5	238		235	61	82	91	16.7	
4	22.5	244.25	1.05	1.76	201	415	.	240	255	232	61	82	92		
3	25	246.10	.94	1.58	190	605	8.0	240		232	61	82	93	15.3	
2	27.5	247.99	.93	1.57	189	744	7.9	239	256	235	61	82	93	15.2	
1	30	249.90	.92	1.55	183	983	8.2	238		238	61	83	93	14.8	
	32.5	253.15							261	2	61	83	93		
	Θ=32.5	V_m = 26.75	0.997	$\overline{\Delta H}$=1.621				$\overline{T_s}$=238.92					$\overline{T_m}$=86		

Samples Recovered: Filter No. _____ ; ☒ Probe Wash; ☒ Wet Catch; ☐ Other _____

Integrated Gas Sampling Data:

Box No. B4 — Bag Material Tedlar

Bag No. 2 — Leak Checks 0.00 cc/min. @ 25"Hg

Bag Vol. 40 Liters — Posttest O_2 Reading _____

320 P No. 6X-1

Moisture Recovery Data:

Impinger No.	1	2	3	4	Desiccant	Total
Final Volume	265	97	1		1419	
Initial Volume	100	100	0	X	1407	
Difference	165	-3	1		12	175

AS 105

EPA Method 5 Field Data Sheet

Project L. P. Hayward | Train No. B4 CM-7 P2 | Pitot Tube No. 24 | C_p .843

Sample Location EFB Outlet | Meter Coef. ∂ 1.0044 | Bar. Pres. 28.63 Ins. Hg

Date 6-16-94 | Test 2 | Run 2 | Orifice Coef. ΔH@ 1.685 | Static Pres. 6 Ins. H_2O

Operators JFP MEW | Nozzle No. 7-2 | D_n .275 | Estimated MC 24 %

Sampling Train Leak Checks:
Pretest 0.00 @ 15 Ins. Hg
Posttest 0.00 @ 10 Ins. Hg
Pitot - Positive OK Negative OK

Point No.	Time ΔT	Meter Vol. V_m Cubic Feet	Velocity Head - ΔP Inches WC	Orifice Meter - ΔH Inches WC	Desired ΔV_m	Desired V_m	Vacuum Inches Hg	Stack Temp. °F	Sampling Train Temperatures - °F: Filter	Probe	Impinger Outlet	Meter Inlet	Meter Outlet	320 P Oxygen Percent	
	(0737)	(253.60)													
A 12	5	257.19	.90	1.44	360	720	3.4	233			59	71	73	17.1	
11	10	260.65	.88	1.39	351	071	4.5	233			57	71	75	16.1	
10	15	264.07	.85	1.35	346	417	5.0	232			55	78	76	18.1	
9	20	267.55	.86	1.32	349	765	5.3	232			56	81	72	17.5	
8	25	271.28	.94	1.50	366	132	5.8	230			56	83	72	15.1	
7	30	275.01	.98	1.52	375	506	6.1	231			56	84	73	15.2	
6	35	278.84	1.05	1.68	388	894	8.5	231			57	86	74	15.5	
5	40	282.72	1.05	1.66	387	281	9.5	241			56	87	75	14.9	
4	45	286.67	1.05	1.67	388	669	8.5	240			58	88	76	15.3	
3	50	290.33	.92	1.47	364	033	8.0	238			58	89	77	15.6	
2	55	294.12	.97	1.55	375	407	8.0	238			59	90	79	16.2	
1	60	297.76	.95	1.53	372	779	8.0	237			59	91	79	14.8	
	(0837)														
	θ=60	V_m = 44.16	.974	ΔH=1.514				$\bar{T}_s$ = 234.83					$\bar{T}_m$ = 248		

Samples Recovered: Filter No. 3M #10 ; ☒ Probe Wash; ☒ Wet Catch; ☐ Other _____

Integrated Gas Sampling Data:

Box No. B4 | Bag Material Tedlar
Bag No. 1 | Leak Checks 0.00 cc/min. @ 25"Hg
Bag Vol. 40 Liters | Posttest O_2 Reading _____
320 P No. 0X-1

Moisture Recovery Data:

Impinger No.	1	2	3	4	Desiccant	Total
Final Volume	360	138	3		1435	
Initial Volume	100	100	0		1430	
Difference	260	38	3		5	306

AS 105

EPA Method 5 Field Data Sheet

Project L.P. Hayward — Train No. 04 CM-7 P2 — Pitot Tube No. 24 C_p .843 — Sampling Train Leak Checks:
Sample Location Line 1 (Cure Room) EP outlet — Meter Coef. ∂ 1.0144 — Bar. Pres. 28.63 Ins. Hg — Pretest 0.001 @ 15 Ins. Hg
Date 6-16-94 — Test 1 — Run 2 — Orifice Coef. ΔH@ 1.689 — Static Pres. 6 Ins. H_2O — Posttest 0.001 @ 15 Ins. Hg
Operators JEP Mew — Nozzle No. 2-2 D_n .235 — Estimated MC 25 % — Pitot - Positive 0.0 Negative 0.0

Point No.	Time ΔT	Meter Vol. V_m Cubic Feet	Velocity Head - ΔP Inches WC	Orifice Meter - ΔH Inches WC	Desired ΔV_m	Desired V_m	Vacuum Inches Hg	Stack Temp. °F	Sampling Train Temperatures - °F: Filter	Probe	Impinger Outlet	Meter Inlet	Meter Outlet	320 P Oxygen Percent	
	(1135)	(298.00)													
A 12	5	301.40	.95	1.34	346	146	6.0	237			68	84	87		
11	10	304.83	.84	1.32	342	493	6.2	242			67	91	87	17.1	
10	15	308.42	.87	1.37	354	847	7.0	241			63	93	87	16.9	
9	20	312.03	.92	1.45	365	212	8.5	241			61	95	87	17.4	
8	25	315.85	.97	1.54	375	587	9.8	240			61	96	88		
7	30	319.59	.97	1.57	380	962	10.0	238			62	97	88	4.1	O2 under at Leaks
6	35	323.55	1.05	1.67	392	360	12.3	238			62	98	89	4.8	
5	40	327.41	1.05	1.66	391	751	12.4	245			62	98	89	4.6	
4	45	331.41	1.10	1.73	406	157	14.0	246			62	97	90	4.7	
3	50	335.27	1.02	1.61	385	536	13.8	247			62	97	90	4.5	
2	55	339.16	1.05	1.66	391	926	14.0	245			62	97	91	4.7	
1	60	343.12	1.03	1.63	388	314	14.0	244			62	97	91	4.6	
	(1235)														
	Θ=60	V_m = 45.12	.984	ΔH=1.546				$\bar{T}_s$=242.00					$\bar{T}_m$=92.00		

Samples Recovered: Filter No. 3M #5 thimble ☒ Probe Wash; ☒ Wet Catch; ☐ Other _____

Integrated Gas Sampling Data:

Box No. 04 — Bag Material Tedlar
Bag No. 2 — Leak Checks 0.00 cc/min. @ 25"Hg
Bag Vol. 40 Liters — Positest O_2 Reading _____
320 P No. UX-1

Moisture Recovery Data:

Impinger No.	1	2	3	4	Desiccant	Total
Final Volume	326	177	3	X	1476	
Initial Volume	100	100	0		1459	
Difference	226	77	3		17	323

AS 105

AIR SAMPLING DEPARTMENT

Field Computer Summary

Project Name: LP Hayward Operator M. Loftus
Sampling Location: core dryer Line 1 outlet
Date of Test: 6-15-94
Test Number: 1

Initialization Parameters

core dryer Line 1 6/15

Meter Coef. - ∂	=	.9992
Orif. Coef. - ΔH@	=	1.760
Pitot Coef. - C_p	=	.835
Nozzle Dia. - D_n	=	.198
Bar. Pres. - P_b	=	28.55
Time/Point - ΔT	=	3
Moisture Content	=	21
% Oxygen	=	19
Meter Temp. - t_m	=	72
Static Pres. - P_g	=	-8.1

surface 6/16 .9992 1.760 .835 28.63 3 24 17 70 -9.0.

core -8.2

Run Specific Input Parameters

	core dryer Line 1 Run 1	surface dryer Line 1 Run 2	surface dryer Line 1 R2 Run 3	core dryer Line 1 Run 4
V/O	321.89	346.70	370.00	407.00
No. Of Points	20	20	20	20
MC	21	26	24	28
V/F	344.20	369.85	406.66	436.65
Grams H_2O	165	187	312	160
Run Time	360	37.760	60	52
1-Rnd/2-Rect	1	1	1	1
Diameter(Ins.)	42	42	42	42
Length(Ins.)	x	x	x	x
Width(Ins.)	x	x	x	x

End Of Run Summary

	Run 1	Run 2	Run 3	Run 4
Avg. √ΔP	1.167	1.234	1214	1158
Avg. ΔH	1.071	1.090	1091	.952
Avg. t_s	246.58	247.15	24735	24050
Avg. t_m	93.96	81.23	7130	9403
Standard Vol.	20.33	21.59	3493	2708
Moist. Content	27.64	28.96	2960	21.76
Avg. Gas Vel.	81.50	86.78	8451	80.81
% Isokinetic	106.98	103.87	10938	91.00
ACFM	47048	50095	48782	46647
DSCFM	23767	24826	23963	25769

EPA Method 5 Field Data Sheet

Project LP Hayward Surface Train No. C562P1 Pitot Tube No. 2 C_p .835
Sample Location Line 1 Dryer out Meter Coef. ∂ .9992 Bar. Pres. 28.63 Ins. Hg
Date 6-16-94 Test 2 Run 2 Orifice Coef. ΔH@ 1.760 Static Pres. -1.0 Ins. H_2O
Operators MJC KJL Nozzle No. 4-1 D_n .198 Estimated MC 24 %

Sampling Train Leak Checks:
Pretest 0.00 @ 15 Ins. Hg
Posttest 0.00 @ 8.1 Ins. Hg
Pitot - Positive OK Negative OK

Point No.	Time ΔT	Meter Vol. V_m Cubic Feet	Velocity Head - ΔP Inches WC	Orifice Meter - ΔH Inches WC	Desired ΔV_m	Desired V_m	Vacuum Inches Hg	Stack Temp. °F	Sampling Train Temperatures - °F: Filter	Probe	Impinger Outlet	Meter Inlet	Meter Outlet	320 P Oxygen Percent	
	(0735)	(370.00)													
A 10	3	372.13	1.90	1.39	208	208	4.2	248	250	250	67	67	69		
9	6	374.13	1.95	1.41	209	417	4.2	253	250	240	56	68	69		
8	9	376.04	1.85	1.34	204	621	4.2	252	251	247	57	72	69		
7	12	378.03	1.65	1.21	194	815	4.5	251	250	249	59	73	69		
6	15	379.95	1.50	1.10	185	999	4.8	252	249	248	59	75	70		
5	18	381.68	1.30	.95	173	172	4.5	250	250	249	60	76	70		
4	21	383.66	1.40	1.03	179	351	5.2	251	249	251	61	76	70		
3	24	385.50	1.40	1.03	179	530	5.2	252	249	252	61	78	71		
2	27	387.33	1.45	1.07	183	713	5.5	247	250	250	61	78	71		
1	30	388.79	.93	.69	147	861	4.1	244	249	249	62	79	72		
B 10	33	390.68	1.85	1.28	194	054	6.5	250	249	253	63	77	72		
9	36	392.66	1.80	1.24	190	245	6.6	250	251	230	61	78	73		
8	39	394.60	1.85	1.36	206	451	6.9	255	253	228	62	80	73		
7	42	396.45	1.70	1.25	199	649	6.9	252	253	237	62	81	74		
6	45	398.30	1.50	1.11	187	836	7.1	253	243	243	63	81	74		
5	48	400.01	1.20	.89	167	003	6.5	252	249	244	64	82	74		
4	51	401.77	1.30	.96	174	177	6.5	252	249	248	65	82	75		
3	54	403.47	1.20	.91	170	347	6.1	233	249	247	65	82	75		
2	57	405.12	1.10	.86	164	511	6.3	218	249	248	65	83	75		
1	60	406.66	.98	.75	154	665	6.2	232	249	241	65	83	76		
	(0836)														
	Θ=60	V_m=36.66	1.14	ΔH=1.091				$\bar{T}_s$=247.5					$\bar{T}_m$=71.30		

Down?: 0825

Samples Recovered: Filter No. 3215 ; [A] Probe Wash; [X] Wet Catch; [ ] Other _____

Integrated Gas Sampling Data:

Box No. 2
Bag No. 3
Bag Vol. 40 Liters
Bag Material Tedlar
Leak Checks 0.00 cc/min. @ 25"Hg
Positest O_2 Reading _____
320 P No. _____

Moisture Recovery Data:

Impinger No.	1	2	3	4	Desiccant	Total
Final Volume	348	151	0	—	1377	
Initial Volume	100	100	0	—	1364	
Difference	248	51	0	—	13	312

299

AS 105

EPA Method 5 Field Data Sheet

Project LP HAYWARD Train No. C5,B2,P1 Pitot Tube No. 2 C_p .835 Sampling Train Leak Checks:
Sample Location Line 1 core dryer out Meter Coef. ∂ .9992 Bar. Pres. 28.63 Ins. Hg Pretest 0.00 @ 15 Ins. Hg
Date 6-16-94 Test 1 Run 2 Orifice Coef. ΔH@ 1.760 Static Pres. -8.2 Ins. H_2O Posttest 0.00 @ 6.1 Ins. Hg
Operators MSL, KSL Nozzle No. 4-1 D_n .198 Estimated MC 28 % Pitot - Positive OK Negative OK

