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STATIONARY SOURCE SAMPLING REPORT

REFERENCE NO. 15575B

ROXBORO OSB PLANT
ROXBORO, NORTH CAROLINA

EMISSIONS TESTING FOR:

CARBON MONOXIDE

CHROMIUM

NITROGEN OXIDES

TOTAL HYDROCARBONS

RTO NOS. 1, 2, AND 3

PERFORMED FOR: LOUISIANA-PACIFIC CORPORATION

AUGUST 1996

REPORT CERTIFICATION

El Reference Number 15575B

The sampling and analysis performed for this report were carried out under my direction and supervision, and I hereby certify that, to the best of my knowledge, the test report is authentic and accurate.

Signature: _____

Carl F. Fink

Date: _____

9-20-96

Carl F. Fink
Project Director
Client Services Division

Table of Contents

LIST OF TABLES AND FIGURES	iv
1.0 INTRODUCTION	1-1
1.1 Background	1-1
1.2 Outline of Test Program	1-1
1.3 Test Participants	1-1
2.0 SUMMARY OF RESULTS	2-1
2.1 Presentation	2-1
2.2 Dryer Exhausts Flue Gas Composition	2-1
2.3 Dryer Exhausts Moisture Content	2-1
2.4 Aborted Runs	2-1
2.5 RTO Stack Results	2-1
2.6 Chromium Results	2-1
3.0 PROCESS DESCRIPTION AND OPERATION	3-1
3.1 General	3-1
3.2 Source Air Flow	3-1
4.0 SAMPLING AND ANALYTICAL PROCEDURES	4-1
4.1 General	4-1
4.2 Sampling Points	4-1
4.3 Cyclonic Flow Check	4-1
4.4 Volumetric Air Flow Rates	4-1
4.4.1 Flue Gas Velocity	4-1
4.4.2 Flue Gas Composition	4-5
4.4.3 Flue Gas Moisture Content	4-5
4.5 Emissions Determinations	4-5
4.5.1 Carbon Dioxide, Oxygen, Carbon Monoxide, Nitrogen Oxides, and Total Hydrocarbons	4-5
4.5.2 Chromium	4-7
4.6 Equipment Calibration	4-8
5.0 QUALITY ASSURANCE/QUALITY CONTROL	5-1
5.1 General	5-1
5.2 Preventive Maintenance and Equipment Calibration	5-1
5.3 Sample Processing	5-3
5.4 Instrument Calibration	5-4
5.5 Blanks and Spikes	5-4

Table of Contents (continued)

5.6 Internal/External System Audit Checks.....	5-5
5.7 Data Reduction and Validation.....	5-5
5.8 QA/QC Summary.....	5-6

APPENDIX A. TEST RESULTS

1. Dryer Exhaust No. 1	
a. Carbon Monoxide, Nitrogen Oxides, and Total Hydrocarbons	1
b. Volumetric Air Flow Rates.....	11
2. Dryer Exhaust No. 2	
a. Carbon Monoxide, Nitrogen Oxides, and Total Hydrocarbons	17
b. Volumetric Air Flow Rates.....	27
3. Dryer Exhaust No. 3	
a. Carbon Monoxide, Nitrogen Oxides, and Total Hydrocarbons	33
b. Volumetric Air Flow Rates.....	43
4. Dryer Exhaust No. 4	
a. Carbon Monoxide, Nitrogen Oxides, and Total Hydrocarbons	47
b. Volumetric Air Flow Rates.....	57
5. Dryer Exhaust No. 5	
a. Carbon Monoxide, Nitrogen Oxides, and Total Hydrocarbons	61
b. Volumetric Air Flow Rates.....	71
6. RTO No. 3 Inlet	
a. Total Hydrocarbons	75
b. Volumetric Air Flow Rates.....	79
7. RTO No. 1 Stack	
a. Chromium.....	87
b. Carbon Dioxide and Oxygen	91
8. RTO No. 2 Stack	
a. Chromium.....	99
b. Carbon Dioxide and Oxygen	103
9. Example Calculations.....	111

APPENDIX B. FIELD DATA

1. Dryer Exhaust Nos. 1 - 5	
a. Carbon Monoxide, Nitrogen Oxides, and Total Hydrocarbons	119
b. Volumetric Air Flow Rates.....	145

Table of Contents (continued)

2. RTO No. 3 Inlet	
a. Total Hydrocarbons	163
b. Volumetric Air Flow Rates	179
3. RTO No. 1 Stack	
a. Chromium	191
b. Carbon Dioxide and Oxygen	201
4. RTO No. 2 Stack	
a. Chromium	211
b. Carbon Dioxide and Oxygen	219
5. Sampling Point Determinations and Cyclonic Flow Checks	231
 APPENDIX C. ANALYTICAL DATA	245
 APPENDIX D. CALIBRATION DATA	
1. Manual Test Methods	253
2. Instrumental Test Methods	285

List of Tables and Figures

Table Figure

1-1	-	Test Log.....	1-2
1-2	-	Test Participants.....	1-3
2-1	-	Destruction Removal Efficiency, RTO Nos. 1 and 2	2-2
2-2	-	Destruction Removal Efficiency, RTO No. 3	2-3

Run-By-Run Tests Summaries

Carbon Monoxide, Nitrogen Oxides, and Total Hydrocarbons

2-3	-	Dryer No. 1 Exhaust.....	2-4
2-4	-	Dryer No. 2 Exhaust.....	2-5
2-5	-	Dryer No. 3 Exhaust.....	2-6
2-6	-	Dryer No. 4 Exhaust.....	2-7
2-7	-	Dryer No. 5 Exhaust.....	2-8

Chromium

2-8	-	RTO No. 1 Stack	2-9
2-9	-	RTO No. 2 Stack	2-10

RTO No. 3 Inlet

2-10	-	Total Hydrocarbons	2-11
------	---	--------------------------	------

Air Flow Schematics

-	3-1	RTO Nos. 1 and 2.....	3-2
-	3-2	RTO No. 3.....	3-3

4-1	-	Sampling Points per Sampling Location.....	4-1
-----	---	--	-----

Test Locations

-	4-1	Dryer Exhausts.....	4-2
-	4-2	RTO No. 3 Inlet.....	4-3
-	4-3	RTO Nos. 1, 2, and 3 Stacks.....	4-4

5-1	-	In-House Equipment Calibration	5-2
5-2	-	Quality Assurance/Quality Control Criteria	5-6

1.0 INTRODUCTION

1.1 Background

Louisiana-Pacific Corporation has conducted a testing program to quantify specific emissions from the Regenerative Thermal Oxidizers (RTOs) at their Roxboro OSB Plant in Roxboro, North Carolina. The testing was conducted at the inlets and stacks of RTO Nos. 1, 2, and 3.

1.2 Outline of Test Program

Stationary source sampling was conducted on August 6 and 9, 1996. Table 1-1 is a test log which presents the sampling locations, sampling objectives, sampling methods, test dates, and run numbers for the test program. Several runs utilized volumetric air flow rates and/or flue gas composition data from other runs; refer to Table 1-1.

1.3 Test Participants

Table 1-2 lists the personnel involved in the test program.

TABLE 1-2
TEST PARTICIPANTS
AUGUST 1996

Louisiana-Pacific Corporation	Shane McCarthy Test Coordinator
North Carolina Dept. of Environment, Health, and Natural Resources	Stephen G. Hall Test Observer
Entropy, Inc.	Carl F. Fink Project Director
	Todd C. Meissner Project Manager
	Patrick F. Daley Sampling Team Leader
	Craig E. Haden Sampling Team Leader
	Dennis D. Holzschuh Sampling Team Leader
	Jeffrey D. Kunstling Sampling Team Leader
	William E. Morgan Sampling Team Leader
	Danny L. Speer Sampling Team Leader
	M. Todd Rogers Instrument Operator (CEM)
	Lauren A. Sherwood Instrument Operator (CEM)
	Stephen B. Wieber Instrument Operator (CEM)
	Michael G. Worthy Instrument Operator (CEM)
	Jeffrey S. Coppedge Laboratory Technician

TABLE 1-1
TEST LOG
AUGUST 1996

Test Location	Sampling Objective	Test Method	Test Date	Run Numbers	Flue Gas Composition	Volumetric Air Flow Rate
Dryer No. 1 Exhaust	O ₂ , NO _x , CO, & THC	EPA 3A, 7E, 10, & 25A	8/09	D1-CEM-1	Average of RTO Nos. 1 & 2 O ₂ /CO ₂	D1-M2-2
			8/09	D1-CEM-2		D1-M2-3
			8/09	D1-CEM-3		D1-M2-4
Dryer No. 2 Exhaust	O ₂ , NO _x , CO, & THC	EPA 3A, 7E, 10, & 25A	8/09	D2-CEM-1	Average of RTO Nos. 1 & 2 O ₂ /CO ₂	D2-M2-2
			8/09	D2-CEM-2		D2-M2-3
			8/09	D2-CEM-3		D2-M2-4
Dryer No. 3 Exhaust	NO _x , CO, & THC	EPA 7E, 10, & 25A	8/09	D3-CEM-1	Average of RTO Nos. 1 & 2 O ₂ /CO ₂	D3-M2-3
			8/09	D3-CEM-2		D3-M2-3
			8/09	D3-CEM-3		D3-M2-4
Dryer No. 4 Exhaust	NO _x , CO, & THC	EPA 7E, 10, & 25A	8/09	D4-CEM-1	Average of RTO Nos. 1 & 2 O ₂ /CO ₂	D4-M2-3
			8/09	D4-CEM-2		D4-M2-3
			8/09	D4-CEM-3		D4-M2-4
Dryer No. 5 Exhaust	NO _x , CO, & THC	EPA 7E, 10, & 25A	8/09	D5-CEM-1	Average of RTO Nos. 1 & 2 O ₂ /CO ₂	D5-M2-3
			8/09	D5-CEM-2		D5-M2-3
			8/09	D5-CEM-3		D5-M2-4
RTO No. 3 Inlet	THC	EPA 25A	8/06	I3-CEM-1	Ambient	I3-M2-1,2
			8/06	I3-CEM-2	Ambient	I3-M2-2,3
			8/06	I3-CEM-3	Ambient	I3-M2-3,4
RTO No. 1 Stack	O ₂ /CO ₂	EPA 3A	8/09	S1-CEM-1	NA	NA
			8/09	S1-CEM-2		
			8/09	S1-CEM-3		
	Chromium	EPA 29	8/09	S1-M29-1	S1-CEM-1	NA
			8/09	S1-M29-2	S1-CEM-2	
			8/09	S1-M29-3	S1-CEM-3	
RTO No. 2 Stack	O ₂ /CO ₂	EPA 3A	8/09	S2-CEM-1	NA	NA
			8/09	S2-CEM-2		
			8/09	S2-CEM-3		
	Chromium	EPA 29	8/09	S2-M29-1	S2-CEM-1	NA
			8/09	S2-M29-2	S2-CEM-2	
			8/09	S2-M29-3	S2-CEM-3	

TABLE 2-1
DESTRUCTION REMOVAL EFFICIENCY
THREE-RUN AVERAGES
RTO NOS. 1 AND 2
AUGUST 1996

	Carbon Monoxide	Nitrogen Oxides as NO ₂	Total Hydrocarbons	Chromium ⁽¹⁾
INLETS				
Emission Rate, lb/hr				
Dryer No. 1 Exhaust	30.5	7.69	57.3	NA
Dryer No. 2 Exhaust	26.4	6.32	33.9	NA
Dryer No. 3 Exhaust	9.61	3.83	26.9	NA
Dryer No. 4 Exhaust	9.04	4.83	48.8	NA
Dryer No. 5 Exhaust	38.2	8.62	55.2	NA
Total of Dryers (Inlet)	113.8	31.3	222.1	NA
STACKS⁽²⁾				
Emission Rate, lb/hr				
RTO No. 1 Stack	13.2	17.2	2.25	0.00136
RTO No. 2 Stack	14.1	18.3	2.03	0.00105
Total of Stacks	27.3	35.5	4.28	0.00241
Destruction Removal Efficiency, %	76.00	0.0	98.07	NA

(1) Testing for chromium was conducted at the stack locations, only.

(2) Supporting data for stack emissions except chromium are presented under a separate cover (EI No. 15575A).

TABLE 2-2
DESTRUCTION REMOVAL EFFICIENCY
RTO NO. 3
AUGUST 1996

Emission Rate, lb/hr	Rep 1	Rep 2	Rep 3	Average
RTO NO. 3 INLET				
Total Hydrocarbons as C	37.2	34.9	44.3	38.8
RTO NO. 3 STACK				
Total Hydrocarbons as C	1.72	1.85	1.77	1.78
DESTRUCTION REMOVAL EFFICIENCY, %				
Total Hydrocarbons as C	95.38	94.70	96.00	95.36

2.0 SUMMARY OF RESULTS

2.1 Presentation

Table 2-1 presents the destruction removal efficiencies for RTO Nos. 1 and 2. The RTO No. 3 destruction removal efficiencies are presented in Table 2-2. Tables 2-3 through 2-10 present run-by-run test summaries; refer to the "List of Tables and Figures" of the "Table of Contents." Detailed test results are presented in Appendix A; field data is given in Appendix B; and analytical data can be found in Appendix C.

2.2 Dryer Exhausts Flue Gas Composition

Spot checks of the flue gas composition in the dryer exhausts showed that the O₂ and CO₂ values were approximately the same as at the RTO Nos. 1 and 2 stacks. Therefore, an average of the O₂ and CO₂ values determined at the RTO Nos. 1 and 2 stacks were used in the dryer exhaust volumetric flow rate calculations.

2.3 Dryer Exhausts Moisture Content

Two (2) EPA Method 4 tests for the determination of moisture were conducted at the Dryer No. 2 Exhaust. The percent moisture obtained from the two runs were averaged. The average percent moisture of 23.8% was used in the volumetric air flow rate calculations for all the dryer exhausts.

2.4 Aborted Runs

Due to process problems, Method 2, Run 1 for all dryer exhaust test locations were aborted. In the cases of Dryer Nos. 1 and 2, replacement runs were performed and three runs were conducted. For Dryer Nos. 3, 4, and 5, no replacement run was conducted and Method 2, Run 3 was used in the CEM, Runs 1 and 2 emission rate calculations. No test results or field data for the aborted runs appear in this report.

2.5 RTO Stack Results

The supporting data (field data, analytical data, etc.) for the RTO Stacks test emissions, except chromium, summarized in Tables 2-1 and 2-2 are presented under a separate cover (EI No. 15575A).

2.6 Chromium Results

The reagent blank analytical result for chromium was 1.72 µg. In accordance with Section 3.1.8.4.3 of the method, the runs' analytical results were adjusted to account for the reagent blank results. The adjusted results were used in the concentration and emission rate calculations.

TABLE 2-3
CARBON MONOXIDE, NITROGEN OXIDES,
AND TOTAL HYDROCARBONS TESTS SUMMARY
Dryer No. 1 Exhaust

	<u>D1-CEM-1</u>	<u>D1-CEM-2</u>	<u>D1-CEM-3</u>	<u>Average</u>
Test Date	8/9/96	8/9/96	8/9/96	
Run Start Time	1720	1845	2020	
Run Finish Time	1820	1945	2120	
<u>Flue Gas Parameters</u>				
CO ₂ , percent by volume, dry	3.8	3.8	3.8	3.8
O ₂ , percent by volume, dry	16.7	16.7	16.7	16.7
Air Flow Rate, dry SCFM	31,966	31,799	31,783	31,849
<u>Carbon Monoxide</u>				
Concentration, ppmvd	274.6	202.2	181.1	219.3
Emission Rate, lb/hr	38.3	28.0	25.1	30.5
<u>Nitrogen Oxides as NO₂</u>				
Concentration, ppmvd	27.8	28.7	44.7	33.7
Emission Rate, lb/hr	6.37	6.54	10.2	7.69
<u>THC as Carbon</u>				
Concentration, ppmvw	1250.3	515.0	431.5	732.3
Concentration, ppmvd	1641	676	566	961
Emission Rate, lb/hr	98.1	40.2	33.7	57.3

TABLE 2-4
CARBON MONOXIDE, NITROGEN OXIDES,
AND TOTAL HYDROCARBONS TESTS SUMMARY
Dryer No. 2 Exhaust

	<u>D2-CEM-1</u>	<u>D2-CEM-2</u>	<u>D2-CEM-3</u>	<u>Average</u>
Test Date	8/9/96	8/9/96	8/9/96	
Run Start Time	1720	1845	2020	
Run Finish Time	1820	1945	2120	
<u>Flue Gas Parameters</u>				
CO ₂ , percent by volume, dry	3.8	3.8	3.8	3.8
O ₂ , percent by volume, dry	16.7	16.7	16.7	16.7
Air Flow Rate, dry SCFM	26,483	26,827	26,120	26,477
<u>Carbon Monoxide</u>				
Concentration, ppmvd	204.1	249.0	233.0	228.7
Emission Rate, lb/hr	23.6	29.1	26.5	26.4
<u>Nitrogen Oxides as NO₂</u>				
Concentration, ppmvd	33.8	31.2	35.0	33.3
Emission Rate, lb/hr	6.41	6.00	6.55	6.32
<u>THC as Carbon</u>				
Concentration, ppmvw	509.6	557.9	496.0	521.2
Concentration, ppmvd	662	732	658	684
Emission Rate, lb/hr	32.8	36.7	32.1	33.9

TABLE 2-5
CARBON MONOXIDE, NITROGEN OXIDES,
AND TOTAL HYDROCARBONS TESTS SUMMARY
Dryer No. 3 Exhaust

	<u>D3-CEM-1</u>	<u>D3-CEM-2</u>	<u>D3-CEM-3</u>	<u>Average</u>
Test Date	8/9/96	8/9/96	8/9/96	
Run Start Time	1720	1943	2020	
Run Finish Time	1820	1958	2120	
<u>Flue Gas Parameters</u>				
CO ₂ , percent by volume, dry	3.8	3.8	3.8	3.8
O ₂ , percent by volume, dry	16.7	16.7	16.7	16.7
Air Flow Rate, dry SCFM	28,426	28,426	27,994	28,282
<u>Carbon Monoxide</u>				
Concentration, ppmvd	96.1	98.4	38.6	77.7
Emission Rate, lb/hr	11.9	12.2	4.71	9.61
<u>Nitrogen Oxides as NO₂</u>				
Concentration, ppmvd	17.8	15.9	23.0	18.9
Emission Rate, lb/hr	3.63	3.24	4.61	3.83
<u>THC as Carbon</u>				
Concentration, ppmvw	367.5	435.2	358.9	387.2
Concentration, ppmvd	482	571	471	508
Emission Rate, lb/hr	25.6	30.4	24.7	26.9

TABLE 2-6
CARBON MONOXIDE, NITROGEN OXIDES,
AND TOTAL HYDROCARBONS TESTS SUMMARY
Dryer No. 4 Exhaust

	<u>D4-CEM-1</u>	<u>D4-CEM-2</u>	<u>D4-CEM-3</u>	<u>Average</u>
Test Date	8/9/96	8/9/96	8/9/96	
Run Start Time	1720	1858	2020	
Run Finish Time	1820	1958	2120	
<u>Flue Gas Parameters</u>				
CO ₂ , percent by volume, dry	3.8	3.8	3.8	3.8
O ₂ , percent by volume, dry	16.7	16.7	16.7	16.7
Air Flow Rate, dry SCFM	24,916	24,916	24,673	24,835
<u>Carbon Monoxide</u>				
Concentration, ppmvd	109.3	80.1	60.8	83.4
Emission Rate, lb/hr	11.9	8.71	6.54	9.04
<u>Nitrogen Oxides as NO₂</u>				
Concentration, ppmvd	30.0	25.4	26.1	27.2
Emission Rate, lb/hr	5.36	4.53	4.61	4.83
<u>THC as Carbon</u>				
Concentration, ppmvw	683.7	851.1	868.7	801.2
Concentration, ppmvd	897	1117	1140	1051
Emission Rate, lb/hr	41.8	52.0	52.6	48.8

TABLE 2-7
CARBON MONOXIDE, NITROGEN OXIDES,
AND TOTAL HYDROCARBONS TESTS SUMMARY
Dryer No. 5 Exhaust

	<u>D5-CEM-1</u>	<u>D5-CEM-2</u>	<u>D5-CEM-3</u>	<u>Average</u>
Test Date	8/9/96	8/9/96	8/9/96	
Run Start Time	1720	1943	2020	
Run Finish Time	1820	1958	2120	
<u>Flue Gas Parameters</u>				
CO ₂ , percent by volume, dry	3.8	3.8	3.8	3.8
O ₂ , percent by volume, dry	16.7	16.7	16.7	16.7
Air Flow Rate, dry SCFM	27,027	27,027	27,727	27,260
<u>Carbon Monoxide</u>				
Concentration, ppmvd	345.7	274.1	344.5	321.4
Emission Rate, lb/hr	40.8	32.3	41.7	38.2
<u>Nitrogen Oxides as NO₂</u>				
Concentration, ppmvd	35.7	61.7	35.2	44.2
Emission Rate, lb/hr	6.91	11.9	6.99	8.62
<u>THC as Carbon</u>				
Concentration, ppmvw	821.8	1000.2	655.3	825.8
Concentration, ppmvd	1078	1313	860	1084
Emission Rate, lb/hr	54.5	66.3	44.6	55.2

TABLE 2-8

CHROMIUM TESTS SUMMARY

RTO No. 1 Stack

	S1-M29-1	S1-M29-2	S1-M29-3	Average
Run Date	8/09/96	8/09/96	8/09/96	
Run Start Time	1140	1315	1445	
Run Finish Time	1248	1420	1550	
Test Train Parameters:				
Volume Of Dry Gas Sample, SCF *	43.736	47.901	39.980	
Percent Isokinetic:	102.8	96.6	100.0	
Flue Gas Parameters:				
CO ₂ , Percent By Volume, Dry	2.5	2.4	2.9	2.6
O ₂ , Percent By Volume, Dry	17.7	18.0	17.4	17.7
Temperature, °F	272	274	272	273
Air Flow Rate, Dry SCFM *	82,779	83,353	77,738	81,290
Air Flow Rate, Wet ACFM	138,300	133,786	129,984	134,023
Chromium, Total:				
Concentration, mg/DSCM *	0.00238	0.00804	0.00285	0.00442
Concentration, ug/DSCM	2.38	8.04	2.85	4.42
Emission Rate, lb/hr	7.39E-004	2.51E-003	8.31E-004	1.36E-003

* 68° F (20° C) -- 29.92 Inches of Mercury (Hg)

TABLE 2-9
CHROMIUM TESTS SUMMARY

RTO No. 2 Stack

	S2-M29-1	S2-M29-2	S2-M29-3	Average
Run Date	8/09/96	8/09/96	8/09/96	
Run Start Time	1140	1315	1445	
Run Finish Time	1250	1420	1550	
Test Train Parameters:				
Volume Of Dry Gas Sample, SCF *	44.442	48.083	47.869	
Percent Isokinetic:	100.8	97.2	99.6	
Flue Gas Parameters:				
CO ₂ , Percent By Volume, Dry	2.6	2.4	2.4	2.5
O ₂ , Percent By Volume, Dry	18.3	18.5	18.1	18.3
Temperature, °F	273	280	284	279
Air Flow Rate, Dry SCFM *	73,008	80,789	77,894	77,230
Air Flow Rate, Wet ACFM	120,835	130,961	132,891	128,229
Chromium, Total:				
Concentration, mg/DSCM *	0.00309	0.00339	0.00437	0.00362
Concentration, ug/DSCM	3.09	3.39	4.37	3.62
Emission Rate, lb/hr	8.45E-004	1.03E-003	1.27E-003	1.05E-003

* 68° F (20° C) -- 29.92 Inches of Mercury (Hg)

TABLE 2-10
TOTAL HYDROCARBONS TESTS SUMMARY
RTO No. 3 Inlet

	<u>I3-CEM-1</u>	<u>I3-CEM-2</u>	<u>I3-CEM-3</u>	<u>Average</u>
Test Date	8/6/96	8/6/96	8/6/96	
Run Start Time	1125	1345	1530	
Run Finish Time	1305	1503	1630	
<u>Flue Gas Parameters</u>				
CO2, percent by volume, dry	0.0	0.0	0.0	0.0
O2, percent by volume, dry	20.9	20.9	20.9	20.9
Air Flow Rate, dry SCFM	99,052	95,446	97,389	97,296
<u>THC as Carbon</u>				
Concentration, ppmvw	195.5	188.9	235.3	206.6
Concentration, ppmvd	201	195	243	213
Emission Rate, lb/hr	37.2	34.9	44.3	38.8

3.0 PROCESS DESCRIPTION AND OPERATION

3.1 General

Louisiana-Pacific Corporation manufactures oriented strand board (OSB) at their Roxboro, North Carolina facility. The manufacture of OSB begins with pine logs trucked to the facility, off-loaded and stored or fed into a whole log (drum) debarker. The debarked log proceeds to a whole log waferizer which slices the logs into thin wafers.

The wafers are collected on conveyor belts that transport them to green wafer storage bins above the triple-pass rotary dryers; into which they are fed via gravity and rotary air locks. The inlet temperatures of these dryers may range between 800° and 1100° F. The wafers are moved through the dryers by air flows of approximately 45,000-55,000 acfm. A primary cyclone removes the wood material and a screen separates the usable wafers from small fines. These dry fines are collected and pneumatically transported to storage bins for use as fuel for the wafer dryer burners and thermal oil heater while the exhaust air stream passes through a fabric filter. The exhaust air from this process then passes through a multicyclone and to the two dryer RTO's (Nos. 1 and 2) for thermal oxidation.