Point No.	Time ΔT	Meter Vol. V_m Cubic Feet	Velocity Head - ΔP Inches WC	Orifice Meter - ΔH Inches WC	Desired ΔV_m	Desired V_m	Vacuum Inches Hg	Stack Temp. °F	Sampling Train Temperatures - °F					320 P Oxygen Percent	
									Filter	Probe	Impinger Outlet	Meter Inlet	Meter Outlet		
	(1135)	(407.00)													
A 10	3	408.88	1.40	.95	172	872	2.9	240	247	246	65	88	89		
9	6	410.50	1.50	1.64	183	055	3.0	247	248	229	63	89	89		
8	9	412.42	1.45	1.01	180	235	3.2	248	250	230	63	91	89		
7	12	414.19	1.40	.97	177	412	3.2	248	251	237	63	94	90		
6	15	415.79	1.20	.84	165	576	2.9	248	252	244	64	95	90		
5	18	417.46	1.20	.84	165	741	2.9	248	250	248	64	95	90		
4	21	419.26	1.25	1.02	182	923	3.5	245	249	251	64	96	91		
3	24	421.04	1.40	.98	178	101	3.3	247	249	252	64	98	91		
2	27	422.68	1.20	.85	166	267	3.1	245	250	249	64	98	91		
1	30	424.19	.95	.67	148	414	2.9	240	250	253	64	98	92		
A 10	33	426.26	1.70	1.19	197	611	4.5	248	249	240	64	97	92		
9	36	428.21	1.70	1.19	197	808	4.5	248	249	234	62	98	93		
8	39	430.10	1.55	1.10	189	996	4.5	244	251	243	62	100	93		
7	42	431.99	1.45	1.02	182	178	4.5	250	251	249	61	100	93		
6	45	433.72	1.35	.95	176	354	4.1	250	249	255	61	101	93		
5	48	435.27	1.15	.82	163	517	3.9	244	248	246	62	101	94		
4	51	436.65	1.20	.85	166	683	4.1	246	250	247	62	99	94		
3	54	438.	1.20	.85	166	850	4.1	245	250	247	62	99	94		
2	57								2	2					
1	60								2	2					
	(1327)														
		Lost power & static pulled filter off Ended Run @ 1327.													
	0-51.9	V_m =		$\overline{\Delta H}$ =				$\overline{T_s}$ =					$\overline{T_m}$ =		

Samples Recovered: Filter No. 3216 ; ☒ Probe Wash; ☒ Wet Catch; ☐ Other

Integrated Gas Sampling Data:

Box No. 2
Bag No. 1
Bag Vol. 40 Liters
Bag Material Tedlar
Leak Checks 0.00 cc/min. @ 25"Hg
Positest O_2 Reading
320 P No.

Moisture Recovery Data:

Impinger No.	1	2	3	4	Desiccant	Total
Final Volume	232	122	0	—	1383	
Initial Volume	100	100	0	—	1377	
Difference	132	22	0	—	6	160
		154				

AS 105

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AIR SAMPLING DEPARTMENT

Field Computer Summary

Project Name: L.P. Hayward
Operator JEP
Sampling Location: Line 2 EFB Outlet
Date of Test: 6-16-94
Test Number:

Initialization Parameters

Meter Coef. - ∂	=	.9942
Orif. Coef. - ΔH@	=	1.760
Pitot Coef. - C_p	=	.843
Nozzle Dia. - D_n	=	.239
Bar. Pres. - P_b	=	28.63
Time/Point - ΔT	=	2.5 5
Moisture Content	=	25
% Oxygen	=	17
Meter Temp. - t_m	=	90
Static Pres. - P_g	=	-5

Run Specific Input Parameters

	Run 1	Run 2	Run 3	Run 4
V/O	436.50	488.30	523.50	
No. Of Points	12	12	12	
MC	25	25	25	
V/F	~~486~~ 487.14	522.06	574.49	
Grams H_2O	284	182	186	
Run Time	60	39	60	
1-Rnd/2-Rect	1	1	1	
Diameter(Ins.)	65.25	65.25	65.25	
Length(Ins.)				
Width(Ins.)				

End Of Run Summary

	Run 1	Run 2	Run 3	Run 4
Avg. $\sqrt{\Delta P}$	1.024	1.110	1.089	
Avg. ΔH	1.963	2.065	2.022	
Avg. t_s	220.75	222.60	210.58	
Avg. t_m	97.46	91.44	84.58	
Standard Vol.	45.92	30.92	47.28	
Moist. Content	22.55	21.70	15.63	
Avg. Gas Vel.	23.26	26.33	24.31	
% Isokinetic	97.85	97.01	90.45	
ACFM	102799	106343	103534	
DSCFM	58333	60895	64971	

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EPA Method 5 Field Data Sheet

Project L.P. Hayward
Sample Location Line 2 EFB Outlet
Date 6-16-94 Test 1 Run 1
Operators JEP MEW

Train No. B2 LA-5 PL
Meter Coef. ∂ .9942
Orifice Coef. ΔH@ 1.760
Nozzle No. 3-2 D_n .234

Pitot Tube No. 24 C_p .842
Bar. Pres. 28.63 Ins. Hg
Static Pres. -5 Ins. H_2O
Estimated MC 25 %

Sampling Train Leak Checks:
Pretest 0.001 @ 15 Ins. Hg
Posttest 0.001 @ 11 Ins. Hg
Pitot - Positive 0.0 Negative 0.0

Point No.	Time ΔT	Meter Vol. V_m Cubic Feet	Velocity Head - ΔP Inches WC	Orifice Meter - ΔH Inches WC	Desired ΔV_m	Desired V_m	Vacuum Inches Hg	Stack Temp. °F	Sampling Train Temperatures - °F (In Stack) Filter	Probe	Impinger Outlet	Meter Inlet	Meter Outlet	320 P Oxygen Percent	
	(VS?)	(436.80)													
A 12	5	441.10	1.30	2.21	445	125	5.5	217			65	90	88		
11	10	445.40	1.20	2.03	426	550	7.4	220			67	91	90		
10	15	449.69	1.20	2.04	427	978	7.6	218			67	93	90		
9	20	453.98	1.20	2.04	424	405	8.5	220			67	95	92		
8	25	458.70	1.15	1.96	420	823	8.6	218			68	96	90		
7	30	462.52	1.20	2.04	428	254	8.9	222			68	94	92		
6	35	466.82	1.20	2.04	428	683	9.2	222			66	97	92		
5	40	471.05	1.20	2.04	429	111	9.2	223			65	97	93		
4	45	475.17	1.10	1.87	411	522	9.0	222			64	97	94		
3	50	479.25	1.10	1.87	411	933	9.2	223			64	97	94		
2	55	483.30	1.05	1.79	402	336	9.0	222			66	97	95		
1	60	487.14	.95	1.62	383	719	9.0	222			67	96	95		
	(1637)														
	θ=60	V_m =50.34	1.074	$\overline{\Delta H}$=1.963				$\overline{T_s}$=220.75					$\overline{T_m}$=93.46		

Samples Recovered: Filter No. Thimble #P11 ; ☒ Probe Wash; ☒ Wet Catch; ☐ Other

Integrated Gas Sampling Data:

Box No. B2
Bag No. 1
Bag Vol. 40 Liters

Bag Material Tedlar
Leak Checks 0.00 cc/min. @ 25"Hg
Posttest O_2 Reading none
320 P No. none

Moisture Recovery Data:

Impinger No.	1	2	3	4	Desiccant	Total
Final Volume	325	130	7	X	1457	
Initial Volume	100	100	0	X	1435	
Difference	225	30	7	X	22	284

AS 105

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EPA Method 5 Field Data Sheet

Project L.P. Hayward — Train No. B2 CM-5 #1 — Pitot Tube No. 34 C_p .843 — Sampling Train Leak Checks:

Sample Location Line 2 (Surface) FEB Outlet — Meter Coef. ∂ .9942 — Bar. Pres. 28.63 Ins. Hg — Pretest 0.00 @ 15 Ins. Hg

Date 6-16-94 — Test 2 — Run 1 — Orifice Coef. ΔH@ 1.760 — Static Pres. −5 Ins. H_2O — Posttest 0.00 @ 10 Ins. Hg

Operators JEP MFW — Nozzle No. 3-2 D_n .239 — Estimated MC 25 % — Pitot - Positive 0.00 Negative 0.00

Point No.	Time ΔT	Meter Vol. V_m Cubic Feet	Velocity Head - ΔP Inches WC	Orifice Meter - ΔH Inches WC	Desired ΔV_m	Desired V_m	Vacuum Inches Hg	Stack Temp. °F	Sampling Train Temperatures - °F (Instack)					320 P Oxygen Percent	
									Filter	Probe	Impinger Outlet	Meter Inlet	Meter Outlet		
	(1734)	(488.30)													
A 12	5	492.65	1.25	2.13	438	868	6.1	220			67	88	90		
11	10	496.98	1.20	2.02	425	643	6.2	223			65	88	90		
10	15	501.17	1.20	2.02	425	117	6.3	224			65	91	90		
9	20	505.20	1.30	2.20	44	561	9.0	222			66	93	90		
8	25	509.98	1.20	2.03	427	988	8.7	221			66	94	91		
7	30	514.35	1.25	2.12	437	425	9.5	222			65	94	91		
6	35	518.69	1.25	2.12	437	861	9.6	222			65	94	92		
5	40	522.06	1.20	2.04	428	290	9.5	222			65	94	92		
4	45														
3	50														
2	55														
1	60														
	(1818)														
	Θ=39	V_m = 33.76		ΔH=				$\overline{T_s}$=					$\overline{T_m}$=		

Stop Run at 34 min mike's Train is plugged

Samples Recovered: Filter No. Nothing #214 ; ☒ Probe Wash; ☒ Wet Catch; ☐ Other _____

Integrated Gas Sampling Data:

Box No. B2 — Bag Material Tedlar

Bag No. 2 — Leak Checks 0.000 cc/min. @ 25"Hg

Bag Vol. 40 Liters — Posttest O_2 Reading _____

320 P No. none — Red O2 analyzed

Moisture Recovery Data:

Impinger No.	1	2	3	4	Desiccant	Total
Final Volume	186	78	3	X	1472	
Initial Volume	50	50	0		1462 1457	
Difference	136	28	3		15	182

AS 105

EPA Method 5 Field Data Sheet

Project L.P. Hayward — Train No. B2 CM-3 PF — Pitot Tube No. 24 C_p .843 — Sampling Train Leak Checks:
Sample Location Line 2 EFB outlet — Meter Coef. ∂ .9542 — Bar. Pres. 28.63 Ins. Hg — Pretest 0.002 @ 15 Ins. Hg
Date 6-16-94 — Test 3 — Run 1 — Orifice Coef. ΔH@ 1.760 — Static Pres. -5 Ins. H_2O — Posttest 0.00 @ 2 Ins. Hg
Operators DEP MEG — Nozzle No. 3-2 D_n .234 — Estimated MC 25 % — Pitot - Positive 0.0 Negative 0.0

Point No.	Time ΔT	Meter Vol. V_m Cubic Feet	Velocity Head - ΔP Inches WC	Orifice Meter - ΔH Inches WC	Desired ΔV_m	Desired V_m	Vacuum Inches Hg	Stack Temp. °F	Sampling Train Temperatures - °F					320 P Oxygen Percent	
									Filter	Probe	Impinger Outlet	Meter Inlet	Meter Outlet		
	(0724)	(523.50)													
A 12	5	527.68	1.15	1.96	419	769	5.0	217	260	252	64	83	82		
11	10	531.87	1.20	2.02	422	191	5.4	216	261	248	61	83	82		
10	15	536.22	1.25	2.11	431	622	5.5	214	253	248	59	85	82		
9	20	540.63	1.30	2.26	442	064	6.0	211	260	248	57	87	82		
4	25	544.97	1.25	2.13	434	498	6.0	210	265	248	58	87	83		
7	30	549.25	1.20	2.06	427	925	5.9	206	271	248	61	88	83		
6	35	553.47	1.15	1.98	419	344	6.0	203	272	251	62	88	84		
5	40	557.72	1.20	2.07	428	773	6.7	204	276	246	62	88	84		
4	45	562.01	1.20	2.06	428	200	6.7	206	284	252	62	87	84		
3	50	566.18	1.15	1.96	417	618	6.6	209	275	251	63	87	83		
2	55	570.23	1.15	1.94	415	033	6.6	215	235	247	62	86	83		
1	60	574.49	1.05	1.77	396	429	6.5	216	245	249	62	86	83		
	824														
	Θ=60	V_m =		ΔH=				$\overline{T_s}$ =					$\overline{T_m}$ =		

Samples Recovered: Filter No. _____ ; ☒ Probe Wash; ☒ Wet Catch; ☐ Other _____

Integrated Gas Sampling Data:
Box No. B2 — Bag Material Tedlar
Bag No. 3 — Leak Checks 0.00 cc/min. @ 25"Hg
Bag Vol. 4 Liters — Posttest O_2 Reading _____
320 P No. none

Moisture Recovery Data:

Impinger No.	1	2	3	4	Desiccant	Total
Final Volume	206	68	4		1418	
Initial Volume	50	50	0	X	1410	
Difference	156	18	4		8	186

AS 10%

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AIR SAMPLING DEPARTMENT

Field Computer Summary

Project Name: LP HAYWARD Operator M. Lofdus
Sampling Location: Line 2 core dryer out
Date of Test: 6-16-94
Test Number: 1

Initialization Parameters

Meter Coef. - ∂	=	1.0044
Orif. Coef. - ΔH@	=	1.689
Pitot Coef. - C_p	=	835
Nozzle Dia. - D_n	=	.200
Bar. Pres. - P_b	=	28.63
Time/Point - ΔT	=	5
Moisture Content	=	24
% Oxygen	=	17
Meter Temp. - t_m	=	90
Static Pres. - P_g	=	-16.0

$T_m = 100$
$P_s = 14.2$

Run Specific Input Parameters

SURFACE DRY

	Run 1	Run 2	Run 3	Run 4
V/O	34343	387.00		
No. Of Points	12	20	12	
MC	24	22		
V/F	386.58	415.89		
Grams H_2O	185	161		
Run Time	60	60.36	60	
1-Rnd/2-Rect	1	1	1	
Diameter(Ins.)	41.75	41.75	41.75	
Length(Ins.)	∞	∞	∞	
Width(Ins.)	∞	∞	∞	

End Of Run Summary

	Run 1	Run 2	Run 3	Run 4
Avg. √ΔP	1.301	1.433		
Avg. ΔH	1.358	1.763		
Avg. t_s	219.58	217.67		
Avg. t_m	94.08	104.42		
Standard Vol.	39.66	26.09		
Moist. Content	18.00	22.51		
Avg. Gas Vel.	89.60	97.67		
% Isokinetic	96.47	101.90		
ACFM	57106	55713		
DSCFM	29873	31014		

EPA Method 5 Field Data Sheet

Project AP Hayward — Train No. C7, B4, P3 — Pitot Tube No. 2 C_p .835

Sample Location Line 2 condenser out — Meter Coef. ∂ 1.0044 — Bar. Pres. 28.63 Ins. Hg

Date 6-16-94 — Test 1 Run 1 — Orifice Coef. ΔH@ 1.659 — Static Pres. -16 Ins. H_2O

Operators MSL KTC — Nozzle No. 3-1 D_n .200 — Estimated MC 24 %

Sampling Train Leak Checks:
Pretest 0.00 @ 15 Ins. Hg
Posttest 0.01 @ 13.3 Ins. Hg
Pitot - Positive OK Negative OK

Point No.	Time ΔT	Meter Vol. V_m Cubic Feet	Velocity Head - ΔP Inches WC	Orifice Meter - ΔH Inches WC	Desired ΔV_m	Desired V_m	Vacuum Inches Hg	Stack Temp. °F	Sampling Train Temperatures - °F: Filter	Probe	Impinger Outlet	Meter Inlet	Meter Outlet	320 P Oxygen Percent	
	(1537)	(343.43)													
A 6	5	347.65	2.45	1.91	424	767	7.2	216	250	245	66	95	99		
5	10	351.58	2.10	1.65	397	164	6.5	220	250	252	65	96	102		
4	15	355.40	1.90	1.50	378	542	6.5	221	249	249	62	96	105		
3	20	358.80	1.30	1.03	314	456	6.2	221	249	251	60	97	107	18.0	
2	25	361.66	1.20	.95	303	158	5.1	220	244	251	60	98	107	17.8	
1	30	364.57	1.20	.95	303	461	5.1	220	250	250	61	99	107	17.4	
B 6	35	368.27	1.90	1.50	382	844	8.5	216	237	248	64	100	107	17.4	
5	40	372.09	1.80	1.43	371	215	9.1	222	248	249	62	100	109	17.5	
4	45	375.63	1.45	1.15	334	548	8.5	221	250	251	63	101	110	17.6	
3	50	379.97	1.65	1.32	357	905	8.3	221	250	251	64	101	110	17.5	
2	55	382.76	2.00	1.54	393	298	10.5	221	250	251	64	101	111	17.4	
1	60	386.58	1.60	1.29	353	651	(10.5)	216	249	250	64	102	111	17.4	
	(1638)														
	Θ=60	V_m =43.15	1301	ΔH=1358				$\bar{T}_s$ =21958					$\bar{T}_m$ =9408		

Samples Recovered: Filter No. 3109 ; ☒ Probe Wash; ☒ Wet Catch; ☐ Other _____

Integrated Gas Sampling Data:

Box No. 4 — Bag Material Tedlar
Bag No. 1 — Leak Checks 0.00 cc/min. @ 25"Hg
Bag Vol. 40 Liters — Posttest O_2 Reading _____
320 P No. _____

Moisture Recovery Data:

Impinger No.	1	2	3	4	Desiccant	Total
Final Volume	320	146	0	-	1489	
Initial Volume	100	100	0	-	1476	
Difference	126	46	0	-	13	185
		172				

AS 105

PACE INCORPORATED — THE ASSURANCE OF QUALITY

EPA Method 5 Field Data Sheet

Project LP HAYWARD — Train No. C7, B4, P3 — Pitot Tube No. 2 C_p .835 — Sampling Train Leak Checks:
Sample Location S/U 2 surface dryer out — Meter Coef. ∂ 1.0044 — Bar. Pres. 28.63 Ins. Hg — Pretest 0.00 @ 15 Ins. Hg
Date 6/16/94 — Test 2 — Run 1 — Orifice Coef. ΔH@ 1.689 — Static Pres. -14.2 Ins. H_2O — Posttest 0.00 @ 17.1 Ins. Hg
Operators MSL, KJZ — Nozzle No. 3-1 D_n .202 — Estimated MC 22 % — Pitot - Positive OK Negative OK

Point No.	Time ΔT	Meter Vol. V_m Cubic Feet	Velocity Head - ΔP Inches WC	Orifice Meter - ΔH Inches WC	Desired ΔV_m	Desired V_m	Vacuum Inches Hg	Stack Temp. °F	Sampling Train Temperatures - °F: Filter	Probe	Impinger Outlet	Meter Inlet	Meter Outlet	320 P Oxygen Percent	
	(1737)	(387.00)													
A 10	3	389.58	2.40	2.00	262	962	6.5	216	246	246	64	99	102	18.0	
9	6	392.00	2.05	1.71	242	204	5.9	217	248	244	63	99	103	18.2	
8	9	394.77	2.50	2.14	271	476	7.2	218	251	248	62	99	106	18.0	
7	12	397.17	2.20	1.87	254	730	6.8	220	252	252	62	99	108	17.3	
6	15	399.75	2.25	1.92	258	988	7.6	219	250	252	63	100	108	18.8	
5	18	402.20	1.80	1.54	231	218	7.4	218	249	250	64	100	109	18.0	
4	21	404.55	1.85	1.59	235	453	7.4	215	248	250	64	100	110	18.4	
3	24	406.76	1.70	1.46	225	678	7.1	217	249	250	64	101	110	18.2	
2	27	408.92	1.70	1.47	226	903	7.1	214	250	250	64	101	110	18.3	
1	30	411.06	1.50	1.29	211	115	7.1	217	250	250	64	101	111	18.1	
B 10	33	413.99	2.30	1.97	261	376	11.5	220	249	247	63	102	111	17.9	
9	36	416.89	2.55	2.18	275	651	16.0	221	250	248	63	102	111	17.7	
8	39							2	2	2					
7	42								2	2					
6	45								2	2					
5	48								2	2					
4	51								2	2					
3	54								2	2					
2	57								2	2					
1	60								2	2					
	(1814)														
	36														
	Θ=60	V_m = 28.89		ΔH= 1.763				$\overline{T_s}$ = 217.6					$\overline{T_m}$ = 104.2		

Samples Recovered: Filter No. 3084 ; ☒ Probe Wash; ☒ Wet Catch; ☐ Other _____

Integrated Gas Sampling Data:

Box No. 4 — Bag Material Tedlar
Bag No. 2 — Leak Checks 0.00 cc/min. @ 25"Hg
Bag Vol. 40 Liters — Posttest O_2 Reading _____
320 P No. _____

Moisture Recovery Data:

Impinger No.	1	2	3	4	Desiccant	Total
Final Volume	214	132	0	—	1376	
Initial Volume	100	100	0	—	1361	
Difference	114	32	0	—	15	161

AS 105

APPENDIX B

Laboratory Data and Reports

ORSAT ANALYTICAL DATA

EPA Method 3 Laboratory Summary Sheet

Project L.P. Hayward
Sampling Location Line 1
Sampling Date 6-16-94
Project Number 940614.401

Analyst K. Lattery
Analysis Date 6-17-94
Apparatus Leak Check - Pos. 0.00 Neg. 0.00
Apparatus Identification 06-01
Sample Type ☒ Integrated ☐ Grab

Test No.	Run No.	Orsat Analyzer Results			F_o	O_2 Analyzer Results		Sample Container
		% CO_2	% O_2	% CO		Field	Lab	
1	0	0.00	20.90		—			☐ Tedlar™ Bag ☐ Glass Bulb
FB OUTLET	1	2	4.00	17.00		0.975			☒ Tedlar™ Bag ☐ Glass Bulb
OUTLET	2	2	3.80	17.20		0.974			☒ Tedlar™ Bag ☐ Glass Bulb
CORE BOILER	1	2	3.80	17.00		1.026			☒ Tedlar™ Bag ☐ Glass Bulb
SURFACE DRYER	2	2	4.00	16.90		1.000			☒ Tedlar™ Bag ☐ Glass Bulb
									☐ Tedlar™ Bag ☐ Glass Bulb
									☐ Tedlar™ Bag ☐ Glass Bulb
									☐ Tedlar™ Bag ☐ Glass Bulb
									☐ Tedlar™ Bag ☐ Glass Bulb
									☐ Tedlar™ Bag ☐ Glass Bulb

Calculate F_o before evacuating any samples. Compare F_o to expected fuel values. If discrepancies exist, reanalyze samples. Calculate F_o as follows:

$$F_o = \frac{20.9 - \%\,O_2}{\%\,CO_2}$$

Comments Field + Lab O_2 Analyzer Results Not Recorded Due To Inoperable Analyzer Pump.

F_o Ranges For Common Fuels	
Anthracite Coal & Lignite	1.016 - 1.130
Bituminous Coal	1.083 - 1.230
Distillate Oil	1.260 - 1.413
Residual Oil	1.210 - 1.370
Wood	1.000 - 1.120
Wood Bark	1.003 - 1.130
Natural Gas	1.600 - 1.836
Propane	1.434 - 1.586
Butane	1.405 - 1.553

EPA Method 3 Laboratory Summary Sheet

Project L.P. Hayward
Sampling Location Line 2
Sampling Date 6-16-94
Project Number 940614.401

Analyst K. Lattery
Analysis Date 6-17-94
Apparatus Leak Check - Pos. 0.00 Neg. 0.00
Apparatus Identification 0B-01
Sample Type ☒ Integrated ☐ Grab

Test No.	Run No.	Orsat Analyzer Results			F_o	O_2 Analyzer Results		Sample Container
		% CO_2	% O_2	% CO		Field	Lab	
1	0	0.00	20.90		—			☐ Tedlar™ Bag ☐ Glass Bulb
FB INLET	1	1	2.20	18.80		0.955			☒ Tedlar™ Bag ☐ Glass Bulb
FB OUTLET	2	1	2.80	18.20		0.964			☒ Tedlar™ Bag ☐ Glass Bulb
FB INLET	3	1	2.80	18.40		0.893			☒ Tedlar™ Bag ☐ Glass Bulb
OKE DRYER	1	1	3.60	17.60		0.917			☒ Tedlar™ Bag ☐ Glass Bulb
FALE DRYER	2	1	3.00	18.00		0.967			☒ Tedlar™ Bag ☐ Glass Bulb
									☐ Tedlar™ Bag ☐ Glass Bulb
									☐ Tedlar™ Bag ☐ Glass Bulb
									☐ Tedlar™ Bag ☐ Glass Bulb
									☐ Tedlar™ Bag ☐ Glass Bulb

Calculate F_o before evacuating any samples. Compare F_o to expected fuel values. If discrepancies exist, reanalyze samples. Calculate F_o as follows:

$$F_o = \frac{20.9 - \%\ O_2}{\%\ CO_2}$$

Comments Field + Lab O_2 Analyzer Results Not Recorded Due To Inoperable Analyzer Pump.

F_o Ranges For Common Fuels	
Anthracite Coal & Lignite	1.016 - 1.130
Bituminous Coal	1.083 - 1.230
Distillate Oil	1.260 - 1.413
Residual Oil	1.210 - 1.370
Wood	1.000 - 1.120
Wood Bark	1.003 - 1.130
Natural Gas	1.600 - 1.836
Propane	1.434 - 1.586
Butane	1.405 - 1.553

EPA Method 3 Laboratory Data Sheet

Project L.P. Hayward
Sampling Location Line 1
Sampling Date 6-16-94
Project Number 940614.401

Analyst K. Lattery
Analysis Date 6-17-94
Apparatus Leak Check - Pos. 0.00 Neg. 0.00
Apparatus Identification 08-01

	Aliquot Volume	CO_2	O_2
Test 1 Run 0	Zero Point 0.00 ml Sample Volume 100.00 ml	Initial Reading 0.00 ml Final Reading 0.00 ml Volume CO_2 0.00 ml % CO_2 0.00 %	Initial Reading 0.00 ml Final Reading 20.90 ml Volume O_2 20.90 ml % O_2 20.90 %
Duplicate	Zero Point ____ ml Sample Volume ____ ml	Initial Reading ____ ml Final Reading ____ ml Volume CO_2 ____ ml % CO_2 ____ %	Initial Reading ____ ml Final Reading ____ ml Volume O_2 ____ ml % O_2 ____ %
Average		% CO_2 0.00 %	% O_2 20.90 %
Test 1 Run 2 EFB OUTLET	Zero Point 0.00 ml Sample Volume 100.00 ml	Initial Reading 0.00 ml Final Reading 4.00 ml Volume CO_2 4.00 ml % CO_2 4.00 %	Initial Reading 4.00 ml Final Reading 21.00 ml Volume O_2 17.00 ml % O_2 17.00 %
Duplicate	Zero Point 0.00 ml Sample Volume 100.00 ml	Initial Reading 0.00 ml Final Reading 4.00 ml Volume CO_2 4.00 ml % CO_2 4.00 %	Initial Reading 4.00 ml Final Reading 21.00 ml Volume O_2 17.00 ml % O_2 17.00 %
Average		% CO_2 4.00 %	% O_2 17.00 %