The dry wafers are collected and transported to bins via enclosed, rake conveyors. These dry wafer bins supply wafers to the blenders (core and face) where resin and wax are added. The resinated wafers are fed out of the blenders to the forming line where four (4) mechanical formers lay down successive layers of wafers (bottom face-core-core-top face). This "mat" then passes via a caul system to the press loader where mats are stacked for loading into the press. The press is then loaded (14 mats) and closes with pressure and heat setting the resin. Thermal oil at approximately 420° F supplies the heat for this process. The thermal oil is heated in two natural gas fired thermal oil heaters whose emissions are routed to each of the five (5) dryers and then the dryer RTO's. Emissions from the enclosed press area are collected via exhaust fans and directed to the press RTO (No. 3). The RTO's are operated between 1400° and 1600° F.

3.2 Source Air Flow

Figure 3-1 is an air flow schematic which shows the passage of flue gases exhausted from the dryers. Figure 3-2 is an air flow schematic which shows the passage of flue gases exhausted from the press.

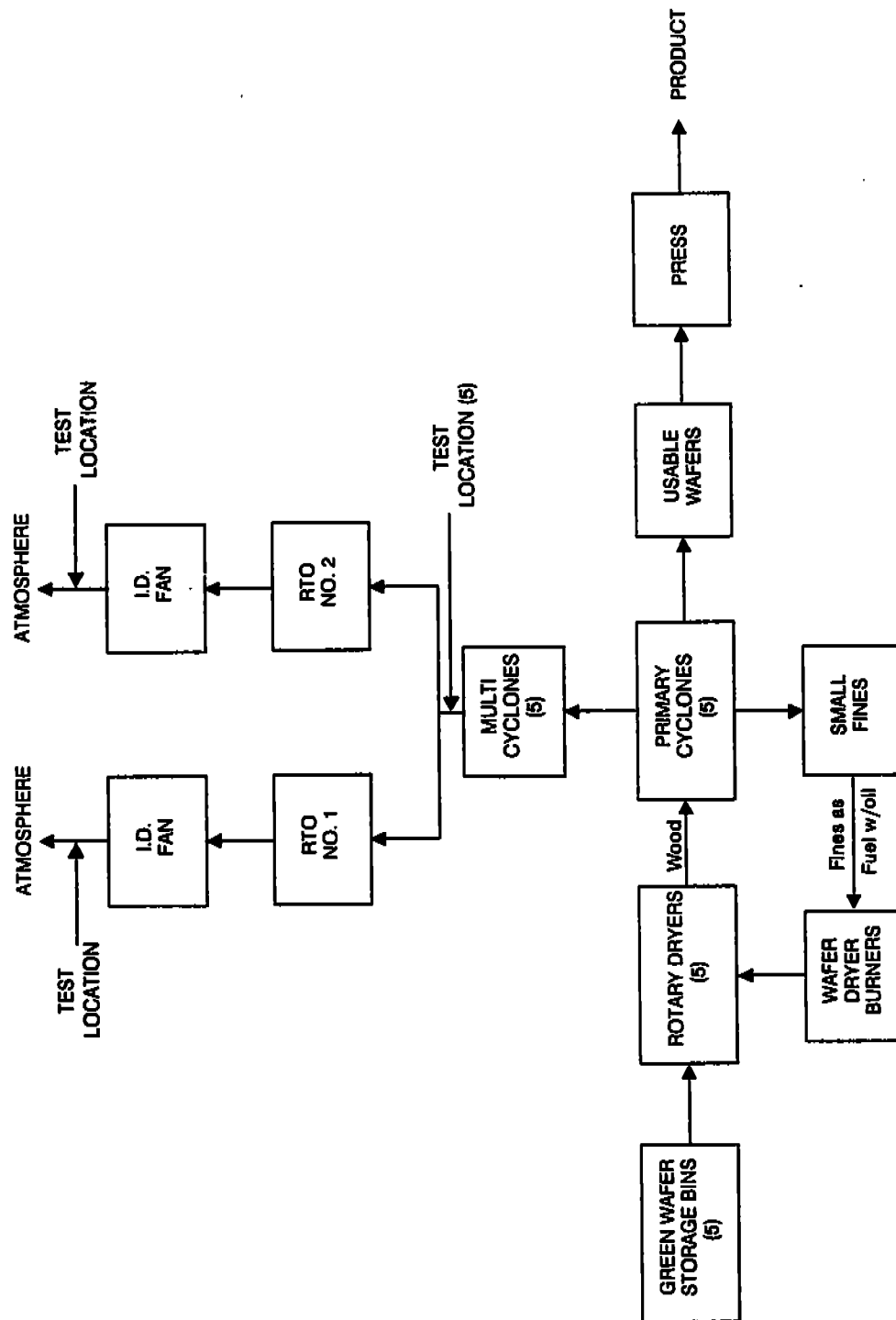


FIGURE 3-1. RTO NOS. 1 AND 2 AIR FLOW SCHEMATIC

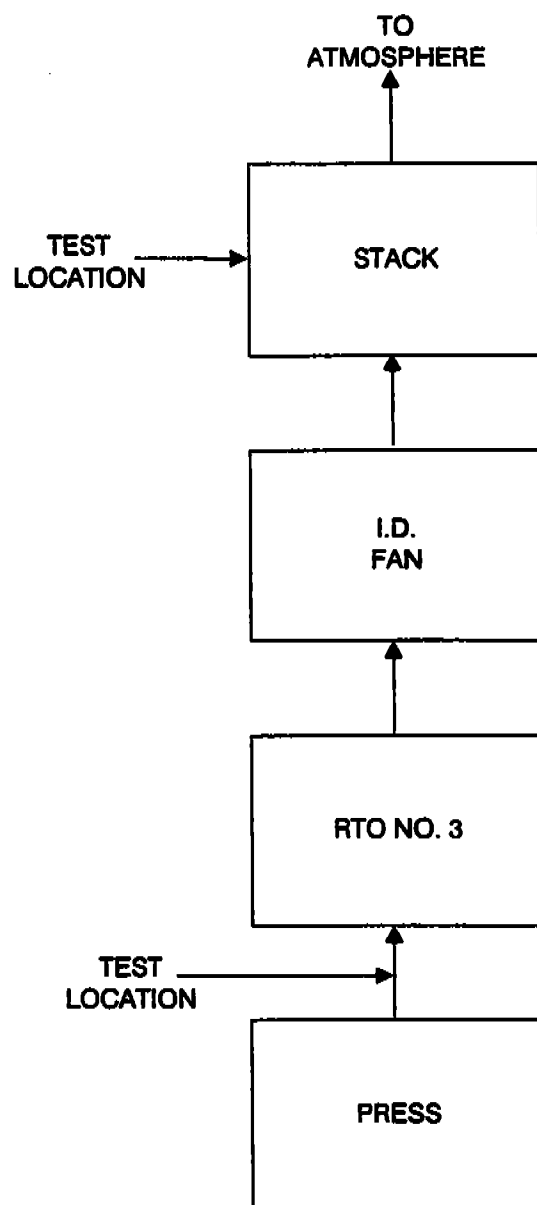


FIGURE 3-2. RTO NO. 3 AIR FLOW SCHEMATIC

4.0 SAMPLING AND ANALYTICAL PROCEDURES

4.1 General

All sampling and analytical procedures were those recommended by the United States Environmental Protection Agency and the North Carolina Department of Environment, Health, and Natural Resources. This section provides brief descriptions of the sampling and analytical procedures.

4.2 Sampling Points

The number and location of the sampling points for velocity and particulate traverses were determined according to the procedures outlined in EPA Method 1. Refer to Table 4-1 and Figures 4-1 through 4-3.

TABLE 4-1
SAMPLING POINTS PER SAMPLING LOCATION

Sampling Location	Figure Number	Number of Axes	Points per Axis	Total Sampling Points
Dryer Exhausts	4-1	1	16	16
RTO No. 3 Inlet	4-2	1	16	16
RTO Stacks	4-3	2	12	24

4.3 Cyclonic Flow Check

A Type S Pitot tube assembly, Magnehelic gauges, and a universal protractor (angle finder) were used to determine the flow angles at each of the sampling or velocity traverse points. At each point, the Pitot tube was positioned at a right angle to the air flow. The angles were determined by rotating the Pitot tube until a null reading was obtained on the Magnehelic gauges. When the null reading was obtained, the angle of the Pitot tube was recorded.

4.4 Volumetric Air Flow Rates

4.4.1 Flue Gas Velocity

The flue gas velocity and volumetric flow rate were determined according to the procedures outlined in EPA Method 2. Velocity head measurements (ΔP) were made using Type S Pitot tubes conforming to the geometric specifications outlined in EPA Method 2. Accordingly, each has been assigned a coefficient of 0.84. Differential pressures were measured with Magnehelic gauges of appropriate range. Flue gas temperatures were measured with chromel-alumel thermocouples equipped with hand-held digital readouts.