Comments: _____

EPA Method 3 Laboratory Data Sheet

Project L.P. Hayward
Sampling Location Line 1
Sampling Date 6-16-94
Project Number 940614.401

Analyst K. Luttery
Analysis Date 6-17-94
Apparatus Leak Check - Pos. 0.00 Neg. 0.00
Apparatus Identification OB-01

	Aliquot Volume	CO_2	O_2
Test 2 Run 2 EFB OUTLET	Zero Point 0.00 ml Sample Volume 100.00 ml	Initial Reading 0.00 ml Final Reading 3.80 ml Volume CO_2 3.80 ml % CO_2 3.80 %	Initial Reading 3.80 ml Final Reading 21.00 ml Volume O_2 17.20 ml % O_2 17.20 %
Duplicate	Zero Point 0.00 ml Sample Volume 100.00 ml	Initial Reading 0.00 ml Final Reading 3.80 ml Volume CO_2 3.80 ml % CO_2 3.80 %	Initial Reading 3.80 ml Final Reading 21.00 ml Volume O_2 17.20 ml % O_2 17.20 %
Average		% CO_2 3.80 %	% O_2 17.20 %
Test 1 Run 2 CORE DRYER OUTLET	Zero Point 0.00 ml Sample Volume 100.00 ml	Initial Reading 0.00 ml Final Reading 3.80 ml Volume CO_2 3.80 ml % CO_2 3.80 %	Initial Reading 3.80 ml Final Reading 20.80 ml Volume O_2 17.00 ml % O_2 17.00 %
Duplicate	Zero Point 0.00 ml Sample Volume 100.00 ml	Initial Reading 0.00 ml Final Reading 3.80 ml Volume CO_2 3.80 ml % CO_2 3.80 %	Initial Reading 3.80 ml Final Reading 20.80 ml Volume O_2 17.00 ml % O_2 17.00 %
Average		% CO_2 3.80 %	% O_2 17.00 %

Comments:

EPA Method 3 Laboratory Data Sheet

Project L.P. Hayward
Sampling Location Line 1
Sampling Date 6-16-94
Project Number 940614.401

Analyst K. Lattery
Analysis Date 6-17-94
Apparatus Leak Check - Pos. 0.00 Neg. 0.00
Apparatus Identification OB-01

	Aliquot Volume	CO_2	O_2
Test 2 Run 2 SURFACE DRYER OUTLET	Zero Point 0.00 ml Sample Volume 100.00 ml	Initial Reading 0.00 ml Final Reading 4.00 ml Volume CO_2 4.00 ml % CO_2 4.00 %	Initial Reading 4.00 ml Final Reading 20.90 ml Volume O_2 16.90 ml % O_2 16.90 %
Duplicate	Zero Point 0.00 ml Sample Volume 100.00 ml	Initial Reading 0.00 ml Final Reading 4.00 ml Volume CO_2 4.00 ml % CO_2 4.00 %	Initial Reading 4.00 ml Final Reading 20.90 ml Volume O_2 16.90 ml % O_2 16.90 %
Average		% CO_2 4.00 %	% O_2 16.90 %
Test ____ Run ____	Zero Point ____ ml Sample Volume ____ ml	Initial Reading ____ ml Final Reading ____ ml Volume CO_2 ____ ml % CO_2 ____ %	Initial Reading ____ ml Final Reading ____ ml Volume O_2 ____ ml % O_2 ____ %
Duplicate	Zero Point ____ ml Sample Volume ____ ml	Initial Reading ____ ml Final Reading ____ ml Volume CO_2 ____ ml % CO_2 ____ %	Initial Reading ____ ml Final Reading ____ ml Volume O_2 ____ ml % O_2 ____ %
Average		% CO_2 ____ %	% O_2 ____ %

Comments: _____

EPA Method 3 Laboratory Data Sheet

Project L.P. Hayward
Sampling Location Line 2
Sampling Date 6-16-94
Project Number 940614.401

Analyst K. Lattery
Analysis Date 6-17-94
Apparatus Leak Check - Pos. 0.00 Neg. 0.00
Apparatus Identification OB-01

	Aliquot Volume	CO_2	O_2
Test 1 Run 0	Zero Point 0.00 ml Sample Volume 100.00 ml	Initial Reading 0.00 ml Final Reading 0.00 ml Volume CO_2 0.00 ml % CO_2 0.00 %	Initial Reading 0.00 ml Final Reading 20.90 ml Volume O_2 20.90 ml % O_2 20.90 %
Duplicate	Zero Point ____ ml Sample Volume ____ ml	Initial Reading ____ ml Final Reading ____ ml Volume CO_2 ____ ml % CO_2 ____ %	Initial Reading ____ ml Final Reading ____ ml Volume O_2 ____ ml % O_2 ____ %
Average		% CO_2 0.00 %	% O_2 20.90 %
Test 1 Run 1 EFB OUTLET	Zero Point 0.00 ml Sample Volume 100.00 ml	Initial Reading 0.00 ml Final Reading 2.20 ml Volume CO_2 2.20 ml % CO_2 2.20 %	Initial Reading 2.20 ml Final Reading 21.00 ml Volume O_2 18.80 ml % O_2 18.80 %
Duplicate	Zero Point 0.00 ml Sample Volume 100.00 ml	Initial Reading 0.00 ml Final Reading 2.20 ml Volume CO_2 2.20 ml % CO_2 2.20 %	Initial Reading 2.20 ml Final Reading 21.00 ml Volume O_2 18.80 ml % O_2 18.80 %
Average		% CO_2 2.20 %	% O_2 18.80 %

Comments: _____

EPA Method 3 Laboratory Data Sheet

Project L.P. Hayward
Sampling Location Line 2
Sampling Date 6-16-94
Project Number 940614.401

Analyst K. Lattery
Analysis Date 6-17-94
Apparatus Leak Check - Pos. 0.00 Neg. 0.00
Apparatus Identification OB-01

	Aliquot Volume	CO_2	O_2
Test 2 Run 1 EFB OUTLET	Zero Point 0.00 ml Sample Volume 100.00 ml	Initial Reading 0.00 ml Final Reading 2.80 ml Volume CO_2 2.80 ml % CO_2 2.80 %	Initial Reading 2.80 ml Final Reading 21.00 ml Volume O_2 18.20 ml % O_2 18.20 %
Duplicate	Zero Point 0.00 ml Sample Volume 100.00 ml	Initial Reading 0.00 ml Final Reading 2.80 ml Volume CO_2 2.80 ml % CO_2 2.80 %	Initial Reading 2.80 ml Final Reading 21.00 ml Volume O_2 18.20 ml % O_2 18.20 %
Average		% CO_2 2.80 %	% O_2 18.20 %
Test 3 Run 1 EFB OUTLET	Zero Point 0.00 ml Sample Volume 100.00 ml	Initial Reading 0.00 ml Final Reading 2.80 ml Volume CO_2 2.80 ml % CO_2 2.80 %	Initial Reading 2.80 ml Final Reading 21.20 ml Volume O_2 18.40 ml % O_2 18.40 %
Duplicate	Zero Point 0.00 ml Sample Volume 100.00 ml	Initial Reading 0.00 ml Final Reading 2.80 ml Volume CO_2 2.80 ml % CO_2 2.80 %	Initial Reading 2.80 ml Final Reading 21.20 ml Volume O_2 18.40 ml % O_2 18.40 %
Average		% CO_2 2.80 %	% O_2 18.40 %

Comments:

EPA Method 3 Laboratory Data Sheet

Project L.P. Hayward
Sampling Location Line 2
Sampling Date 6-16-94
Project Number 940614.401

Analyst K. Lattery
Analysis Date 6-17-94
Apparatus Leak Check - Pos. 0.00 Neg. 0.00
Apparatus Identification 08-01

	Aliquot Volume	CO_2	O_2
Test 1 Run 1 CORE DRYER OUTLET	Zero Point 0.00 ml Sample Volume 100.00 ml	Initial Reading 0.00 ml Final Reading 3.60 ml Volume CO_2 3.60 ml % CO_2 3.60 %	Initial Reading 3.60 ml Final Reading 21.20 ml Volume O_2 17.60 ml % O_2 17.60 %
Duplicate	Zero Point 0.00 ml Sample Volume 100.00 ml	Initial Reading 0.00 ml Final Reading 3.60 ml Volume CO_2 3.60 ml % CO_2 3.60 %	Initial Reading 3.60 ml Final Reading 21.20 ml Volume O_2 17.60 ml % O_2 17.60 %
Average		% CO_2 3.60 %	% O_2 17.60 %
Test 2 Run 1 SURFACE DRYER OUTLET	Zero Point 0.00 ml Sample Volume 100.00 ml	Initial Reading 0.00 ml Final Reading 3.00 ml Volume CO_2 3.00 ml % CO_2 3.00 %	Initial Reading 3.00 ml Final Reading 21.00 ml Volume O_2 18.00 ml % O_2 18.00 %
Duplicate	Zero Point 0.00 ml Sample Volume 100.00 ml	Initial Reading 0.00 ml Final Reading 3.00 ml Volume CO_2 3.00 ml % CO_2 3.00 %	Initial Reading 3.00 ml Final Reading 21.00 ml Volume O_2 18.00 ml % O_2 18.00 %
Average		% CO_2 3.00 %	% O_2 18.00 %

Comments:

PARTICULATE ANALYTICAL DATA

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EPA Method 5 Particulate Gravimetric Sheet

Inorganic Residuals

Project LOUISIANA PACIFIC
Analyst KAB
Sampling Location DRYERS OUT
Analysis Date(s) 6/17, 6/18, 6/20, 6/21/94
Sampling Date 6/15/94
Sampling Reagent
Test Number T1, T2
LDMS Entry Initials
Project Number 940617.500
LDMS Validation 6.22.94 Initials

Sample No. 13077.0	Sample No. 13078.8	Sample No. 13079.6
Run Number T1R1	Run Number T1R2	Run Number T1R1
Dish Number 56	Dish Number B4	Dish Number MOSER
Date/Time 6/21/94 0830	Date/Time 6/21/94 0830	Date/Time 6/21/94 0830
Gross Weight 115.3897 g	Gross Weight 103.2664 g	Gross Weight 104.5774 g
Date/Time 6/21/94 1445	Date/Time 6/21/94 1445	Date/Time 6/21/94 1445
Gross Weight 115.3892 g	Gross Weight 103.2666 g	Gross Weight 104.5769 g
Avg. Gross Wt. 115.3894 g	Avg. Gross Wt. 103.2665 g	Avg. Gross Wt. 104.5772 g
Dish Tare Wt. 115.2820 g	Dish Tare Wt. 103.2058 g	Dish Tare Wt. 104.5198 g
Difference 0.1074 g	Difference 0.0607 g	Difference 0.0574 g
Blank Weight 0.0007 g	Blank Weight 0.0007 g	0.0007 Blank Weight 0.0567 g KAB 6/21/94
Inorganic Residuals Wt. 0.1067 g	Inorganic Residuals Wt. 0.0600 g	Inorganic Residuals Wt. 0.0567 g
Transfer "Inorganic Residuals Wt." to Box Number 1.	Transfer "Inorganic Residuals Wt." to Box Number 2.	Transfer "Inorganic Residuals Wt." to Box Number 3.
WC 1 0.1067 g	WC 2 0.0600 g	WC 3 0.0567 g

AS 105 A

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EPA Method 5 Particulate Gravimetric Sheet

Organic Condensibles

Project LOUISIANA PACIFIC
Analyst KAB
Sampling Location DRYERS OUT
Analysis Date(s) 6/17, 6/18, 6/20, 6/21/94
Sampling Date 6/15/94
Sampling Reagent
Test Number T1, T2
LDMS Entry Initials
Project Number 940617.500
LDMS Validation 6.22.94 Initials

Sample No. 13077.0	Sample No. 13078.8	Sample No. 13079.6
Run Number T1R1	Run Number T1R2	Run Number T1R1
Dish Number SLP	Dish Number FE	Dish Number PO
Date/Time 6/21/94 0830	Date/Time 6/21/94 0830	Date/Time 6/21/94 0830
Gross Weight 105.0826 g	Gross Weight 115.9293 g	Gross Weight ~~116.8586~~ 116.8846 g KAB 6/21/94
Date/Time 6/21/94 1445	Date/Time 6/21/94 1445	Date/Time 6/21/94 1445
Gross Weight 105.0823 g	Gross Weight 115.9289 g	Gross Weight 116.8842 g
Avg. Gross Wt. 105.0824 g	Avg. Gross Wt. 115.9291 g	Avg. Gross Wt. 116.8844 g
Dish Tare Wt. 105.0343 g	Dish Tare Wt. 115.9018 g	Dish Tare Wt. 116.8586 g
Difference 0.0481 g	Difference 0.0273 g	Difference 0.0258 g
Blank Weight 0.0002 g	Blank Weight 0.0002 g	Blank Weight ~~0.0256~~ 0.0002 KAB 6/21/94 g
Condensible Organic Wt. 0.0479 g	Condensible Organic Wt. 0.0271 g	Condensible Organic Wt. 0.0256 g
Transfer "Condensible Organic Wt." to Box Number 1.	Transfer "Condensible Organic Wt." to Box Number 2.	Transfer "Condensible Organic Wt." to Box Number 3.
WC 1 0.0479 g	WC 2 0.0271 g	WC 3 0.0256 g

AS 105 A

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EPA Method 5 Particulate Gravimetric Sheet

Particulate In Probe Wash

Project LOUISIANA PACIFIC
Analyst KAB
Sampling Location DRYER'S OUT
Analysis Date(s) 6/17/94, 6/18/94, 6/20/94
Sampling Date 6/15/94
Cleanup Reagent(s)
Test Number T1,T2
LDMS Entry Initials
Project Number 940617.500
LDMS Validation 6.22.94 Initials