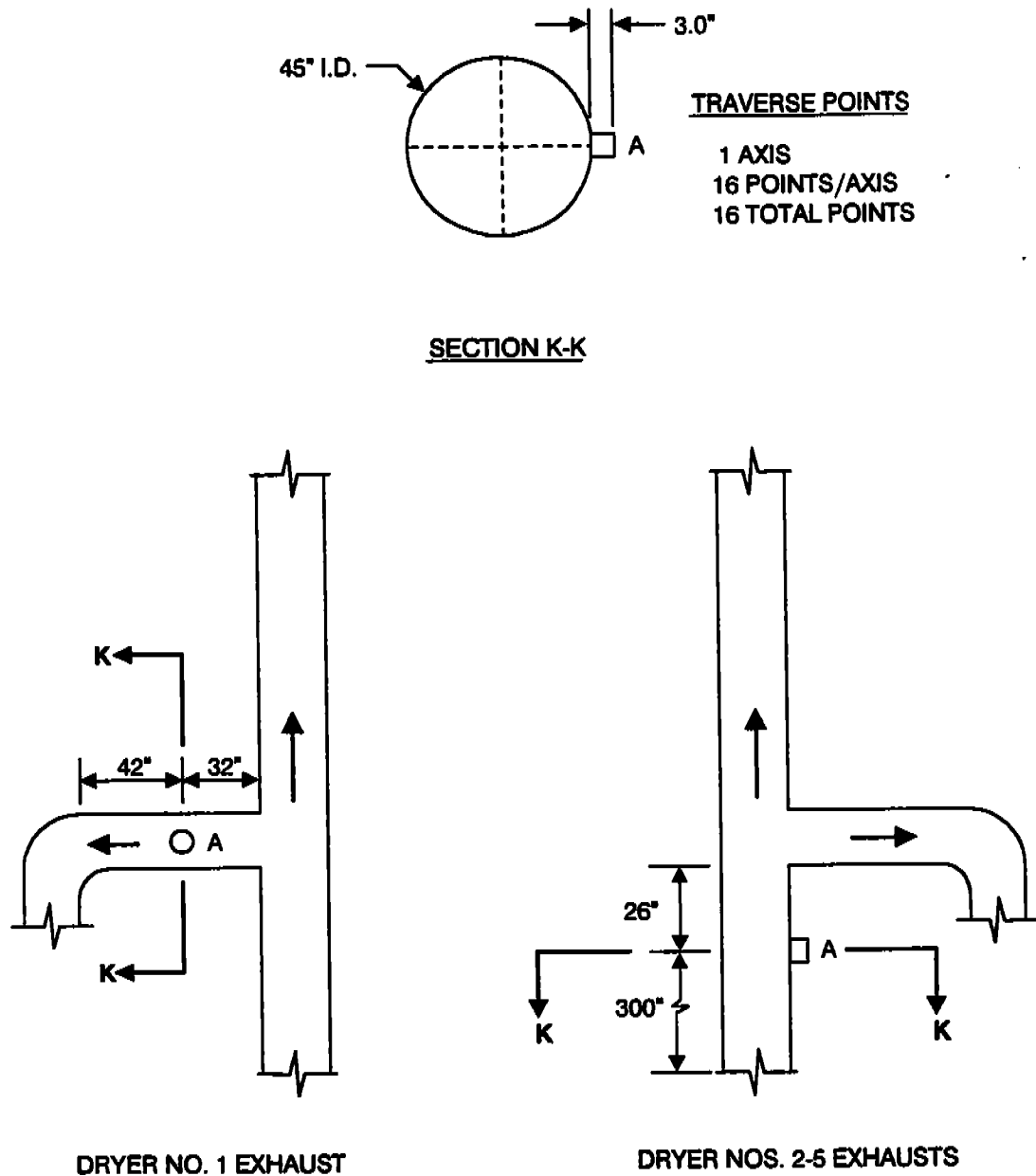


FIGURE 4-1. DRYER EXHAUSTS TEST LOCATIONS

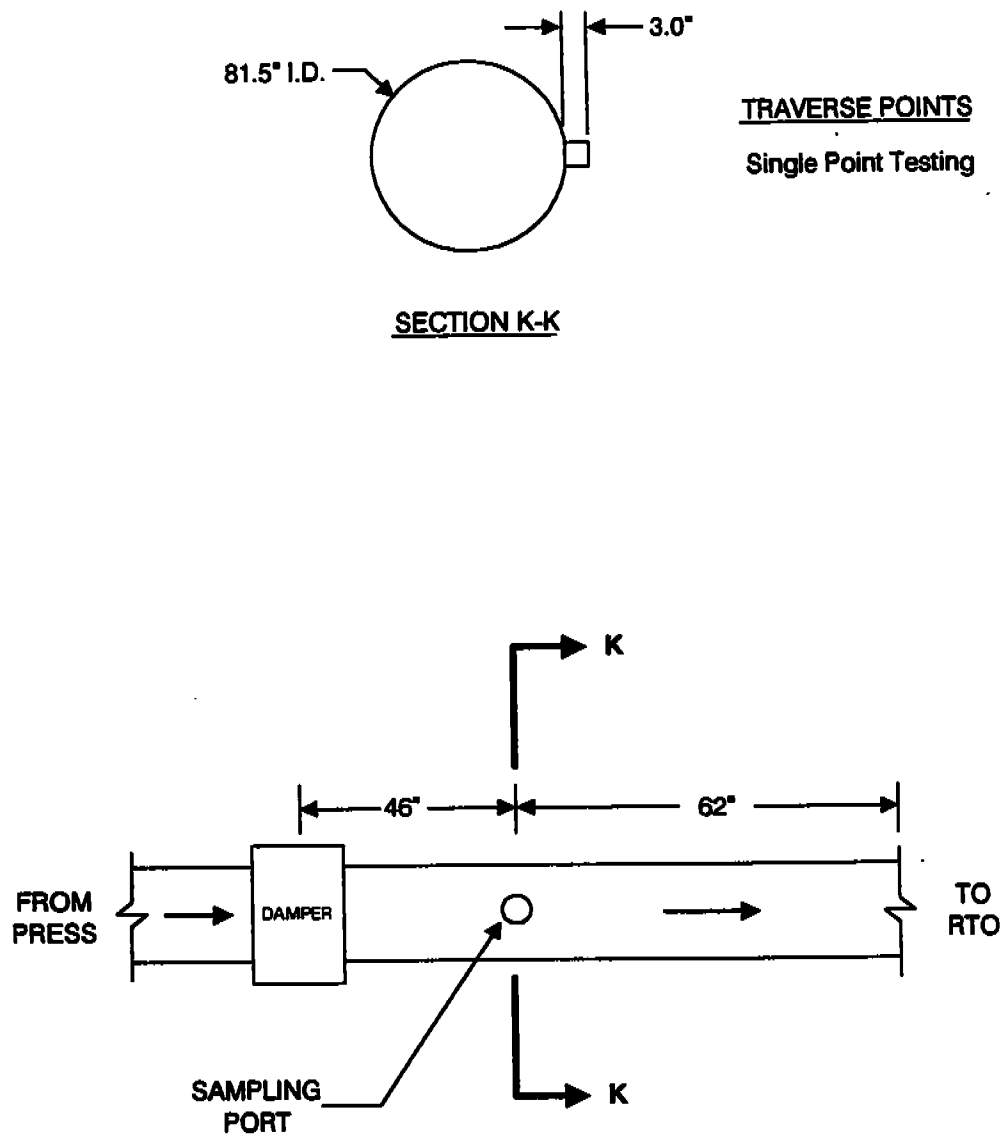
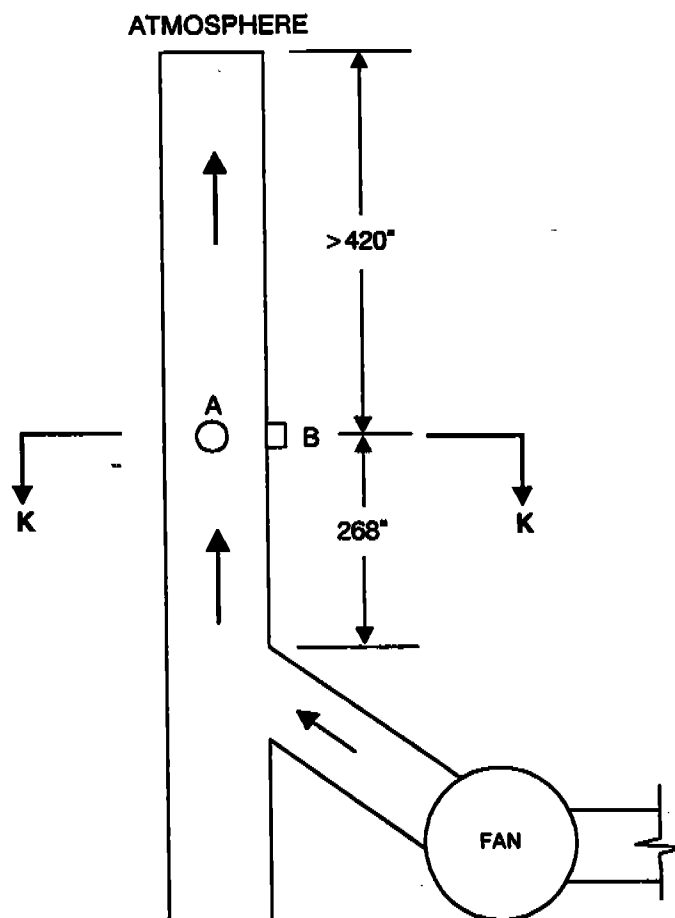
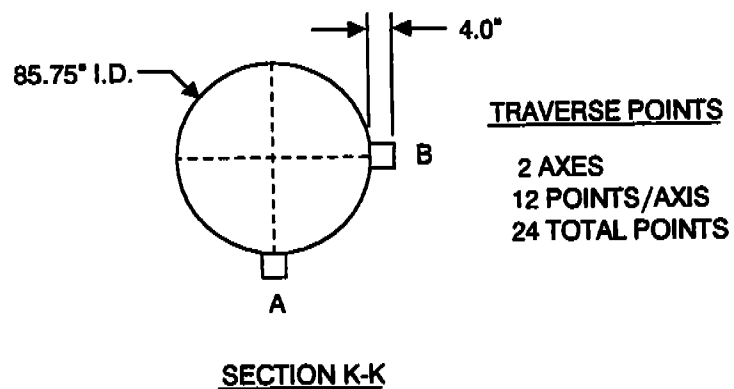


FIGURE 4-2. RTO NO. 3 INLET TEST LOCATION



NOTE: RTO No. 3 Stack has an additional 20 foot section that was added after the ports.

FIGURE 4-3. RTO NOS. 1, 2, AND 3 STACK TEST LOCATIONS

4.4.2 Flue Gas Composition

Dryer Exhausts. The oxygen (O_2) and carbon dioxide (CO_2) concentrations in the flue gas stream were not measured at the dryer exhausts. The concentrations used in the dryer flow rate calculations were averages of the O_2 and CO_2 concentrations obtained at the RTO Nos. 1 and 2 stack locations.

RTO No. 3 Inlet. The flue gas composition and molecular weight were assumed to be that of ambient air. The absence of CO_2 in the flue gas was verified by Fyrite analysis.

RTO Nos. 1 and 2 Stacks. Determination of the oxygen (O_2) and carbon dioxide (CO_2) concentrations in the flue gas stream were made using instrumentation and test procedures that conform with the requirements of EPA Method 3A. The analyzers and procedures used in the determination of O_2 and CO_2 are discussed in Section 4.5.1.

4.4.3 Flue Gas Moisture Content

Dryer Exhausts and RTO No. 3 Inlet. Samples were withdrawn at a constant rate from the source using an EPA Method 4 sampling train. The sampling train consisted of a heated glass probe, four chilled impingers, and a metering console. The first two impingers each contained 100 mL of water, the third remained empty, and the fourth contained preweighed silica gel. Single-point, constant rate sampling was conducted and each run was 60 minutes in duration.

Sample Recovery/Analysis. The water was returned to the original container, weighed, the weight recorded on the label, and the liquid level marked. The silica gel was returned to the original tared container, weighed, and the weight recorded on the label. The volume of water vapor condensed in the impingers and the volume of water vapor collected in the silica gel were summed and entered into moisture content calculations.

RTO Nos. 1 and 2 Stacks. The moisture content was determined in conjunction with the combined EPA Method 29 train discussed in the following sections.

4.5 Emissions Determinations

4.5.1 Carbon Dioxide, Oxygen, Carbon Monoxide, Nitrogen Oxides, and Total Hydrocarbons

Continuous emissions monitoring (CEM) was conducted for carbon dioxide (CO_2) and oxygen (O_2) concentrations and nitrogen oxides (NO_x), carbon monoxide (CO), and total hydrocarbons (THC) emissions. The sampling and analytical procedures for CO_2/O_2 , NO_x , CO, and THC were in accordance with EPA Methods 3A, 7E, 10, and 25A, respectively.

The extractive monitors require that the effluent gas sample be conditioned to eliminate any possible interference (i.e., water vapor and/or particulate matter) before being transported and

injected into each analyzer. All components of the sampling system which contacted the sample were constructed of Type 316 stainless steel or Teflon. The outputs from the monitors were connected to a computerized data acquisition system (DAS).

The CO₂/O₂, NO_x, and CO sample collection system consisted of a heated probe with an in-stack glass wool particulate filter, heated sample lines, a moisture removal trap, an out-of-stack secondary particulate filter, and a pump. The THC sample collection system was the same except no moisture removal trap or secondary particulate filter were used. All samples were routed through a distribution manifold board for delivery to the analyzers. The configuration of the sampling system allows for the injection of calibration gases directly to the analyzers or through the sampling system. All pretest and posttest calibration procedures were performed as outlined in the specific EPA methods. The operation of each analyzer and the DAS are described below.

ACS Fuji 3300 CO/CO₂ Analyzer. This nondispersive infrared analyzer automatically and continuously monitors the CO and CO₂ concentrations. The theory of operation is based on the principle that both gases have a unique absorption line spectrum in the infrared region. The instrument consists of an infrared light source, a chopper, a measuring cell, and a two-chamber, sealed detector.

The infrared light beam emitted by the source passes through the measuring cell which is filled with a continuously flowing gas sample. Before reaching the front chamber of the detector, the light beam is partially absorbed or attenuated by the gas species of interest in the cell. Both the front and rear chambers of the detector are filled with a reference gas. The difference in the amount of light absorbed between the front and rear chambers is dependent on the concentration of the gas species of interest within the measuring cell and creates a pressure differential between the two chambers. The pressure differential is then observed as gas flow by the micro-flow sensor located in the channel communicating the two chambers. The resulting AC signal from the sensor is rectified, amplified, and linearized into DC voltage signal for output.

Thermo Environmental Instruments Model 48/GFC CO Analyzer. The analyzer utilizes the gas filter correlation (GFC) technique to determine CO concentrations. The GFC technique involves the use of a high CO concentration filter which, when inserted into the infrared light beam, produces a reference beam, i.e., no further infrared radiation can be attenuated by the CO in the effluent sample. The CO filter is located on a modulated copper wheel which allows the use of a single infrared source and detector. A multiple pass optical bench/sample chamber of the white cell design provides improved sensitivity with a smaller chamber length.

Thermo Environmental Instruments Model 10 NO/NO_x Analyzer. This analyzer automatically and continuously determines the concentration of the nitric oxide (NO) or nitrogen oxides (NO_x) in the effluent. The analytical technique is chemiluminescence. The sample is routed through a converter where the NO₂ is dissociated to form NO. The sample is then passed through

a reaction chamber where the NO is quantitatively converted to NO₂ by gas phase oxidation with molecular ozone produced within the analyzer. In this reaction, the NO₂ molecules are elevated to an electronically excited state and immediately reverted to a nonexcited ground state. This reversion is accompanied by the emission of photons, which impinge on a photomultiplier detector and generate a low level DC current. The current is then amplified and used to drive a front panel meter and a data recorder. The NO_x concentration seen by the instrument includes the contributions of both the NO in the sample and the NO resulting from the dissociation of the NO₂ in the sample.

Ratfish Model RS-55 (or equivalent) THC Analyzer. This analyzer automatically and continuously monitors the THC concentrations in a flowing gas mixture. The theory of operation is based on the principle of flame ionization detection. In the flame ionization detector, hydrogen is mixed with the sample gas and is burned in a small jet. The ionization current in the hydrogen flame is measured. In a pure hydrogen flame, very few ions are produced, but if an organic component or hydrocarbon is burned in the flame, the ion current is greatly increased. The current provides a quantitative measure of the amount of hydrocarbons in the flame. The current is converted to a voltage output. The hydrogen flame ionization detector is extremely sensitive and is capable of detecting hydrocarbon levels in the low parts per million range and is insensitive to inorganic gases such as nitrogen, carbon dioxide, and water vapor.

Teddy Model 320P-4 O₂ Analyzer. This analyzer was designed specifically to measure O₂ in flue gas streams. It utilizes a patented micro-fuel cell that consumes O₂ from the atmosphere surrounding the measuring probe. The consumption of O₂ generates a proportional electric current, which is amplified and used to drive a built-in front panel meter with a scale of 0 to 25%. The analyzer incorporates its own integral pump and power system.

Data Acquisition System. The DAS uses an IBM compatible computer with hard disk storage and an internal 12-bit analog-to-digital converter with a 16-channel multiplexer. In addition to providing an instantaneous display of analyzer responses, the DAS compiles the analyzer data collected once each second and averages them, calculates emission rates, and documents analyzer calibrations. The DAS integrates the real-time measurements and provides printouts of 1-minute, 15-minute, and 60-minute averaged emissions.

4.5.2 Chromium

Sample Collection. Samples were withdrawn isokinetically from the source using an EPA Method 29 sampling train. The sampling train consisted of a glass nozzle, a heated glass probe with a Type S Pitot tube attached, a filter, four chilled impingers, and a metering console. The particulate sample was collected on a Pallflex 2500QAT-UP quartz filter maintained at a temperature of $248^{\circ}\text{F} \pm 25^{\circ}\text{F}$. The first impinger remained empty, the second and third impingers

each contained 100 mL of 5% nitric acid (HNO_3)/10% hydrogen peroxide (H_2O_2), and the fourth contained preweighed silica gel. Each of the 24 points was sampled for 2.5 minutes, resulting in net run times of 60 minutes.

Sample Recovery. A Teflon spatula and Teflon coated tweezers were used to remove the filter from the filter holder and place it in a 250 mL glass jar. The reagents were returned to the original bottles, weighed, the weights recorded on the labels, and the liquid levels marked. The silica gel was returned to the original container, weighed, and the weight recorded on the label. The volume of water vapor condensed in the impingers and the volume of water vapor collected in the silica gel were summed and entered into moisture content calculations.

The nozzle, probe, and fronthalf of the filter holder were rinsed with 100 mL of 0.1N HNO_3 into a 500 mL glass jar. A Teflon probe brush was used for cleaning the probe.

The backhalf of the filter holder and the first, second, and third impingers were rinsed with 100 mL of 0.1N HNO_3 into the 1000 mL jar containing the $\text{HNO}_3/\text{H}_2\text{O}_2$ reagent.

Sample Analyses. The fronthalf HNO_3 rinse, filter and $\text{HNO}_3/\text{H}_2\text{O}_2$ reagent samples were combined and analyzed for total chromium by ICP/MS.

4.6 Equipment Calibration

Pertinent calibration data are provided in **Appendix D**.

Entropy used EPA Protocol No. 1 gases for all continuous emissions testing. The calibration gas certificates of analysis are presented in **Appendix D**.

5.0 QUALITY ASSURANCE/QUALITY CONTROL

5.1 General

Entropy, Inc. (EI) is committed to the continued implementation of a Quality Assurance Program to assure the quality of sampling and analytical procedures of environmental measurement data. The Quality Assurance measures taken during this test project equal or exceed the minimum QA/QC recommendations as set forth by the U.S. Environmental Protection Agency (EPA) for a particular method.

The following sections outline the QA program implemented by EI to justify the validity of test procedures. As applicable, the QA system for the various test programs addresses the following areas:

- Preventive Maintenance & Equipment Calibration
- Sample Processing
- Analytical Instrument Calibration
- Blanks and Spiked Samples
- Internal/External System Checks
- Data Reduction & Validation
- QA/QC Summary

5.2 Preventive Maintenance and Equipment Calibration

An effective preventive maintenance program decreases downtime and thus increases data completeness and quality. Pretest and posttest equipment calibrations are conducted in a manner and at a frequency which meets or exceeds U.S. EPA specifications.

Each item transported to the field is inspected to detect equipment problems which may originate during periods of storage. All equipment returning from the field is cleaned, repaired, reconditioned, and recalibrated as necessary. Routine maintenance on equipment (dry gas meters, pumps, Magnehelics, manometers, Pitot tubes, and nozzles) is carried out periodically for leaks, corrosion, dents, or any other damage. Table 5-1 shows the activities for equipment calibration.

TABLE 5-1
IN-HOUSE EQUIPMENT CALIBRATION

Apparatus	Calibration Method And Frequency	Specifications	Corrective Action
Type S Pitot Tubes	Standards contained in EPA Method 2	Coefficient of 0.84 ± 0.02	Refurbish or recalibrate
	Visual inspection prior to shipment to test site and again prior to each day of testing		
Manometers	Leak checked before and after each field use		Adjust or replace
Magnehelic Gauges	Initially calibrate over full range	0-10" water column	
	After each field use, checked against inclined manometer at average settings encountered during testing	Within $\pm 5\%$	Repair and Recalibrate
Thermometers - Impinger - Dry Gas Meter - Filter Box	After purchase and prior to each field use, using ASTM Hg-in-glass thermometer	Impinger = $\pm 2^\circ\text{F}$ DGM = $\pm 5.4^\circ\text{F}$ FB = $\pm 5.4^\circ\text{F}$	Adjust, determine correction factor, or reject
	After purchase and prior to each field use, using ASTM mercury-in-glass thermometer		
Thermocouple/ Potentiometer	After purchase. 3-point (ice bath, boiling water, and hot oil) using ASTM Hg-in-glass thermometer	$\pm 1.5\%$ of absolute temperature	Adjust, determine correction factor, or reject
	Before and after each field use, compared to ASTM Hg-in-glass thermometer at ambient conditions		
Dry Gas Meter and Orifice	Full calibration (every 6 months) over wide range of orifice settings to obtain calibration factor (isokinetic meter box) as per EPA Method 5	DGM = ± 0.02 from avg. coeff. for each run Orifice = $\pm 0.15'' \text{ H}_2\text{O}$ over delta H range of 0.4"-4.0"	Adjust or replace
	10-minute quick calibration before sending to test site and again prior to first day of field use (isokinetic)	$\pm 3\%$ of full calibration Y $\pm 5\%$ of full calibration Y	Use if no backup Do not use
	Calculate $\bar{Y}_{qa}$ on-site for each test run to determine if the meter gamma ($\bar{\gamma}$) has changed (EPA Method 5 Section 5.3.2 Alternate Procedures as approved by Administrator)	Average $\bar{Y}_{qa}$ must be within $\pm 5\%$ of full calibration Y	Perform post test calibration at average delta H and highest vacuum encountered during testing to determine if meter gamma has changed (isokinetic)
	A post test isokinetic meter box calibration is performed after every job at the approximate average delta H to determine if meter gamma has changed (isokinetic) as per EPA Method 5	+5% of full calibration Gamma (initial or recalibration) that yields the lowest sample volume for the testing is used for calculations	Recalibrate or replace
Critical Orifice	Dry gas meter transfer standard (EPA Method 5 Alternate)	Calibrated to obtain K factor	Replace/repair and Recalibrate

* See Appendix D for EMTIC guideline document

TABLE 5-1 (Continued)
IN-HOUSE EQUIPMENT CALIBRATION

Apparatus	Calibration Method And Frequency	Specifications	Corrective Action
Barometer	Before and after each field use against an aneroid barometer	$\pm 0.1''$ mercury	Adjust to agree
	Reference barometer adjusted for elevation differences		
Probe Nozzle	Average of 5 I.D. measurements using a micrometer. Visual inspection before and after each field use	Difference between high and low measurement $\leq 0.004''$	Repair and recalibrate

5.3 Sample Processing

Entropy, Inc. employs systems which ensure the integrity of an environmental sample from the time of acquisition, through analysis, and ultimately to proper disposal. These systems are necessary to allow valid conclusions to be drawn from analytical results separated in time and space from the sampling operation. In addition, these systems recognize that samples are occasionally of value even after analytical results have been reported.

Samples are collected, transported, and stored in clean containers which are constructed of materials inert to the analytical matrix. Containers are used which allow air tight seals. When necessary, containers are employed which prevent photochemical reactions. All sample containers are labeled with the following information:

- Unique source identifier
- Sample run identifier
- Analyte identifier
- Sample matrix identifier
- Sample analyst identifier

Additional information relating to the sample is recorded on the data sheet for the sampling run that afforded the subject sample. Accordingly, the sampling data sheet contains all the information listed above, plus the date and time the sample was acquired and supplemental information such as observations pertinent to the quality of the sample. For condensed samples, e.g., samples in liquid media, the sample levels are marked on the outside of the container; this mark is used to indicate sample loss, and as such, may serve as a reference in adjusting results accordingly.

For transport from the field to the laboratory, samples are stored in sealed containers and secured in a fashion which minimizes movement and thus prevents breakage of containers. Containers used for transporting glass are packed with foam. Samples which require chilling are kept cold until analyzed.

Samples remain in the custody of the sampler, from acquisition until conveyance to the sample custodian. All custody transfers are signed and documented on a record of custody form, which remains with the sample until turned over to the custodian.

Analytical data are identified in a manner identical to that of the sampling data. Accordingly, all data generated from the analysis of samples are documented with the following information:

- Source identifier
- Sample run identifier
- Analyte identifier
- Sample matrix identifier
- Analyst identifier
- Analysis date

Portions of samples remaining after analysis are returned to their original sample containers. These samples are stored in designated storage areas until their destruction is authorized.

5.4 Instrument Calibration

Instrument calibration is one of the most important functions in generating precise and accurate quality data. All of the contract laboratories involved in the analytical testing for the test program maintain rigorous QA programs for instrument calibration.

5.5 Blanks and Spikes

Field blanks, method blanks, trip blanks, lab-proof blanks and filter blanks are obtained, digested, and analyzed when applicable. The blanks reflect the background contamination obtained from the various sources during the sampling and analysis. Thus, data adjustment or correction can be made accordingly.

In most cases, it is not necessary to digest and analyze the method blanks, reagent blanks or the lab-proof blanks unless the field blank shows a high level of contamination. If a high level of contamination is present, it is imperative to individually analyze the above blanks to help determine the cause of contamination.

Spiked samples are used to check on the performance of a routine analysis or the recovery efficiency of a method. During spiking, a known amount of stock solutions of the substance of interest is added to the sample prior to sample extraction, digestion, and analysis.

5.6 Internal/External System Audit Checks

System and performance audits are routine elements of all Entropy QA/QC programs.

Internal Systems Audit: The following sampling equipment checks were conducted prior to sample collection.

- All sampling equipment was thoroughly checked to ensure clean and operable components.
- Equipment was inspected for possible damage from shipment.
- The oil manometers or Magnehelic gauges were leveled and zeroed.
- The temperature measurement systems were checked for damage and operability by measuring the ambient temperature.

Performance Audits: Performance audits of the laboratory are conducted prior to the processing of any compliance samples for analysis. Audit materials typically include samples available from the EPA prior to new source testing. Also, samples of known concentration are prepared in-house or obtained from the EPA for Internal QA checks.

External Systems Audits: Entropy is subject to a system audit each time a test is conducted for any Air Pollution Control agency. This procedure entails an EPA observer on-site to do qualitative evaluation of performance to demonstrate compliance with the applicable regulations.

5.7 Data Reduction and Validation

The test team leader is responsible for reviewing and validating data as they are acquired. Each team leader has extensive knowledge of sampling methodology and the characteristics of the process being measured and is capable of evaluating the accuracy, representativeness, and completeness of raw data on-site. Action to replace inadequate data can be taken immediately.

Data obtained during calibrations and test runs are recorded on standardized forms which are checked twice for completeness and accuracy by the QA Director or his designated representative. Data reduction and consistency are achieved by using the standardized forms and using Entropy's in-house computer facilities.

5.8 QA/QC Summary

All chemicals used were American Chemical Society (ACS), High Performance Liquid Chromatography (HPLC), or pesticide grade. The deionized, distilled water utilized met or exceeded the American Society for Testing and Materials (ASTM) specifications for Type-I reagent water. Pretest and posttest leak checks were conducted on each sampling train. Table 5-2 presents a summary of quality assurance/quality control requirements for each test method used in this test program.