Sample No. 13077.0	Sample No. 13078.8	Sample No. 13079.6
Run Number T1R1	Run Number T1R2	Run Number T1RB1 6/20/94
Dish Number B10	Dish Number Ø	Dish Number B2
Reagent Vol. 175 ml	Reagent Vol. 175 ml	Reagent Vol. 10 ml
Date/Time 6/18/94 1600	Date/Time 6/18/94 1600	Date/Time 6/18/94 1600
Gross Weight 103.2642 g	Gross Weight 103.0805 g	Gross Weight 103.9253 g
Date/Time 6/20/94 0830	Date/Time 6/20/94 0830	Date/Time 6/18/94 0830
Gross Weight 103.2647 g	Gross Weight 103.0806 g	Gross Weight 103.9258 g
Avg. Gross Wt. 103.2644 g	Avg. Gross Wt. 103.0806 g	Avg. Gross Wt. 103.9256 g
Dish Tare Wt. 103.18285 g	Dish Tare Wt. 103.0201 g	Dish Tare Wt. 103.9185 g
Difference 0.0819 g	Difference 0.0605 g	Difference 0.0071 g
Blank Weight 0.001 g	Blank Weight 0.001 g	Blank Weight 0.001 g
Particulate In Rinse Weight 0.0809 g	Particulate In Rinse Weight 0.0595 g	Particulate In Rinse Weight 0.0061 g
Transfer "Particulate In Rinse Weight" to Box Number 1.	Transfer "Particulate In Rinse Weight" to Box Number 2.	Transfer "Particulate In Rinse Weight" to Box Number 3.
PW 1 0.0809 g	PW 2 0.0595 g	PW 3 0.0061 g

AS 105 A

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EPA Method 5 Particulate Gravimetric Sheet

Particulate On Filter

Project LOUISIANA PACIFIC
Analyst KAB
Sampling Location DRYERS OUT
Analysis Date(s) 6/17/94
Sampling Date 6/15/94
Filter Type FIBERGLASS & METAL TUBE
Test Number T1, T2
LDMS Entry _____ Initials ____
Project Number 940617.500
LDMS Validation 6.22.94 Initials jmc

Sample No. 13077.0	Sample No. 13078.8	Sample No. 13079.6
Run Number T1R1	Run Number T1R2	Run Number T1R1
Filter Number 3109	Filter Number 3216	Filter Number P11
Date/Time 6/17/94 1630	Date/Time 6/17/94 1630	Date/Time 6/17/94 1630
Gross Weight 1.0600 g	Gross Weight 0.8698 g	Gross Weight 42.7528 g
Date/Time _____	Date/Time _____	Date/Time _____
Gross Weight _____ g	Gross Weight _____ g	Gross Weight _____ g
Avg. Gross Wt. 1.0600 g	Avg. Gross Wt. 0.8698 g	Avg. Gross Wt. 42.7528 g
Filter Tare Wt. 0.66760 g	Filter Tare Wt. 0.66326 g	Filter Tare Wt. 42.6193 g
Difference 0.3924 g	Difference 0.2065 g	Difference 0.1335 g
Particulate On Filter Weight 0.3924 g	Particulate On Filter Weight 0.2065 g	Particulate On Filter Weight 0.1335 g
Transfer "Particulate On Filter Weight" to Box Number 1.	Transfer "Particulate On Filter Weight" to Box Number 2.	Particulate On Filter Weight" to Box Number 3.
Sum particulate weights from each box labeled "1" and record in box labeled "T1."	Sum particulate weights from each box labeled "2" and record in box labeled "T2."	Sum particulate weights from each box labeled "3" and record in box labeled "T3."
AF 1 0.3924 g	AF 2 0.2065 g	AF 3 0.1335 g
Total T1 0.6279 g	Total T2 0.3531 g	Total T3 0.2219 g

AS 105 A

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pace

INORGANIC LABORATORY

EPA Method 5 Particulate Gravimetric Sheet

Reagent Blanks

Project LOUISIANA PACIFIC
Sampling Location DRYERS OUT
Sampling Date 6/15/94
Test Number T1, T2
Project Number 940617.500

Analyst KAB
Analysis Date(s) 6/17/94, 6/18, 6/20, 6/21

Wet Catch

Type:
- [X] Organic Condensibles (Extract.)
- [ ] Inorganic (Residual)
- [ ] Other
- [ ] Retain For Further Analyses

Reagent H2O
Volume 200 ml

Date/Time 6/21/94 0830
Gross Weight ~~105~~ 114.3205 g
KAC 6/24/94

Date/Time 6/21/94 1445
Gross Weight 114.3206 g

Avg. Gross Wt. 114.3206 g
Dish Tare Wt. 114.3204 g
Difference 0.0002 g

Blank Weight 0.0002 g

Probe Wash

Type:
- [X] Gravimetric
- [ ] Other
- [ ] Retain For Further Analyses

Reagent
Volume 200 ml

Date/Time 6/18/94 1600
Gross Weight 105.3115 g

Date/Time 6/20/94 0830
Gross Weight 105.3112 g

Avg. Gross Wt. 105.3114 g
Dish Tare Wt. 105.3104 g
Difference 0.0010 g

Blank Weight 0.0010 g

EPA Method 5 Particulate Gravimetric Sheet
Reagent Blanks

Project _____ Analyst _____

Sampling Location _____ Analysis Date(s) _____

Sampling Date _____

Test Number _____

Project Number _____

Wet Catch

Type:
- ☐ Organic Condensibles (Extract.)
- ☒ Inorganic (Residual)
- ☐ Other _____
- ☐ Retain For Further Analyses

TOB

Reagent _____

Volume _____ ml

Date/Time 6/21/94 0830

Gross Weight 108.6231 g

Date/Time 6/21/94 1445

Gross Weight 108.6224 8 g

Avg. Gross Wt. 108.6236 g

Dish Tare Wt. 108.6223 g

Difference +0.0007 g

Blank Weight .0007 g

Probe Wash

Type:
- ☒ Gravimetric
- ☐ Other _____
- ☐ Retain For Further Analyses

Reagent _____

Volume _____ ml

Date/Time _____

Gross Weight _____ g

Date/Time _____

Gross Weight _____ g

Avg. Gross Wt. _____ g

Dish Tare Wt. _____ g

Difference _____ g

Blank Weight _____ g

EPA Method 5 Particulate Gravimetric Sheet
Reagent Blanks

Project _____ Analyst _____

Sampling Location _____ Analysis Date(s) _____

Sampling Date _____

Test Number _____

Project Number _____

Wet Catch

Type:
- ☐ Organic Condensibles (Extract.)
- ☒ Inorganic (Residual)
- ☐ Other _____
- ☐ Retain For Further Analyses

TOB

Reagent _____

Volume _____ ml

Date/Time 6/21/94 0830

Gross Weight 108.6231 g

Date/Time 6/21/94 1445

Gross Weight 108.62248 g

Avg. Gross Wt. 108.6236 g

Dish Tare Wt. 108.6223 g

Difference ±0.0007 g

Blank Weight .0007 g

Probe Wash

Type:
- ☒ Gravimetric
- ☐ Other _____
- ☐ Retain For Further Analyses

Reagent _____

Volume _____ ml

Date/Time _____

Gross Weight _____ g

Date/Time _____

Gross Weight _____ g

Avg. Gross Wt. _____ g

Dish Tare Wt. _____ g

Difference _____ g

Blank Weight _____ g

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EPA Method 5 Particulate Gravimetric Sheet

Inorganic Residuals

Project LOUISIANA PACIFIC — Analyst KAB

Sampling Location DRYER'S OUT — Analysis Date(s) 6/17, 6/18, 6/20, 6/21/94

Sampling Date 6/15/94 — Sampling Reagent ____

Test Number T1, T2 — LDMS Entry ____ Initials ____

Project Number 940617.500 — LDMS Validation 6-22-94 Initials JMC

Sample No. 13085.0	Sample No. 13086.9	Sample No. ____
Run Number T2R1	Run Number T2R2	Run Number ____
Dish Number Z4	Dish Number ATP	Dish Number ____
Date/Time 6/21/94 0830	Date/Time 6/21/94 0830	Date/Time ____
Gross Weight 98.2750 g	Gross Weight ~~100.7512~~ 100.7715 g	Gross Weight ____ g
Date/Time 6/21/94 1145	Date/Time 6/21/94 1	Date/Time ____
Gross Weight 98.2745 g	Gross Weight 100.7710 g	Gross Weight ____ g
Avg. Gross Wt. 98.2748 g	Avg. Gross Wt. 100.7712 g	Avg. Gross Wt. ____ g
Dish Tare Wt. 98.2284 g	Dish Tare Wt. 100.6966 g	Dish Tare Wt. ____ g
Difference 0.0464 g	Difference 0.0746 g	Difference ____ g
Blank Weight 0.0007 g	Blank Weight 0.0007 g	Blank Weight ____ g
Inorganic Residuals Wt. 0.0457 g	Inorganic Residuals Wt. 0.0739 g	Inorganic Residuals Wt. ____ g
Transfer "Inorganic Residuals Wt." to Box Number 1.	Transfer "Inorganic Residuals Wt." to Box Number 2.	Transfer "Inorganic Residuals Wt." to Box Number 3.
WC 1 [0.0457] g	WC 2 [0.0739] g	WC 3 [ ] g

AS 106 A

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INORGANIC LABORATORY

EPA Method 5 Particulate Gravimetric Sheet

Organic Condensibles

Project LOUISIANA PACIFIC
Analyst KAB
Sampling Location DRYER'S OUT
Analysis Date(s) 6/17, 6/18, 6/20, 6/21/94
Sampling Date 6/15/94
Sampling Reagent
Test Number T1, T2
LDMS Entry
Initials
Project Number 940617.500
LDMS Validation 6.22.94
Initials JMC

Sample No. 13085.0	Sample No. 130869	Sample No.
Run Number T2R1	Run Number T2R2	Run Number
Dish Number 702	Dish Number JOSE	Dish Number
Date/Time 6/21/94 0830	Date/Time 6/21/94 0830	Date/Time
Gross Weight 98.9646 g	Gross Weight 103.0697 g	Gross Weight g
Date/Time 6/21/94 1445	Date/Time 6/21/94 1445	Date/Time
Gross Weight 98.9641 g	Gross Weight 103.0693 g	Gross Weight g
Avg. Gross Wt. 98.9644 g	Avg. Gross Wt. 103.0695 g	Avg. Gross Wt. g
Dish Tare Wt. 98.9497 g	Dish Tare Wt. 103.0413 g	Dish Tare Wt. g
Difference 0.0147 g	Difference 0.0282 g	Difference g
Blank Weight 0.0002 g	Blank Weight 0.0002 g	Blank Weight 0.0002 g
Condensible Organic Wt. 0.0145 g	Condensible Organic Wt. 0.0280 g	Condensible Organic Wt. g
Transfer "Condensible Organic Wt." to Box Number 1.	Transfer "Condensible Organic Wt." to Box Number 2.	Transfer "Condensible Organic Wt." to Box Number 3.
WC 1 [0.0145] g	WC 2 [0.0280] g	WC 3 [ ] g

AS 105 A

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EPA Method 5 Particulate Gravimetric Sheet

Particulate In Probe Wash

Project: LOUISIANA PACIFIC
Sampling Location: DRYERS OUT
Sampling Date: 6/15/94
Test Number: T1, RT2
Project Number: 940617.500

Analyst: KAS
Analysis Date(s): 6/17, 6/18, 6/20/94
Cleanup Reagent(s):
LDMS Entry: Initials:
LDMS Validation: 6.22.94 Initials: ~~JDC~~

Sample No. 13085.0	Sample No. 13086.9	Sample No.
Run Number T2B1	Run Number T2R2	Run Number
Dish Number 14	Dish Number REM	Dish Number
Reagent Vol. 10 ml	Reagent Vol. 10 ml	Reagent Vol. ml
Date/Time 6/18/94 1600	Date/Time 6/18/94 1600	Date/Time
Gross Weight 101.4620 g	Gross Weight 114.2088 g	Gross Weight g
Date/Time 6/20/94 0830	Date/Time 6/20/94 0830	Date/Time
Gross Weight 101.4624 g	Gross Weight 114.2092 g	Gross Weight g
Avg. Gross Wt. 101.4622 g	Avg. Gross Wt. 114.2090 g	Avg. Gross Wt. g
Dish Tare Wt. 101.4555 g	Dish Tare Wt. 114.2011 g	Dish Tare Wt. g
Difference 0.0067 g	Difference 0.0079 g	Difference g
Blank Weight 0.001 g	Blank Weight 0.001 g	Blank Weight g
Particulate In Rinse Weight 0.0057 g	Particulate In Rinse Weight 0.0069 g	Particulate In Rinse Weight g
Transfer "Particulate In Rinse Weight" to Box Number 1.	Transfer "Particulate In Rinse Weight" to Box Number 2.	Transfer "Particulate In Rinse Weight" to Box Number 3.
PW 1 0.0057 g	PW 2 0.0069 g	PW 3 g

AS 105 A

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EPA Method 5 Particulate Gravimetric Sheet

Particulate On Filter

Project: LOUISIANA PACIFIC
Analyst: KAB
Sampling Location: DRYER OUT
Analysis Date(s): 6/17/94
Sampling Date: 6/15/94
Filter Type: FIBERGLASS, METAL THIMBEL
Test Number: T1, T2
LDMS Entry: _____ Initials: _____
Project Number: 940617.500
LDMS Validation: 6.22.94 Initials: [signature]