TABLE 5-2
QUALITY ASSURANCE/QUALITY CONTROL CRITERIA
RTO NOS. 1, 2, AND 3
AUGUST 1996

Test Method	Parameter	QA/QC Criteria	QA/QC Status
EPA 3A, 7E, 10	Calibration Error	± 2%	≤ 2 %
	Zero Drift	± 3%	≤ 3 %
	Calibration Drift	± 3%	≤ 3 %
	Sampling System Bias	± 5%	≤ 5%
EPA 25A	Calibration Error	± 5% of gas value	≤ 5%
	Zero Drift	± 3%	≤ 3 %
	Calibration Drift	± 3%	≤ 3 %
EPA 29 (Chromium)	Matrix spike recovery	75 - 125%	106%
	Duplicate analyses	≤ 20 % from mean	≤ 0.315 % difference

APPENDIX A. TEST RESULTS

1. Dryer Exhaust No. 1

**a. Carbon Monoxide, Nitrogen Oxides
and Total Hydrocarbons**

FIELD DATA AND RESULTS TABULATION

PLANT: Roxboro OSB Plant, Roxboro, NC

SAMPLING LOCATION: Dryer No. 1 Exhaust

OPERATOR: Stephen B. Weiber

		<u>D1-CEM-1</u>	<u>D1-CEM-2</u>	<u>D1-CEM-3</u>
	Test Date	8/9/96	8/9/96	8/9/96
	Run Start Time	1720	1845	2020
	Run Finish Time	1820	1945	2120
Theta	Net Run Time, min	60.00	60.00	60.00
Pbar	Barometric Pressure, in Hg	29.90	29.90	29.90
Mfd	Dry Mole Fraction	0.762	0.762	0.762
%CO2	Carbon Dioxide, % by volume	3.80	3.80	3.80
%O2	Oxygen, % by volume	16.70	16.70	16.70
Pg	Flue Gas Static Pressure, in H2O	0.38	0.39	0.45
ts	Flue Gas Temperature, °F	182	184	189
Qsd	Volumetric Flow Rate, dry SCFM*	31,966	31,799	31,783
	<u>Carbon Monoxide</u>			
Fwt	Formula Weight, gm/gm-mole	28.01	28.01	28.01
ppmvd	Concentration, ppmvd	274.6	202.2	181.1
lb/hr	Emission Rate, lb/hr	38.3	28.0	25.1
	<u>Nitrogen Oxides as NO2</u>			
Fwt	Formula Weight, gm/gm-mole	46.01	46.01	46.01
ppmvd	Concentration, ppmvd	27.8	28.7	44.7
lb/hr	Emission Rate, lb/hr	6.37	6.54	10.2
	<u>THC as Carbon</u>			
Fwt	Formula Weight, gm/gm-mole	12.01	12.01	12.01
ppmvw	Concentration, ppmvw	1250.3	515	431.5
ppmvd	Concentration, ppmvd	1641	676	566
lb/hr	Emission Rate, lb/hr	98.1	40.2	33.7

TOTAL HYDROCARBON MEASUREMENT RESULTS SUMMARY

PLANT NAME: LOUISIAN-PACIFIC Roxboro NC
TEST LOCATION: RTO Inlet #1
TEST DATE: 08-09-96
OPERATOR: S. Wieber

Pre-Test Calibration Error Check

SPAN VALUE: 1,000 (ppm as C)	CALIBRATION GAS VALUE (ppmC)*	SYSTEM CAL ERROR RESPONSE	CAL ERROR %
THC Zero Gas	0.0	3.6	0.36
Low-Level Gas	298.0	300.6	1.55
Mid-Level Gas	518.4	522.1	0.71
High-Level Gas	841.8	835.9	-0.70

* ppmC values = ppmC3H8 values x 3

Drift Determinations

Run Number	D1-M25A-1	D1-M25A-2	D1-M25A-3
Zero Sys. Cal. Response	3.6	1.6	1.6
Zero Drift Response	1.6	1.6	1.3
Zero Drift	-0.2	0.0	-0.0
Upscale Sys. Cal. Resp.	300.6	308.0	308.1
Upscale Drift Response	308.0	308.1	295.8
Upscale Drift	0.8	-0.1	-1.2

RUN NO.:	D1-M25A-1	D1-M25A-2	D1-M25A-3
RUN TIME:	1720-1820	1845-1945	2020-2120
THC (ppmwC):	1250.3	515.0	431.5
%H2O:	23.80	23.80	23.80
THC (ppmdC):	1640.8	675.9	568.3
DSCFM:	31,966	31,799	31,783
THC (lb/hr C):	98.08	40.19	33.66

$$\text{ppmd} = \text{ppmw} / (1 - (\%H_2O/100))$$

$$\text{lb/hr} = (\text{ppmd} \times \text{DSCFM} \times 60 \times \text{Mol. Wt.}) / 385.3 \text{ E06}$$

Where: 12.01 lb/lb mole

$$\text{Cal. Error} = \frac{\text{System Cal. Response} - \text{Cal. Gas Value}}{\text{Cal. Gas Value}} \times 100$$

$$\text{Drift} = \frac{\text{Drift Response} - \text{System Cal. Response}}{\text{Span Value}} \times 100$$

** For zero gas calibration error use span value

CALCULATION OF AVERAGE NOx AND CO EMISSIONS

COMPANY: LOUISIANA-PACIFIC Roxboro, NC

SOURCE: RTO #1 INLET

RUN: 1 (17:20 - 18:20)

DATE: 8-9-96

GAS VALUE	INITIAL CAL	FINAL CAL	MEAN CAL
0.0 ppm NOx	0.0	0.7	0.4
47.1 ppm NOx	46.0	44.6	45.3
0.0 ppm CO	0.6	0.0	0.3
149.2 ppm CO	152.9	150.3	151.6
0.00 % Oxygen	0.04	0.04	0.04
12.26 % Oxygen	12.04	12.16	12.10

Uncorrected Data:	26.9 ppm NOx	16.82 % Oxygen
	278.8 ppm CO	31,966 DSCFM

CORRECTED RESULTS

27.8 ppm NOx	6.4 lb/hr NOx
274.6 ppm CO	38.3 lb/hr CO
17.06 % Oxygen	

$$\text{Corrected Conc.} = C_{ma}(\bar{C} - C_o)/(C_m - C_o)$$

Where: $\bar{C}$ = mean reference measurement

C_o = mean zero calibration response

C_m = mean mid or upscale calibration gas response

C_{ma} = actual mid or upscale calibration gas concentration

$$\text{lb/hr} = (60)(\text{ppm pollutant})(\text{Conv. Factor})(\text{DSCFM})$$

Where: NOx Conv. Factor = 1.194E-07 lb NO2/SCF - ppm NO2

CO Conv. Factor = 7.263E-08 lb CO/SCF - ppm CO

CALCULATION OF AVERAGE NOx AND CO EMISSIONS

COMPANY: LOUISIANA-PACIFIC Roxboro, NC

SOURCE: RTO #1 INLET

RUN: 2 (18:45 - 19:45)

DATE: 8-9-96

GAS VALUE	INITIAL CAL	FINAL CAL	MEAN CAL
0.0 ppm NOx	0.7	0.2	0.5
47.1 ppm NOx	44.6	46.0	45.3
0.0 ppm CO	0.0	0.6	0.3
149.2 ppm CO	150.3	150.4	150.4
0.00 % Oxygen	0.04	0.08	0.06
12.26 % Oxygen	12.16	12.09	12.13

Uncorrected Data:	27.8 ppm NOx	17.21 % Oxygen
	203.7 ppm CO	31,799 DSCFM

CORRECTED RESULTS

28.7 ppm NOx	6.5 lb/hr NOx
202.2 ppm CO	28.0 lb/hr CO
17.42 % Oxygen	

$$\text{Corrected Conc.} = C_{ma}(\bar{C} - C_o)/(C_m - C_o)$$

Where: $\bar{C}$ = mean reference measurement

C_o = mean zero calibration response

C_m = mean mid or upscale calibration gas response

C_{ma} = actual mid or upscale calibration gas concentration

$$\text{lb/hr} = (60)(\text{ppm pollutant})(\text{Conv. Factor})(\text{DSCFM})$$

Where: NOx Conv. Factor = 1.194E-07 lb NO2/SCF - ppm NO2

CO Conv. Factor = 7.263E-08 lb CO/SCF - ppm CO

CALCULATION OF AVERAGE NOx AND CO EMISSIONS

COMPANY: LOUISIANA-PACIFIC Roxboro, NC

SOURCE: RTO #1 INLET

RUN: 3 (20:20 - 21:20)

DATE: 8-9-96

GAS VALUE	INITIAL CAL	FINAL CAL	MEAN CAL
0.0 ppm NOx	0.2	0.1	0.2
47.1 ppm NOx	46.0	47.6	46.8
0.0 ppm CO	0.6	0.6	0.6
149.2 ppm CO	150.4	151.4	150.9
0.00 % Oxygen	0.08	0.04	0.06
12.26 % Oxygen	12.09	12.28	12.19

Uncorrected Data:	44.4 ppm NOx	17.10 % Oxygen
	183.0 ppm CO	31,783 DSCFM

CORRECTED RESULTS

44.7 ppm NOx	10.2 lb/hr NOx
181.1 ppm CO	25.1 lb/hr CO
17.22 % Oxygen	

$$\text{Corrected Conc.} = C_{ma}(\bar{C} - C_o)/(C_m - C_o)$$

Where: $\bar{C}$ = mean reference measurement

C_o = mean zero calibration response

C_m = mean mid or upscale calibration gas response

C_{ma} = actual mid or upscale calibration gas concentration

$$\text{lb/hr} = (60)(\text{ppm pollutant})(\text{Conv. Factor})(\text{DSCFM})$$

Where: NOx Conv. Factor = 1.194E-07 lb NO2/SCF - ppm NO2

CO Conv. Factor = 7.263E-08 lb CO/SCF - ppm CO

SYSTEM CALIBRATION BIAS AND DRIFT CALCULATIONS

COMPANY: LOUISIANA-PACIFIC Roxboro, NC
SOURCE: RTO #1 INLET

TEST DATE: 8-9-96

RUN NUMBER: 1 (17:20 - 18:20)

SPAN VALUES: 100.0 ppm NOx
500.0 ppm CO
25.00 % Oxygen

	—INITIAL VALUES—			—FINAL VALUES—		
	ANALYZER CAL RESPONSE	SYSTEM CAL RESPONSE	SYSTEM CAL BIAS (% OF SPAN)	SYSTEM CAL RESPONSE	SYSTEM CAL BIAS (% OF SPAN)	DRIFT (% OF SPAN)
NOx ZERO GAS	0.4	0.0	-0.40	0.7	0.30	0.70
NOx UP-SCALE	46.3	46.0	-0.30	44.6	-1.70	-1.40
CO ZERO GAS	0.0	0.6	0.12	0.0	0.00	-0.12
CO UP-SCALE	147.5	152.9	1.08	150.3	0.56	-0.52
O2 ZERO GAS	0.34	0.04	-1.20	0.04	-1.20	0.00
O2 UP-SCALE	12.19	12.04	-0.60	12.16	-0.12	0.48

$$\text{SYSTEM CAL BIAS} = \frac{\text{SYSTEM CAL RESPONSE} - \text{ANALYZER CAL RESPONSE}}{\text{SPAN}} \times 100$$

$$\text{DRIFT} = \frac{\text{FINAL SYSTEM CAL RESPONSE} - \text{INITIAL CAL RESPONSE}}{\text{SPAN}} \times 100$$

SYSTEM CALIBRATION BIAS AND DRIFT CALCULATIONS

COMPANY: LOUISIANA-PACIFIC Roxboro, NC
SOURCE: RTO #1 INLET

TEST DATE: 8-9-86

RUN NUMBER: 2 (18:45 - 19:45)

SPAN VALUES: 100.0 ppm NOx
500.0 ppm CO
25.00 % Oxygen

	INITIAL VALUES			FINAL VALUES		
	ANALYZER CAL. RESPONSE	SYSTEM CAL. RESPONSE	SYSTEM CAL. BIAS (% OF SPAN)	SYSTEM CAL. RESPONSE	SYSTEM CAL. BIAS (% OF SPAN)	DRIFT (% OF SPAN)
NOx ZERO GAS	0.4	0.7	0.30	0.2	-0.20	-0.50
NOx UP-SCALE	48.3	44.6	-1.70	46.0	-0.30	1.40
CO ZERO GAS	0.0	0.0	0.00	0.6	0.12	0.12
CO UP-SCALE	147.5	150.3	0.56	150.4	0.58	0.02
O2 ZERO GAS	0.34	0.04	-1.20	0.08	-1.04	0.16
O2 UP-SCALE	12.19	12.16	-0.12	12.09	-0.40	-0.28

$$\text{SYSTEM CAL. BIAS} = \frac{\text{SYSTEM CAL. RESPONSE} - \text{ANALYZER CAL. RESPONSE}}{\text{SPAN}} \times 100$$

$$\text{DRIFT} = \frac{\text{FINAL SYSTEM CAL. RESPONSE} - \text{INITIAL CAL. RESPONSE}}{\text{SPAN}} \times 100$$

SYSTEM CALIBRATION BIAS AND DRIFT CALCULATIONS

COMPANY: LOUISIANA-PACIFIC Roxboro, NC
SOURCE: RTO #1 INLET

TEST DATE: 8-9-96

RUN NUMBER: 3 (20:20 - 21:20)