Sample No. 13085.0	Sample No. 13086.9	Sample No. _____
Run Number T2R1	Run Number T2R2	Run Number _____
Filter Number P14	Filter Number P10	Filter Number _____
Date/Time 6/17/94 1630	Date/Time 6/17/94 1630	Date/Time _____
Gross Weight 40.8700 g	Gross Weight 43.3157 g	Gross Weight _____ g
Date/Time _____	Date/Time _____	Date/Time _____
Gross Weight _____ g	Gross Weight _____ g	Gross Weight _____ g
Avg. Gross Wt. 40.8700 g	Avg. Gross Wt. 43.3157 g	Avg. Gross Wt. _____ g
Filter Tare Wt. 40.8019 g	Filter Tare Wt. 43.1702 g	Filter Tare Wt. _____ g
Difference 0.0681 g	Difference 0.1455 g	Difference _____ g
Particulate On Filter Weight 0.0681 g	Particulate On Filter Weight 0.1455 g	Particulate On Filter Weight _____ g
Transfer "Particulate On Filter Weight" to Box Number 1.	Transfer "Particulate On Filter Weight" to Box Number 2.	Particulate On Filter Weight" to Box Number 3.
Sum particulate weights from each box labeled "1" and record in box labeled "T1."	Sum particulate weights from each box labeled "2" and record in box labeled "T2."	Sum particulate weights from each box labeled "3" and record in box labeled "T3."
AF 1 0.0681 g	AF 2 0.1455 g	AF 3 _____ g
Total T1 0.134 g	Total T2 0.2543 KAB 6/22/94 ~~0.2347~~ g	Total T3 _____ g

AS 105 A

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INORGANIC LABORATORY

EPA Method 5 Particulate Gravimetric Sheet

Inorganic Residuals

Project LOUISIANA PACIFIC
Analyst KAB
Sampling Location DRYERS OUT
Analysis Date(s) 6/17, 6/18, 6/20, 6/21
Sampling Date 6/15/94
Sampling Reagent
Test Number T1, T2
LDMS Entry Initials
Project Number 940617.500
LDMS Validation 6.22.94 Initials

Sample No. 13081.8	Sample No. ~~6/21~~ 13082.6	Sample No. 13083.4
Run Number T1R2	Run Number T2R1	Run Number T2R2
Dish Number BL	Dish Number LMB	Dish Number B5
Date/Time 6/21/94 0830	Date/Time 6/21/94 0830	Date/Time 6/21/94 0830
Gross Weight 108.7677 g	Gross Weight 107.9778 g	Gross Weight 97.5205 g
Date/Time 6/21/94 1445	Date/Time 6/21/94 1445	Date/Time 6/21/94 1445
Gross Weight 108.7676 g	Gross Weight 107.9778 g	Gross Weight 97.5209 g
Avg. Gross Wt. 108.7676 g	Avg. Gross Wt. 107.9778 g	Avg. Gross Wt. 97.5207 g
Dish Tare Wt. 108.6735 g	Dish Tare Wt. 107.9071 g	Dish Tare Wt. 97.4119 g
Difference 0.0941 g	Difference 0.0707 g	Difference 0.1088 g
Blank Weight 0.0007 g	Blank Weight 0.0007 g	Blank Weight 0.0007 g
Inorganic Residuals Wt. 0.0934 g	Inorganic Residuals Wt. 0.0700 g	Inorganic Residuals Wt. 0.1081 g
Transfer "Inorganic Residuals Wt." to Box Number 1.	Transfer "Inorganic Residuals Wt." to Box Number 2.	Transfer "Inorganic Residuals Wt." to Box Number 3.
WC 1 0.0934 g	WC 2 0.0700 g	WC 3 0.1081 g

AS 105 A

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INORGANIC LABORATORY

EPA Method 5 Particulate Gravimetric Sheet

Organic Condensibles

Project LOUISIANA PACIFIC
Analyst KAB
Sampling Location DRYERS OUT
Analysis Date(s) 6/17, 6/18, 6/20, 6/21/94
Sampling Date 6/15/94
Sampling Reagent
Test Number T1,T2
LDMS Entry Initials
Project Number 940617.500
LDMS Validation 6-21-94 Initials

Sample No. 13081.8	Sample No. 13082.6	Sample No. 13083.4
Run Number T1R2	Run Number T2R1	Run Number T2R2
Dish Number Z5	Dish Number T	Dish Number 87
Date/Time 6/21/94 0830	Date/Time 6/21/94 0830	Date/Time 6/21/94 0830
Gross Weight 100.1456 g	Gross Weight 115.2418 g	Gross Weight 111.2574 g
Date/Time 6/21/94 1445	Date/Time 6/21/94 1445	Date/Time 6/21/94 1445
Gross Weight 100.1452 g	Gross Weight 115.2414 g	Gross Weight 111.2573 g
Avg. Gross Wt. 100.1454 g	Avg. Gross Wt. 115.2416 g	Avg. Gross Wt. 111.2574 g
Dish Tare Wt. 100.1096 g	Dish Tare Wt. 115.1991 g	Dish Tare Wt. 111.2090 g
Difference 0.0358 g	Difference 0.0425 g	Difference 0.0484 g
Blank Weight 0.0002 g	Blank Weight 0.0002 g	Blank Weight 0.0002 g
Condensible Organic Wt. 0.0356 g	Condensible Organic Wt. 0.0423 g	Condensible Organic Wt. 0.0482 g
Transfer "Condensible Organic Wt." to Box Number 1.	Transfer "Condensible Organic Wt." to Box Number 2.	Transfer "Condensible Organic Wt." to Box Number 3.
WC 1 0.0356 g	WC 2 0.0423 g	WC 3 0.0482 g

AS 105 A

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EPA Method 5 Particulate Gravimetric Sheet

Particulate In Probe Wash

Project LOUISIANA PACIFIC
Analyst KRD
Sampling Location DRYER'S OUT
Analysis Date(s) 6/17, 6/18, 6/20
Sampling Date 6/15/94
Cleanup Reagent(s)
Test Number T1, T2
LDMS Entry Initials
Project Number 940617.500
LDMS Validation 6.22-94 Initials Jme

Sample No. 13081.8	Sample No. 13082.6	Sample No. 13083.4
Run Number T1R2	Run Number T2R1	Run Number T2R2
Dish Number JJL	Dish Number TDS	Dish Number DON
Reagent Vol. 10 ml	Reagent Vol. 175 ml	Reagent Vol. 175 ml
Date/Time 6/18/94 1600	Date/Time 6/18/94 1600	Date/Time 6/18/94 1600
Gross Weight 97.9438 g	Gross Weight 97.1128 g	Gross Weight 102.4689 g
Date/Time 6/20/94 0830	Date/Time 6/20/94 0830	Date/Time 6/20/94 0830 102.469
Gross Weight 97.9436 g	Gross Weight 97.1123 g	Gross Weight 102.4693 g
Avg. Gross Wt. 97.9437 g	Avg. Gross Wt. 97.1126 g	Avg. Gross Wt. 102.4691 g
Dish Tare Wt. 97.9351 g	Dish Tare Wt. 97.0484 g	Dish Tare Wt. 102.3464 g
Difference 0.0086 g	Difference 0.0642 g	Difference 0.1227 g
Blank Weight 0.001 g	Blank Weight 0.001 g	Blank Weight 0.001 g
Particulate In Rinse Weight 0.0076 ~~0.0085~~ KRD 6/20/94 g	Particulate In Rinse Weight 0.0632 g	Particulate In Rinse Weight 0.1217 g
Transfer "Particulate In Rinse Weight" to Box Number 1.	Transfer "Particulate In Rinse Weight" to Box Number 2.	Transfer "Particulate In Rinse Weight" to Box Number 3.
PW 1 0.0076 g	PW 2 0.0632 g	PW 3 0.1217 g

AS 105 A

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INORGANIC LABORATORY

EPA Method 5 Particulate Gravimetric Sheet

Particulate On Filter

Project LOUISIANA PACIFIC
Sampling Location DRYERS OUT
Sampling Date 6/15/94
Test Number T1, T2
Project Number 940617.800

Analyst KAB
Analysis Date(s) 6/17/94
Filter Type FIBERGLASS, METAL THIMBEL
LDMS Entry _____ Initials ____
LDMS Validation 6.22.94 Initials JME

Sample No. 13081.8	Sample No. 13082.6	Sample No. 13083.4
Run Number T1R2	Run Number T2R1	Run Number T2R2
Filter Number #5	Filter Number 3084	Filter Number 3215
Date/Time 6/17/94 1630	Date/Time 6/17/94 1630	Date/Time 6/17/94 1630
Gross Weight 42.3256 g	Gross Weight 0.8998 g	Gross Weight 1.0650 g
Date/Time _____	Date/Time _____	Date/Time _____
Gross Weight _____ g	Gross Weight _____ g	Gross Weight _____ g
Avg. Gross Wt. 42.3256 g	Avg. Gross Wt. 0.8998 g	Avg. Gross Wt. 1.0650 g
Filter Tare Wt. 42.1703 g	Filter Tare Wt. 0.67375 g	Filter Tare Wt. 0.66579 g
Difference 0.1553 g	Difference 0.2260 g	Difference 0.3992 g
Particulate On Filter Weight 0.1553 g	Particulate On Filter Weight 0.2260 g	Particulate On Filter Weight 0.3992 g
Transfer "Particulate On Filter Weight" to Box Number 1.	Transfer "Particulate On Filter Weight" to Box Number 2.	Particulate On Filter Weight" to Box Number 3.
Sum particulate weights from each box labeled "1" and record in box labeled "T1."	Sum particulate weights from each box labeled "2" and record in box labeled "T2."	Sum particulate weights from each box labeled "3" and record in box labeled "T3."
AF 1 0.1553 g	AF 2 0.2260 g	AF 3 0.3992 g
Total T1 0.2919 g	Total T2* ~~0.3961~~ 0.4015 g	Total T3* ~~0.6697~~ 0.6772 ~~0.6494~~ g

AS 105 A

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REPORT OF LABORATORY ANALYSIS

Louisiana Pacific
Route 8, Box 8030
Hayward, WI 54843

June 27, 1994
PACE Project Number: 940617500

Attn: Ms. Susan Somers

Client Reference: L.P. Hayward

PACE Sample Number:			10 0130770	10 0130788	10 0130796
Date Collected:			06/15/94	06/15/94	06/15/94
Date Received:			06/17/94	06/17/94	06/17/94
Client Sample ID:			Line 2 Core Dryer Out. T1R1	Line 1 Core Dryer Out. T1R2	Line 2 EFB Core Dryer Out. T1R1
Parameter	Units	MDL			
INORGANIC ANALYSIS					
EPA 5: TOTAL PARTICULATE EMISSIONS					
Particulates, filter	g	0.0001	0.3924	0.2065	0.1335
Particulates, probe wash	g	0.0001	0.0809	0.0595	0.0061
Particulates, Inorganic Residuals	g	0.0001	0.1067	0.0600	0.0567
Particulates, Organic Condensibles	g	0.0001	0.0479	0.0271	0.0256
Particulates, total-EPA 5	g	0.0001	0.6279	0.3531	0.2239

1710 Douglas Drive North
Minneapolis, MN 55422
TEL: 612-544-5543
FAX: 612-525-3377

REPORT OF LABORATORY ANALYSIS

Ms. Susan Somers
Page 2

June 27, 1994
PACE Project Number: 940617500

Client Reference: L.P. Hayward

Parameter	Units	MDL	10 0130818 Line 1 EFB Core Dryer Out. T1R2	10 0130826 Line 2 Surf Dryer Out. T2R1	10 0130834 Line 1 Surf Dryer Out. T2R2
PACE Sample Number:					
Date Collected:			06/15/94	06/15/94	06/15/94
Date Received:			06/17/94	06/17/94	06/17/94
Client Sample ID:					
INORGANIC ANALYSIS					
EPA 5: TOTAL PARTICULATE EMISSIONS					
Particulates, filter	g	0.0001	0.1553	0.226	0.3992
Particulates, probe wash	g	0.0001	0.0076	0.0632	0.1217
Particulates, Inorganic Residuals	g	0.0001	0.0934	0.07	0.1081
Particulates, Organic Condensibles	g	0.0001	0.0356	0.0423	0.0482
Particulates, total-EPA 5	g	0.0001	0.2919	0.4015	0.6772

1710 Douglas Drive North
Minneapolis, MN 55422
TEL: 612-544-5543
FAX: 612-525-3377

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REPORT OF LABORATORY ANALYSIS

Ms. Susan Somers
Page 3

June 27, 1994
PACE Project Number: 940617500

Client Reference: L.P. Hayward

Parameter	Units	MDL	10 0130850 Line 2 EFB Surf Dryer Out. T2R1	10 0130869 Line 1 EFB Surf Dryer Out. T2R2
PACE Sample Number:				
Date Collected:			06/15/94	06/15/94
Date Received:			06/17/94	06/17/94
Client Sample ID:				
INORGANIC ANALYSIS				
EPA 5: TOTAL PARTICULATE EMISSIONS				
Particulates, filter	g	0.0001	0.0681	0.1455
Particulates, probe wash	g	0.0001	0.0057	0.0069
Particulates, Inorganic Residuals	g	0.0001	0.0457	0.0739
Particulates, Organic Condensibles	g	0.0001	0.0145	0.0280
Particulates, total-EPA 5	g	0.0001	0.134	0.2543

These data have been reviewed and are approved for release.

Mary Jo Connolly
Project Manager

1710 Douglas Drive North
Minneapolis, MN 55422
TEL: 612-544-5543
FAX: 612-525-3377

Ms. Susan Somers
Page 4

FOOTNOTES
for pages 1 through 3

June 27, 1994
PACE Project Number: 940617500

Client Reference: L.P. Hayward

MDL Method Detection Limit

1710 Douglas Drive North
Minneapolis, MN 55422
TEL: 612-544-5543
FAX: 612-525-3377

APPENDIX C

Calculation Equations and Report Nomenclature

Louisiana - Pacific Corporation
Hayward, Wisconsin
PACE Project No. 940614.401

PACE Incorporated
June 22, 1994

APPENDIX C
METHOD 5 CALCULATION SUMMARY

Line No. 1 EFB Outlet

Parameter	**Run 2**	**Run 2**
Date of Run	6/16/94	6/16/94
Sample Duration (Minutes)	60	60
Barometric Pressure (inches Hg)	28.63	28.63
Static Pressure Of Duct (Inches H2O)	6	6
Absolute Pressure Of Duct (Inches Hg)	29.07	29.07
Meter Coefficient	1.0044	1.0044
Pitot Tube Coefficient	0.843	0.843
Nozzle Diameter (Inches)	0.235	0.235
Area Of Nozzle Opening (Square Feet)	0.000301	0.000301
Average $\sqrt{\Delta P}$	0.9886	0.9740
Average ΔH	1.55	1.52
Average Stack Temperature (°R)	702.00	694.83
Average Meter Temperature (°R)	552.08	538.96
Meter Volume (Cubic Feet)	45.12	44.16
Dry Standard Sample Volume (Cubic Feet)	41.64	41.74
Collected Condensate Volume (mls)	323.0	306.0
Volume Of Water Vapor (Standard Cubic Feet)	15.20	14.40
Moisture Content Of Flue Gas (% v/v)	26.75	25.65
Weight Of Particulate (mg)	291.9	254.3
Particulate Concentration (GR/DSCF)	0.10818627	0.09401762
Source Gas Velocity (Feet Per Second)	68.3	66.8
Isokinetic Variation (%)	105.1	105.1

Louisiana - Pacific Corporation
Hayward, Wisconsin
PACE Project No. 940614.401

PACE Incorporated
June 22, 1994

APPENDIX C
METHOD 5 CALCULATION SUMMARY

Line No. 1 Dryers

Parameter	Core Dryer	Surface Dryer
Date of Run	6/16/94	6/16/94
Sample Duration (Minutes)	54	60
Barometric Pressure (inches Hg)	28.63	28.63
Static Pressure Of Duct (Inches H2O)	-8.2	-9
Absolute Pressure Of Duct (Inches Hg)	28.03	27.97
Meter Coefficient	0.9992	0.9992
Pitot Tube Coefficient	0.835	0.835
Nozzle Diameter (Inches)	0.198	0.198
Area Of Nozzle Opening (Square Feet)	0.000214	0.000214
Average $\sqrt{\Delta P}$	1.1578	1.2121
Average ΔH	0.95	1.09
Average Stack Temperature (°R)	705.89	707.35
Average Meter Temperature (°R)	554.03	534.80
Meter Volume (Cubic Feet)	29.65	36.66
Dry Standard Sample Volume (Cubic Feet)	27.08	34.70
Collected Condensate Volume (mls)	160.0	312.0
Volume Of Water Vapor (Standard Cubic Feet)	7.53	14.69
Moisture Content Of Flue Gas (% v/v)	21.76	29.74
Weight Of Particulate (mg)	353.1	677.2
Particulate Concentration (GR/DSCF)	0.20119692	0.30114642
Source Gas Velocity (Feet Per Second)	80.1	85.4
Isokinetic Variation (%)	89.1	107.7

Louisiana - Pacific Corporation
Hayward, Wisconsin
PACE Project No. 940614.401

PACE Incorporated
June 22, 1994

APPENDIX C
METHOD 5 CALCULATION SUMMARY

Line No. 2 EFB Outlet

Parameter	**Run 1**	**Run 1**
Date of Run	6/16/94	6/16/94
Sample Duration (Minutes)	60	39
Barometric Pressure (inches Hg)	28.63	28.63
Static Pressure Of Duct (Inches H2O)	-5	-5
Absolute Pressure Of Duct (Inches Hg)	28.26	28.26
Meter Coefficient	0.9942	0.9942
Pitot Tube Coefficient	0.843	0.843
Nozzle Diameter (Inches)	0.239	0.239
Area Of Nozzle Opening (Square Feet)	0.000312	0.000312
Average $\sqrt{\Delta P}$	1.0735	1.1095
Average ΔH	1.96	2.09
Average Stack Temperature (°R)	680.75	682.00
Average Meter Temperature (°R)	553.46	551.44
Meter Volume (Cubic Feet)	50.34	33.76
Dry Standard Sample Volume (Cubic Feet)	45.92	30.92
Collected Condensate Volume (mls)	284.0	182.0
Volume Of Water Vapor (Standard Cubic Feet)	13.37	8.57
Moisture Content Of Flue Gas (% v/v)	22.55	21.70
Weight Of Particulate (mg)	221.9	134.0
Particulate Concentration (GR/DSCF)	0.07457647	0.06688604
Source Gas Velocity (Feet Per Second)	73.6	75.9
Isokinetic Variation (%)	98.1	97.6

Louisiana - Pacific Corporation
Hayward, Wisconsin
PACE Project No. 940614.401

PACE Incorporated
June 22, 1994

APPENDIX C
METHOD 5 CALCULATION SUMMARY

Line No. 2 Dryers

Parameter	Core Dryer Outlet	Surface Outlet
Date of Run	6/16/94	6/16/94
Sample Duration (Minutes)	60	36
Barometric Pressure (inches Hg)	28.63	28.63
Static Pressure Of Duct (Inches H2O)	-16	-14.2
Absolute Pressure Of Duct (Inches Hg)	27.45	27.59
Meter Coefficient	1.0044	1.0044
Pitot Tube Coefficient	0.835	0.835
Nozzle Diameter (Inches)	0.2	0.2
Area Of Nozzle Opening (Square Feet)	0.000218	0.000218
Average $\sqrt{\Delta P}$	1.3010	1.4328
Average ΔH	1.36	1.76
Average Stack Temperature (°R)	679.58	677.67
Average Meter Temperature (°R)	562.96	564.25
Meter Volume (Cubic Feet)	43.15	28.89
Dry Standard Sample Volume (Cubic Feet)	39.03	26.10
Collected Condensate Volume (mls)	185.0	161.0
Volume Of Water Vapor (Standard Cubic Feet)	8.71	7.58
Moisture Content Of Flue Gas (% v/v)	18.24	22.50
Weight Of Particulate (mg)	627.9	401.5
Particulate Concentration (GR/DSCF)	0.24825483	0.23739543
Source Gas Velocity (Feet Per Second)	88.6	98.1
Isokinetic Variation (%)	96.3	101.4

Calculation Equations

Nomenclature

A	= Cross-sectional area of duct
A_n	= Cross-sectional area of nozzle
B_{ws}	= Water vapor in gas stream, proportion by volume
C_a	= Particulate concentration, actual, wet basis - GR/ACF
C_p	= Pitot tube calibration coefficient
C_s	= Particulate concentration at dry standard conditions - GR/DSCF
%EA	= Excess air, percent by volume
F_o	= Fuel factor
G_d	= Specific gravity relative to air, dimensionless
I	= Isokinetic variation, percent by volume
M_d	= Molecular weight of flue gas, dry, lb/lb-mole
m_g	= Mass flow of wet flue gas, LB/HR
m_n	= Total particulate collected, grams
m_p	= Particulate mass flow, LB/HR
M_s	= Molecular weight of flue gas, wet, lb/lb-mole
P_b	= Barometric pressure, uncompensated, inches of mercury
P_g	= Static pressure of duct, inches of water
P_s	= Absolute gas pressure of duct, inches of mercury
Q	= Actual flue gas volumetric flow rate, ACFM
Q_{sd}	= Dry flue gas volumetric flow rate corrected to standard conditions, DSCFM
$\overline{T_m}$	= Average dry gas meter temperature, °R
$\overline{T_s}$	= Average stack gas temperature, °R
Ø	= Total sampling time, minutes
V_{lc}	= Total volume of liquid collected in impingers and desiccant, ml
V_m	= Volume of gas sample measured by gas meter, cubic feet
V_{std}	= Volume of gas sample corrected to standard conditions, dry standard cubic feet
V_w	= Volume of water vapor in gas sample, corrected to standard conditions
V_s	= Linear velocity of flue gas, feet per second
Y	= Dry gas meter calibration factor
ΔH	= Orifice meter differential pressure, inches of water
ΔP	= Velocity pressure of flue gas, inches of water
ß	= Actual gas density, pounds per cubic foot

Calculation Equations

EPA Method 2 Calculations

Flue Gas Linear Velocity

$$V_s = 85.49 \times C_p \times \overline{\sqrt{\Delta P}} \times \sqrt{\frac{\overline{T_s}}{P_s \times M_s}}$$

Volumetric Flow Rates - ACFM, SCFM & DSCFM

$$Q = 60 \times v_s \times A$$

$$Q_s = Q \times \left(\frac{528}{T_s}\right) \times \left(\frac{P_s}{29.92}\right) = Q \times 17.647 \times \left(\frac{P_s}{T_s}\right)$$

$$Q_{sd} = Q_s \times (1 - B_{ws})$$

Mass Flow Rate of Wet Flue Gas

$$m_g = \frac{4.995 \times Q_{sd} \times G_d}{1 - B_{ws}}$$

Actual Gas Density

$$\rho = \frac{0.04585 \times P_s \times M_s}{\overline{T_s}}$$

Where:

A	=	Cross-sectional area of duct at sample point (sq. ft.).
B_{ws}	=	Water vapor in gas stream (proportion by volume).
C_p	=	Pitot tube calibration coefficient.
G_d	=	Flue gas specific gravity relative to air, dimensionless.
m_g	=	Mass flow rate of wet flue gas (LB/HR).
M_s	=	Molecular weight of wet flue gas (LB/LB-mole).
P_s	=	Absolute gas pressure of duct (Inches Hg).
ΔP	=	Velocity pressure measured by pitot tube (Inches WC).
Q	=	Actual flue gas volumetric flow rate (ACFM).
Q_s	=	Volumetric gas flow at standard conditions (SCFM).
Q_{sd}	=	Dry standard volumetric gas flow rate (DSCFM).
T_s	=	Flue gas temperature (°R).
V_s	=	Flue gas linear velocity (feet per second).
ρ	=	Actual flue gas density (LB/CF).

Calculation Equations

EPA Method 3 Calculations

Dry Molecular Weight of Flue Gas

$$M_d = (0.44 \times \%CO_2) + (0.32 \times \%O_2) + (0.28 \times (\%N_2 + \%CO))$$

Wet Molecular Weight of Flue Gas

$$M_s = M_d \times (1 - B_{ws}) + (18 \times B_{ws})$$

Percent Excess Air

$$\%EA = 100 \times \left(\frac{\%O_2 - (0.05 \times \%CO)}{(0.264 \times \%N_2) - \%O_2 + (0.5 \times \%CO)} \right)$$

Fuel F-factor (for comparison)

$$F_o = \frac{20.9 - \%O_2}{\%CO_2}$$

Where:

B_{ws}	=	Water vapor in gas stream (proportion by volume).
%CO	=	Carbon monoxide in gas stream (percent).
$\%CO_2$	=	Carbon dioxide in gas stream (percent).
%EA	=	Excess air for combustion (percent).
F_o	=	Fuel F-factor for results comparison.
M_d	=	Molecular weight of dry flue gas (LB/LB-mole).
M_s	=	Molecular weight of wet flue gas (LB/LB-mole).
$\%N_2$	=	Nitrogen in gas stream (percent).
$\%O_2$	=	Oxygen in gas stream (percent).

Calculation Equations

EPA Method 4 Calculations

Sample Volume, Standard Conditions

$$V_{std} = 17.647 \times V_m \times Y \times \left(\frac{P_b + \frac{\overline{\Delta H}}{13.6}}{\overline{T_m}} \right)$$

Volume of Water Vapor Sampled

$$V_w = 0.047070 \times V_{lc}$$

Proportion of Water Vapor in Sampled Gas

$$B_{ws} = \frac{V_w}{V_w + V_{std}}$$

Where:

B_{ws}	=	Water vapor in gas stream (proportion by volume).
ΔH	=	Orifice meter differential pressure (Inches WC).
P_b	=	Barometric pressure (Inches Hg).
T_m	=	Sampling train meter temperature (°R).
V_{lc}	=	Total volume of liquid collected in sampling train (mls).
V_m	=	Volume of gas sample measured by gas meter (CF).
V_{std}	=	Gas volume corrected to standard conditions (DSCF).
V_w	=	Volume of water vapor in gas sample (SCF).
Y	=	Dry gas meter calibration coefficient.

Calculation Equations

EPA Method 5 Calculations

Sample Volume, Standard Conditions

$$V_{std} = 17.647 \times V_m \times Y \times \left(\frac{P_b + \frac{\overline{\Delta H}}{13.6}}{\overline{T_m}} \right)$$

Isokinetic Variation

$$I = 0.09450 \times \left(\frac{\overline{T_s} \times V_m}{P_s \times V_s \times A_n \times \theta \times (1 - B_{ws})} \right)$$

Particulate Concentration

$$C_s = 15.432 \times \left(\frac{m_n}{V_{std}} \right)$$

Particulate Mass Rate

$$m_p = 0.008571 \times C_s \times Q_{sd}$$

Where:

A_n	=	Cross-sectional area of nozzle opening (square feet).
B_{ws}	=	Water vapor in gas stream (proportion by volume).
C_s	=	Particulate concentration of gas stream (GR/DSCF).
ΔH	=	Orifice meter differential pressure (Inches WC).
I	=	Isokinetic variation of sampling rate (percent).
m_n	=	Total particulate collected in sampling train (grams).
m_p	=	Particulate mass flow rate (LB/HR).
P_b	=	Barometric pressure (Inches Hg).
P_s	=	Absolute gas pressure of duct (Inches Hg).
Q_{sd}	=	Dry standard volumetric gas flow rate (DSCFM).
T_m	=	Sampling train meter temperature (°R).
T_s	=	Flue gas temperature (°R).
V_m	=	Volume of gas sample measured by gas meter (CF).
V_{std}	=	Gas volume corrected to standard conditions (DSCF).
V_s	=	Flue gas linear velocity (feet per second).
Y	=	Dry gas meter calibration coefficient.
θ	=	Total sampling time of run (minutes).