SPAN VALUES: 100.0 ppm NOx
500.0 ppm CO
25.00 % Oxygen

	INITIAL VALUES			FINAL VALUES		
	ANALYZER CAL RESPONSE	SYSTEM CAL RESPONSE	SYSTEM CAL BIAS (% OF SPAN)	SYSTEM CAL RESPONSE	SYSTEM CAL BIAS (% OF SPAN)	DRIFT (% OF SPAN)
NOx ZERO GAS	0.4	0.2	-0.20	0.1	-0.30	-0.10
NOx UP-SCALE	46.3	46.0	-0.30	47.6	1.30	1.60
CO ZERO GAS	0.0	0.6	0.12	0.6	0.12	0.00
CO UP-SCALE	147.5	150.4	0.58	151.4	0.78	0.20
O2 ZERO GAS	0.34	0.08	-1.04	0.04	-1.20	-0.16
O2 UP-SCALE	12.19	12.09	-0.40	12.28	0.36	0.76

$$\text{SYSTEM CAL BIAS} = \frac{\text{SYSTEM CAL RESPONSE} - \text{ANALYZER CAL RESPONSE}}{\text{SPAN}} \times 100$$

$$\text{DRIFT} = \frac{\text{FINAL SYSTEM CAL RESPONSE} - \text{INITIAL CAL RESPONSE}}{\text{SPAN}} \times 100$$

APPENDIX A. TEST RESULTS

1. Dryer Exhaust No. 1

b. Volumetric Air Flow Rates

VOLUMETRIC FLOW RATE DETERMINATION

Company & Plant: Louisiana Pacific - Roxboro, NC

Test Location: Dryer Exhaust No. 1

Operator: Danny L. Speer

Run: D1-M2-2

Date: 8/09/96

Time: 1720 - 1725

TEST DATA

Test Point	Delta P (in H2O)	Temp. (° F)	Parameter	D1-M2-2
A-1	1.52	182	A Stack/Duct Area:	1590 sq. in.
2	1.55	182	Pbar Barometric Pressure:	29.90 in. Hg
3	1.62	182	Pg Source Gas Static Pressure:	0.38 in. H2O
4	1.65	182	Cp Pitot Tube Coefficient:	0.84
5	1.55	182	%O2 Oxygen, by vol. dry:	16.7 % O2
6	1.57	182	%CO2 Carbon Dioxide, by vol. dry:	3.8 % CO2
7	1.58	182	%N2 Nitrogen, by vol. dry:	79.5 % N2
8	1.50	182		
9	1.35	182	ts Avg Source Gas Temperature:	182.0 ° F
10	1.30	182	sqrt dp Avg Square Root Delta p:	1.1931 in. H2O
11	1.35	182	dp Average Velocity Head For 16 pts:	1.4235 in. H2O
12	1.32	182	(Squared Avg. Sq.Root Delta p)	
13	1.52	182		
14	1.28	182		
15	1.10	182		
16	1.10	182		

Moisture Content Avg of Runs D2-M2/4-1 & D2-M2/4-4

RESULTS TABULATION

Vmstd	Volume of Metered Gas Sample	31.717	DSCF*
Vwstd	Volume of Water Vapor	9.485	SCF*
%H2O	Moisture Content, by volume	23.8	% **
Mfd	Dry Mole Fraction	0.762	
Md	Source Gas Molecular Wt., Dry	29.28	lb/lb-mole
Ms	Source Gas Molecular Wt., Wet	26.59	lb/lb-mole
Fo	Fuel Factor	1.11	
Ps	Absolute Flue Gas Pressure	29.93	in. Hg
vs	Source Gas Velocity	76.95	ft/sec
	<u>Volumetric Air Flow Rates</u>		
Qsd	Standard Cubic Feet/Min., Dry *	31,966	SCFM Dry
QsdH	Standard Cubic Feet/Hour, Dry *	1,917,973	SCFH Dry
Qsw	Standard Cubic Feet/Min., Wet *	41,950	SCFM Wet
QswH	Standard Cubic Feet/Hour, Wet *	2,517,025	SCFH Wet
Qmsd	Standard Cubic Meter/Min., Dry *	905	SCMM Dry
Qaw	Actual Cubic Feet/Min., Wet	50,994	ACFM

* 68° F (20° C) - 29.92 inches of Mercury

** Value used in calculations

VOLUMETRIC FLOW RATE DETERMINATION

Company & Plant: Louisiana Pacific - Roxboro, NC

Test Location: Dryer Exhaust No. 1

Operator: Danny L. Speer

Run: D1-M2-3

Date: 8/09/96

Time: 1855 - 1900

TEST DATA				
Test Point	Delta P (in H2O)	Temp. (° F)	Parameter	D1-M2-3
A-1	1.56	184	A Stack/Duct Area:	1590 sq. in.
2	1.51	184	Pbar Barometric Pressure:	29.90 in. Hg
3	1.60	184	Pg Source Gas Static Pressure:	0.39 in. H2O
4	1.64	184	Cp Pitot Tube Coefficient:	0.84
5	1.53	184	%O2 Oxygen, by vol. dry:	16.7 % O2
6	1.55	184	%CO2 Carbon Dioxide, by vol. dry:	3.8 % CO2
7	1.62	184	%N2 Nitrogen, by vol. dry:	79.5 % N2
8	1.58	184		
9	1.37	184	ts Avg Source Gas Temperature:	184.0 ° F
10	1.28	184	sqrtdp Avg Square Root Delta p:	1.1887 in. H2O
11	1.27	184	dp Average Velocity Head For 16 pts: (Squared Avg. Sq.Root Delta p)	1.4130 in. H2O
12	1.30	184		
13	1.44	184		
14	1.27	184		
15	1.10	184		
16	1.08	184		

Moisture Content Avg of Runs D2-M2/4-1 & D2-M2/4-4

RESULTS TABULATION

Vmstd	Volume of Metered Gas Sample	31.717	DSCF*
Vwstd	Volume of Water Vapor	9.485	SCF*
%H2O	Assumed Moisture Content, by volume	23.8	% **
Mfd	Dry Mole Fraction	0.762	
Md	Source Gas Molecular Wt., Dry	29.28	lb/lb-mole
Ms	Source Gas Molecular Wt., Wet	26.59	lb/lb-mole
Fo	Fuel Factor	1.11	
Ps	Absolute Flue Gas Pressure	29.93	in. Hg
vs	Source Gas Velocity	76.79	ft/sec
<u>Volumetric Air Flow Rates</u>			
Qsd	Standard Cubic Feet/Min., Dry *	31,799	SCFM Dry
QsdH	Standard Cubic Feet/Hour, Dry *	1,907,928	SCFH Dry
Qsw	Standard Cubic Feet/Min., Wet *	41,731	SCFM Wet
QswH	Standard Cubic Feet/Hour, Wet *	2,503,843	SCFH Wet
Qmsd	Standard Cubic Meter/Min., Dry *	901	SCMM Dry
Qaw	Actual Cubic Feet/Min., Wet	50,884	ACFM

- * 68° F (20° C) ~ 29.92 inches of Mercury
- ** Value used in calculations

VOLUMETRIC FLOW RATE DETERMINATION

Company & Plant: Louisiana Pacific - Roxboro, NC
 Test Location: Dryer Exhaust No. 1
 Operator: Danny L. Speer

Run: D1-M2-4
 Date: 8/09/96
 Time: 2125 - 2130

TEST DATA					
Test Point	Delta P (in H2O)	Temp. (° F)	Parameter	D1-M2-4	
A-1	1.27	189	A	Stack/Duct Area:	1590 sq. in.
2	1.26	189	Pbar	Barometric Pressure:	29.90 in. Hg
3	1.30	189	Pg	Source Gas Static Pressure:	0.45 in. H2O
4	1.50	189	Cp	Pitot Tube Coefficient:	0.84
5	1.55	189	%O2	Oxygen, by vol. dry:	16.7 % O2
6	1.61	189	%CO2	Carbon Dioxide, by vol. dry:	3.8 % CO2
7	1.55	189	%N2	Nitrogen, by vol. dry:	79.5 % N2
8	1.65	189			
9	1.60	189	ts	Avg Source Gas Temperature:	189.0 ° F
10	1.65	189	sqrtdp	Avg Square Root Delta p:	1.1926 in. H2O
11	1.52	189	dp	Average Velocity Head For 16 pts: (Squared Avg. Sq.Root Delta p)	1.4223 in. H2O
12	1.55	189			
13	1.35	189			
14	1.24	189			
15	1.15	189			
16	1.10	189			

Moisture Content Avg of Runs D2-M2/4-1 & D2-M2/4-4

RESULTS TABULATION

Vmstd	Volume of Metered Gas Sample	21.945	DSCF*
Vwstd	Volume of Water Vapor	7.145	SCF*
%H2O	Moisture Content, by volume	23.8	% **
Mfd	Dry Mole Fraction	0.762	
Md	Source Gas Molecular Wt., Dry	29.28	lb/lb-mole
Ms	Source Gas Molecular Wt., Wet	26.59	lb/lb-mole
Fo	Fuel Factor	1.11	
Ps	Absolute Flue Gas Pressure	29.93	in. Hg
vs	Source Gas Velocity	77.33	ft/sec
<u>Volumetric Air Flow Rates</u>			
Qsd	Standard Cubic Feet/Min., Dry *	31,783	SCFM Dry
QsdH	Standard Cubic Feet/Hour, Dry *	1,906,968	SCFH Dry
Qsw	Standard Cubic Feet/Min., Wet *	41,710	SCFM Wet
QswH	Standard Cubic Feet/Hour, Wet *	2,502,583	SCFH Wet
Qmsd	Standard Cubic Meter/Min., Dry *	900	SCMM Dry
Qaw	Actual Cubic Feet/Min., Wet	51,245	ACFM

- * 68° F (20° C) - 29.92 inches of Mercury
- ** Value used in calculations

APPENDIX A. TEST RESULTS

2. Dryer Exhaust No. 2

**a. Carbon Monoxide, Nitrogen Oxides
and Total Hydrocarbons**

FIELD DATA AND RESULTS TABULATION

PLANT: Roxboro OSB Plant, Roxboro, NC

SAMPLING LOCATION: Dryer No. 2 Exhaust

OPERATOR: Stephen B. Weiber

		<u>D2-CEM-1</u>	<u>D2-CEM-2</u>	<u>D2-CEM-3</u>
	Test Date	8/9/96	8/9/96	8/9/96
	Run Start Time	1720	1845	2020
	Run Finish Time	1820	1945	2120
Theta	Net Run Time, min	60.00	60.00	60.00
Pbar	Barometric Pressure, in Hg	29.90	29.90	29.90
Mfd	Dry Mole Fraction	0.770	0.762	0.754
%CO2	Carbon Dioxide, % by volume	3.80	3.80	3.80
%O2	Oxygen, % by volume	16.70	16.70	16.70
Pg	Flue Gas Static Pressure, in H2O	0.61	0.61	0.24
ts	Flue Gas Temperature, °F	192	193	195
Qsd	Volumetric Flow Rate, dry SCFM*	26,483	26,827	26,120
	<u>Carbon Monoxide</u>			
Fwt	Formula Weight, gm/gm-mole	28.01	28.01	28.01
ppmvd	Concentration, ppmvd	204.1	249.0	233.0
lb/hr	Emission Rate, lb/hr	23.6	29.1	26.5
	<u>Nitrogen Oxides as NO2</u>			
Fwt	Formula Weight, gm/gm-mole	46.01	46.01	46.01
ppmvd	Concentration, ppmvd	33.8	31.2	35.0
lb/hr	Emission Rate, lb/hr	6.41	6.00	6.55
	<u>THC as Carbon</u>			
Fwt	Formula Weight, gm/gm-mole	12.01	12.01	12.01
ppmvw	Concentration, ppmvw	509.6	557.9	496.0
ppmvd	Concentration, ppmvd	662	732	658
lb/hr	Emission Rate, lb/hr	32.8	36.7	32.1

TOTAL HYDROCARBON MEASUREMENT RESULTS SUMMARY

PLANT NAME: LOUISIAN-PACIFIC Roxboro NC

TEST LOCATION: RTO Inlet #2

TEST DATE: 08-09-06

OPERATOR: S. Wieber

--- Pre-Test Calibration Error Check ---

SPAN VALUE: 1,000 (ppm as C)	CALIBRATION GAS VALUE (ppmC)*	SYSTEM CAL ERROR RESPONSE	CAL ERROR %
THC Zero Gas	0.0	1.9	0.19
Low-Level Gas	296.0	299.6	1.22
Mid-Level Gas	518.4	514.3	-0.79
High-Level Gas	841.8	842.6	0.10