APPENDIX D

Test Procedures

OXYGEN AND CARBON DIOXIDE CONCENTRATION (ORSAT)

Integrated gas samples are collected in 40 liter Tedlar™ bags and ultimately transferred to an Orsat gas analyzer for oxygen and carbon dioxide analyses. A PACE sampling train which meets or exceeds the specifications of EPA Method 3, 40 CFR 60, Appendix A is used to collect gas samples. Normally, gas samples are collected at the exhaust of an EPA Method 4 or 5 sampling train since this gas stream is moisture conditioned. Method 4 and 5 sampling equipment is maintained and checked to assure no leaks occur between the flue and the integrated gas sampler.

Gas samples are collected by drawing a portion of the stream through a chemically resistant diaphragm pump and delivering it to the Tedlar™ bag at a constant, settable rate depending on expected sampling time. At the conclusion of sampling, the bag and associated hardware is sealed and labeled. When multiple tests are to be performed, gas samples are often transferred to glass gas collection tubes for storage. A portable oxygen analyzer is used for this to ensure sample integrity.

Samples are analyzed by chemical absorption using an Orsat gas analyzer. Following positive and negative leak checks of the gas analyzer, the system is purged with the gas to be analyzed. The burret is filled with approximately 100 mls of sample gas and the exact volume recorded. The sample line stopcock is closed and the stopcock for the first bubbler containing carbon dioxide absorbent is opened. Several passes are made, bubbling the sample gas through the reagent and the absorbent is returned to the initial mark. The new volume of the burret is recorded and an additional 1-2 passes are made to verify total absorption. Similar procedures are used to quantify oxygen with the same gas aliquot and oxygen absorbent.

PARTICULATE LOADINGS AND EMISSION RATES

Particulate emission rates were determined in accordance with EPA Methods 1-5, 40 CFR 60, Appendix A. Using traverse points determined with EPA Method 1, a preliminary velocity profile was obtained with respect to the velocity traverse, gas temperature, gas pressure and estimated moisture content. From this data sampling nozzles of the appropriate diameter to ensure isokinetic sampling were selected.

The particulate sampling train consists of a temperature controlled glass lined sampling probe equipped with a S-type pitot tube and Type K thermocouples to monitor stack temperature and probe liner temperature. The sampling probe is attached to a sample module which houses an all glass in-line filter and cyclone assembly in a temperature controlled oven. The back half of the sampling train consists of a series of three glass impingers followed by a tared desiccant-packed drying column. The sample train is connected by means of a control and sampling umbilical cord to the control module. The control module houses a temperature monitored dry test gas meter, a calibrated orifice, dual inclined manometers, temperature controllers, and necessary flow rate control devices.

Particulate samples are collected by isokinetically extracting a sample gas stream from the flue by means of the sampling probe and passing the stream through the cyclone which collects larger, heavier particles. The sample gas stream then passes through a 4 inch diameter Gelman Type A/E glass fiber filter to collect finer particulates. The filter is followed by an ice-cooled impinger train and a desiccant packed drying column which quantitatively collects all moisture from the sample gas stream. The gas then passes through a leak proof rotary vane sampling pump and a dry test gas meter which integrates the sample volume throughout the course of the test. A calibrated orifice is connected to the gas meter outlet to facilitate sample flow rate adjustment.

Representative particulate samples are collected by sampling the centroid of equal area sections of the duct for equal time periods. The sampling rate is adjusted at each traverse point to ensure isokinetic sampling. Pre-programmed

field computers are used to facilitate rapid determination of the correct sampling rate.

Integrated gas samples are collected concurrently with particulate samples to determine a representative gas composition of the flue gas. Gas samples are collected in Tedlar™ bags throughout the course of the particulate run and analyzed with an Orsat gas analyzer.

At the end of each particulate run, the sampling train is disassembled and the samples recovered. The sampling filter is transferred from the filter holder to its dedicated petri dish. The probe nozzle is acetone rinsed, brushed, rinsed again and the washings placed in a uniquely labeled polyethylene container. The probe is similarly cleaned; acetone rinsed, brushed several times, rinsed again and the washing transferred to the same polyethylene container. The filter holder and cyclone are wiped free of silicone grease, acetone rinsed, brushed, rinsed and these washings added to the probe wash container. The container is tightly capped and the liquid level marked for transport. The impinger catch volume is determined to the nearest milliliter using a graduated cylinder. If the impinger catch is to be analyzed it is transferred to a separate polyethylene container, capped, and the liquid level marked. The desiccant-packed drying column is weighed in the field to the nearest 0.5 g and the weight of absorbed moisture added to the condensate for moisture calculations.

Particulate samples are transported back to the laboratory, logged in, and prepared for analyses. Filters are desiccated for 24 hours and weighed to a constant weight and the results recorded to the nearest 0.1 mg. Probe wash samples are evaporated at ambient temperatures to dryness in tared evaporating dishes. They are then desiccated for 24 hours and weighed to a constant weight. Results are reported to the nearest 0.1 mg.

WET CATCH ANALYSIS - ORGANIC CONDENSIBLES

Particulate concentrations reported in this document include gravimetric results of both the dry catch and the organic wet catch. Organic condensibles were collected in a series of three ice-cooled all-glass impingers in the back half of the Method 5 sampling train. The first two impingers were initially prepared with 100 mls of deionized water in each and the third impinger was dry. After sampling, the volume of condensate in the impingers was determined and the contents transferred to an air-tight polyethylene sample container.

The wet catch was analyzed for condensible organic particulate with the chloroform/diethyl ether extraction. Three 25 ml portions of chloroform and three 25 ml portions of diethyl ether were used to extract condensed organics from the impinger catches (wet catch). The extractions were evaporated at room temperature and desiccated to a constant weight. Gravimetric results were then added to dry catch results to calculate particulate concentrations.

WET CATCH ANALYSES - INORGANIC RESIDUE

Particulate concentrations reported in this document include gravimetric results of both the dry catch and the wet catch. A series of three ice-cooled all-glass impingers was used in the back half of the Method 5 train to collect moisture, dissolved solids and extremely fine particulates. Each of the first two impingers were initially prepared with 100 mls of deionized distilled water and the third impinger was dry. After sampling, the volume of condensate in the impingers was determined and the contents transferred to an air-tight polyethylene container.

The wet catch samples were analyzed by evaporating in a tared beaker at a temperature less than 180 °F. After samples were evaporated to dryness, they were desiccated for 24 hours then weighed to a constant weight. Gravimetric results were then added to dry catch results to calculate particulate concentrations.

APPENDIX E

Quality Assurance Data

SAMPLING TRAIN CALIBRATION DATA

Louisiana-Pacific Corporation
Hayward, Wisconsin
PACE Project No. 940614.401

PACE Incorporated
July 14, 1994

Air Sampling Department Calibration Report

Sampling Nozzle Calibration Data

Nozzle Number : 3-1

Date of Calibration : 5/20/94

Calibration Technician: M. Wilson

Measurement Position	Diameter Inches
1	0.201
2	0.199
3	0.198
4	0.201
5	0.199
Average	0.200

The sampling nozzle is rotated and measured at 36 degree Increments. Diameters are measured to the nearest 0.001". All measurements must be within a range of 0.004".

Louisiana-Pacific Corporation
Hayward, Wisconsin
PACE Project No. 940614.401

PACE Incorporated
July 14, 1994

Air Sampling Department Calibration Report

Sampling Nozzle Calibration Data

Nozzle Number : 3-2

Date of Calibration : 5/20/94

Calibration Technician: M. Wilson

Measurement Position	Diameter Inches
1	0.238
2	0.240
3	0.239
4	0.239
5	0.238
Average	0.239

The sampling nozzle is rotated and measured at 36 degree Increments. Diameters are measured to the nearest 0.001". All measurements must be within a range of 0.004".

Louisiana-Pacific Corporation
Hayward, Wisconsin
PACE Project No. 940614.401

PACE Incorporated
July 14, 1994

Air Sampling Department Calibration Report

Sampling Nozzle Calibration Data

Nozzle Number : 4-1

Date of Calibration : 5/20/94

Calibration Technician: M. Wilson

Measurement Position	Diameter Inches
1	0.197
2	0.199
3	0.199
4	0.198
5	0.197
Average	0.198

The sampling nozzle is rotated and measured at 36 degree Increments. Diameters are measured to the nearest 0.001". All measurements must be within a range of 0.004".

Louisiana-Pacific Corporation
Hayward, Wisconsin
PACE Project No. 940614.401

PACE Incorporated
July 14, 1994

Air Sampling Department Calibration Report

Pitot Tube Calibration Data

Pitot Tube Number : 2

Date of Calibration : 7/7/93

Calibration Technician: K. Lattery

A Side Calibration

Calibration Trial No.	ΔP(standard) Inches WC	ΔP(S-type) Inches WC	Pitot Coefficient
1	0.505	0.715	0.832
2	0.795	1.120	0.834
3	1.100	1.530	0.839
4	1.290	1.820	0.833
		A Side Average	0.835

B Side Calibration

Calibration Trial No.	ΔP(standard) Inches WC	ΔP(S-type) Inches WC	Pitot Coefficient
1	0.500	0.705	0.834
2	0.790	1.115	0.833
3	1.120	1.560	0.839
4	1.295	1.830	0.833
		B Side Average	0.835
		Pitot Tube Coefficient	**0.835**

Louisiana-Pacific Corporation
Hayward, Wisconsin
PACE Project No. 940614.401

PACE Incorporated
July 14, 1994

Air Sampling Department Calibration Report

Pitot Tube Calibration Data

Pitot Tube Number : 24

Date of Calibration : 6/8/93

Calibration Technician: K. Lattery

A Side Calibration

Calibration Trial No.	ΔP(standard) Inches WC	ΔP(S-type) Inches WC	Pitot Coefficient
1	0.480	0.675	0.835
2	0.800	1.095	0.846
3	1.135	1.560	0.844
4	1.325	1.850	0.838
		A Side Average	0.841

B Side Calibration

Calibration Trial No.	ΔP(standard) Inches WC	ΔP(S-type) Inches WC	Pitot Coefficient
1	0.490	0.675	0.843
2	0.795	1.085	0.847
3	1.110	1.540	0.840
4	1.345	1.840	0.846
		B Side Average	0.844
		Pitot Tube Coefficient	**0.843**

Louisiana-Pacific Corporation
Hayward, Wisconsin
PACE Project No. 940614.401

PACE Incorporated
July 14, 1994

Air Sampling Department Calibration Report

Pitot Tube Calibration Data

Pitot Tube Number : 8

Date of Calibration : 3/19/94

Calibration Technician: M. McDermott

A Side Calibration

Calibration Trial No.	ΔP(standard) Inches WC	ΔP(S-type) Inches WC	Pitot Coefficient
1	0.485	0.665	0.845
2	0.800	1.105	0.842
3	1.095	1.510	0.843
4	1.300	1.800	0.841
		A Side Average	0.843

B Side Calibration

Calibration Trial No.	ΔP(standard) Inches WC	ΔP(S-type) Inches WC	Pitot Coefficient
1	0.490	0.680	0.840
2	0.800	1.110	0.840
3	1.100	1.525	0.841
4	1.305	1.810	0.841
		B Side Average	0.841
		Pitot Tube Coefficient	**0.842**

Louisiana-Pacific Corporation
Hayward, Wisconsin
PACE Project No. 940614.401

PACE Incorporated
July 14, 1994

Air Sampling Section Calibration Report

Dry Test Meter and Orifice Calibration Data

Control Module Number : C-7

Calibration Technician: M.Wilson

Date of Calibration : 5/20/94

Barometric Pressure : 29.00

Orifice Diff. Press., ΔH Inches WC	Dry Test Meter Vol. Cubic Ft.	Wet Test Meter Vol. Cubic Ft.	Dry Test Meter Temperatures, °F		Wet Test Meter Temp., °F	Elapsed Time Minutes	Gas Meter Coefficient ∂	Orifice Coefficient ΔH@
			Inlet	Outlet				
0.50	5.040	5.000	81.0	88.5	74.5	12.156	1.0098	1.683
1.00	5.050	5.000	81.0	88.0	74.5	8.579	1.0061	1.678
1.75	5.080	5.000	81.5	93.5	74.5	6.550	1.0037	1.694
2.50	10.200	10.000	84.0	97.0	74.5	10.947	1.0034	1.680
3.50	10.240	10.000	85.5	97.5	74.5	9.341	0.9988	1.711

Average Meter Coefficient 1.0044

Average Orifice Coefficient 1.689

Louisiana-Pacific Corporation
Hayward, Wisconsin
PACE Project No. 940614.401

PACE Incorporated
July 14, 1994

Air Sampling Section Calibration Report

Dry Test Meter and Orifice Calibration Data

Control Module Number : C-5

Calibration Technician: M.Wilson

Date of Calibration : 5/26/94

Barometric Pressure : 28.95

Orifice Diff. Press., ΔH Inches WC	Dry Test Meter Vol. Cubic Ft.	Wet Test Meter Vol. Cubic Ft.	Dry Test Meter Temperatures, °F		Wet Test Meter Temp., °F	Elapsed Time Minutes	Gas Meter Coefficient ∂	Orifice Coefficient ΔH@
			Inlet	Outlet				
0.50	5.090	5.000	80.5	74.0	69.5	12.062	0.9954	1.673
1.00	5.080	5.000	82.5	74.0	69.5	8.655	0.9980	1.723
1.75	5.010	5.000	80.0	70.5	70.0	6.636	1.0034	1.787
2.50	10.080	10.000	84.0	72.0	69.5	11.184	1.0016	1.805
3.50	10.120	10.000	85.0	73.5	69.5	9.481	0.9975	1.810

Average Meter Coefficient 0.9992

Average Orifice Coefficient 1.760