* ppmC values = ppmC3H8 values x 3

--- Drift Determinations ---

Run Number	D2-M25A-1	D2-M25A-2	D2-M25A-3
Zero Sys. Cal. Response	1.9	5.3	1.3
Zero Drift Response	5.3	1.3	0.7
Zero Drift	0.3	-0.4	-0.1
Upscale Sys. Cal. Resp.	299.6	314.3	313.8
Upscale Drift Response	314.3	313.8	306.7
Upscale Drift	1.5	-0.1	-0.7

RUN NO.:	D2-M25A-1	D2-M25A-2	D2-M25A-3
RUN TIME:	1720-1820	1845-1945	2020-2120
THC (ppmwC):	509.6	557.9	496.0
%H2O:	23.00	23.80	24.60
THC (ppmdC):	661.8	732.2	431.5
DSCFM:	26,483	26,827	26,120
THC (lb/hr C):	32.78	36.73	21.08

$$\text{ppmd} = \text{ppmw} / (1 - (\%H_2O/100))$$

$$\text{lb/hr} = (\text{ppmd} \times \text{DSCFM} \times 60 \times \text{MolWt.}) / 385.3 \text{ E06}$$

Where: Carbon = 12.01 lb/lb mole

$$\text{Cal. Error} = \frac{\text{System Cal. Response} - \text{Cal. Gas Value}}{\text{Cal. Gas Value}} \times 100$$

$$\text{Drift} = \frac{\text{Drift Response} - \text{System Cal. Response}}{\text{Span Value}} \times 100$$

** For zero gas calibration error use span value

CALCULATION OF AVERAGE NOx AND CO EMISSIONS

COMPANY LOUISIANA-PACIFIC Roxboro, NC

SOURCE: RTO #2 INLET

RUN: 1 (17:20 - 18:20)

DATE: 08-09-96

GAS VALUE	INITIAL CAL	FINAL CAL	MEAN CAL
0.0 ppm NOx	0.3	0.8	0.6
47.1 ppm NOx	46.3	47.2	46.8
0.0 ppm CO	1.5	1.5	1.5
149.2 ppm CO	151.1	157.1	154.1

Uncorrected Data:

33.8 ppm NOx
210.3 ppm CO

26,483 DSCFM

CORRECTED RESULTS

33.8 ppm NOx
204.1 ppm CO

6.4 lb/hr NOx
23.6 lb/hr CO

$$\text{Corrected Conc.} = \frac{C_m(\bar{C} - C_o)}{(C_m - C_o)}$$

Where: $\bar{C}$ = mean reference measurement

C_o = mean zero calibration response

C_m = mean mid or upscale calibration gas response

C_{ma} = actual mid or upscale calibration gas concentration

$$\text{lb/hr} = (60)(\text{ppm pollutant})(\text{Conv. Factor})(\text{DSCFM})$$

Where: NOx Conv. Factor = 1.194E-07 lb NO2/SCF - ppm NO2

CO Conv. Factor = 7.263E-08 lb CO/SCF - ppm CO

CALCULATION OF AVERAGE NOx AND CO EMISSIONS

COMPANY LOUISIANA-PACIFIC Roxboro, NC

SOURCE: RTO #2 INLET

RUN: 2 (18:45 - 19:45)

DATE: 08-09-96

GAS VALUE	INITIAL CAL	FINAL CAL	MEAN CAL
0.0 ppm NOx	0.8	0.7	0.8
47.1 ppm NOx	47.2	47.3	47.3
0.0 ppm CO	1.5	2.6	2.1
149.2 ppm CO	157.1	149.3	153.2

Uncorrected Data:

31.6 ppm NOx

254.3 ppm CO

26,827 DSCFM

CORRECTED RESULTS

31.2 ppm NOx

249.0 ppm CO

6.0 lb/hr NOx

29.1 lb/hr CO

$$\text{Corrected Conc.} = C_{ma}(\bar{C} - C_o)/(C_m - C_o)$$

Where: $\bar{C}$ = mean reference measurement

C_o = mean zero calibration response

C_m = mean mid or upscale calibration gas response

C_{ma} = actual mid or upscale calibration gas concentration

$$\text{lb/hr} = (60)(\text{ppm pollutant})(\text{Conv. Factor})(\text{DSCFM})$$

Where: NOx Conv. Factor =

1.194E-07 lb NO2/SCF - ppm NO2

CO Conv. Factor =

7.263E-08 lb CO/SCF - ppm CO

CALCULATION OF AVERAGE NOx AND CO EMISSIONS

COMPANY LOUISIANA-PACIFIC Roxboro, NC

SOURCE: RTO #2 INLET

RUN: 3 (20:20 - 21:20)

DATE: 08-09-96

GAS VALUE	INITIAL CAL	FINAL CAL	MEAN CAL
0.0 ppm NOx	0.7	0.6	0.7
47.1 ppm NOx	47.3	47.4	47.4
0.0 ppm CO	2.6	2.0	2.3
149.2 ppm CO	149.3	152.0	150.7

Uncorrected Data:

35.4 ppm NOx
234.1 ppm CO

26,120 DSCFM

CORRECTED RESULTS

35.0 ppm NOx
233.0 ppm CO

6.5 lb/hr NOx
26.5 lb/hr CO

$$\text{Corrected Conc.} = C_{ma}(\bar{C} - C_o)/(C_m - C_o)$$

Where: $\bar{C}$ = mean reference measurement

C_o = mean zero calibration response

C_m = mean mid or upscale calibration gas response

C_{ma} = actual mid or upscale calibration gas concentration

$$\text{lb/hr} = (60)(\text{ppm pollutant})(\text{Conv. Factor})(\text{DSCFM})$$

Where: NOx Conv. Factor = 1.194E-07 lb NO2/SCF - ppm NO2

CO Conv. Factor = 7.263E-08 lb CO/SCF - ppm CO

SYSTEM CALIBRATION BIAS AND DRIFT CALCULATIONS

COMPANY: LOUISIANA-PACIFIC Roxboro, NC
SOURCE: RTO #2 INLET

TEST DATE: 08-09-96

RUN NUMBER: 1 (17:20 - 18:20)

SPAN VALUES: 100.0 ppm NOx
500.0 ppm CO

	—INITIAL VALUES—			—FINAL VALUES—		
	ANALYZER CAL RESPONSE	SYSTEM CAL RESPONSE	SYSTEM CAL BIAS (% OF SPAN)	SYSTEM CAL RESPONSE	SYSTEM CAL BIAS (% OF SPAN)	DRIFT (% OF SPAN)
NOx ZERO GAS	0.4	0.3	-0.10	0.8	0.40	0.50
NOx UP-SCALE	46.6	46.3	-0.30	47.2	0.60	0.90
CO ZERO GAS	1.5	1.5	0.00	1.5	0.00	0.00
CO UP-SCALE	148.2	148.2	0.00	157.1	1.78	1.78

$$\text{SYSTEM CAL BIAS} = \frac{\text{SYSTEM CAL RESPONSE} - \text{ANALYZER CAL RESPONSE}}{\text{SPAN}} \times 100$$

$$\text{DRIFT} = \frac{\text{FINAL SYSTEM CAL RESPONSE} - \text{INITIAL CAL RESPONSE}}{\text{SPAN}} \times 100$$

SYSTEM CALIBRATION BIAS AND DRIFT CALCULATIONS

COMPANY: LOUISIANA-PACIFIC Roxboro, NC
SOURCE: RTO #2 INLET

TEST DATE: 08-09-96

RUN NUMBER: 2 (18:45 - 19:45)

SPAN VALUES: 100.0 ppm NOx
500.0 ppm CO

	—INITIAL VALUES—			—FINAL VALUES—		
	ANALYZER CAL RESPONSE	SYSTEM CAL RESPONSE	SYSTEM CAL BIAS (% OF SPAN)	SYSTEM CAL RESPONSE	SYSTEM CAL BIAS (% OF SPAN)	DRIFT (% OF SPAN)
NOx ZERO GAS	0.4	0.8	0.40	0.7	0.30	-0.10
NOx UP-SCALE	46.6	47.2	0.60	47.3	0.70	0.10
CO ZERO GAS	1.5	1.5	0.00	2.6	0.22	0.22
CO UP-SCALE	148.2	157.1	1.78	149.3	0.22	-1.56

$$\text{SYSTEM CAL BIAS} = \frac{\text{SYSTEM CAL RESPONSE} - \text{ANALYZER CAL RESPONSE}}{\text{SPAN}} \times 100$$

$$\text{DRIFT} = \frac{\text{FINAL SYSTEM CAL RESPONSE} - \text{INITIAL CAL RESPONSE}}{\text{SPAN}} \times 100$$

SYSTEM CALIBRATION BIAS AND DRIFT CALCULATIONS

COMPANY: LOUISIANA-PACIFIC Roxboro, NC
SOURCE: RTO #2 INLET

TEST DATE: 08-09-96

RUN NUMBER: 3 (20:20 - 21:20)

SPAN VALUES: 100.0 ppm NOx
500.0 ppm CO

	INITIAL VALUES			FINAL VALUES		
	ANALYZER CAL RESPONSE	SYSTEM CAL RESPONSE	SYSTEM CAL BIAS (% OF SPAN)	SYSTEM CAL RESPONSE	SYSTEM CAL BIAS (% OF SPAN)	DRIFT (% OF SPAN)
NOx ZERO GAS	0.4	2.6	2.20	0.6	0.20	-2.00
NOx UP-SCALE	48.6	47.3	0.70	47.4	0.80	0.10
CO ZERO GAS	1.5	2.6	0.22	2.0	0.10	-0.12
CO UP-SCALE	148.2	149.3	0.22	152.0	0.76	0.54

$$\text{SYSTEM CAL BIAS} = \frac{\text{SYSTEM CAL RESPONSE} - \text{ANALYZER CAL RESPONSE}}{\text{SPAN}} \times 100$$

$$\text{DRIFT} = \frac{\text{FINAL SYSTEM CAL RESPONSE} - \text{INITIAL CAL RESPONSE}}{\text{SPAN}} \times 100$$

APPENDIX A. TEST RESULTS

2. Dryer Exhaust No. 2

b. Volumetric Air Flow Rates

VOLUMETRIC FLOW RATE DETERMINATION

Company & Plant: Louisiana Pacific - Roxboro, NC

Test Location: Dryer Exhaust No. 2

Operator: Danny L. Speer

Run: D2-M2/4-2

Date: 8/09/96

Time: 1725 - 1730

TEST DATA					D2-M2/4-2	
Test Point	Delta P (in H2O)	Temp. (° F)	Parameter			
A-1	0.75	192	A	Stack/Duct Area:	1590	sq. in.
2	0.78	192	Pbar	Barometric Pressure:	29.90	in. Hg
3	0.8	192	Pg	Source Gas Static Pressure:	0.61	in. H2O
4	0.86	192	Cp	Pitot Tube Coefficient:	0.84	
5	0.88	192	%O2	Oxygen, by vol. dry:	16.7	% O2
6	0.87	192	%CO2	Carbon Dioxide, by vol. dry:	3.8	% CO2
7	0.85	192	%N2	Nitrogen, by vol. dry:	79.5	% N2
8	0.85	192				
9	1.05	192	ts	Avg Source Gas Temperature:	192.0	° F
10	1.10	192	sqrtdp	Avg Square Root Delta p:	0.9874	in. H2O
11	1.12	192	dp	Average Velocity Head For 16 pts: (Squared Avg. Sq.Root Delta p)	0.9749	in. H2O
12	1.15	192				
13	1.17	192				
14	1.17	192				
15	1.14	192	Theta	Net Run Time:	60	Minutes
16	1.16	192	Y	Dry Gas Meter Cal. Factor:	1.0068	
			tm	Dry Gas Meter Temperature:	107.6	° F
			Vm	Volume of Metered Gas Sample:	33.805	ACF
			Vlc	Tot. Vol. of Liquid Collected:	201.5	grams
			dH	Avg Meter Press. Differential:	1.00	in. H2O

RESULTS TABULATION

Vmstd	Volume of Metered Gas Sample	31.717	DSCF*
Vwstd	Volume of Water Vapor	9.485	SCF*
%H2O	Moisture Content, by volume	23.0	% **
Mfd	Dry Mole Fraction	0.770	
Md	Source Gas Molecular Wt., Dry	29.28	lb/lb-mole
Ms	Source Gas Molecular Wt., Wet	26.68	lb/lb-mole
Fo	Fuel Factor	1.11	
Ps	Absolute Flue Gas Pressure	29.94	in. Hg
vs	Source Gas Velocity	64.05	ft/sec
<u>Volumetric Air Flow Rates</u>			
Qsd	Standard Cubic Feet/Min., Dry *	26,483	SCFM Dry
QsdH	Standard Cubic Feet/Hour, Dry *	1,588,980	SCFH Dry
Qsw	Standard Cubic Feet/Min., Wet *	34,402	SCFM Wet
QswH	Standard Cubic Feet/Hour, Wet *	2,064,146	SCFH Wet
Qmsd	Standard Cubic Meter/Min., Dry *	750	SCMM Dry
Qaw	Actual Cubic Feet/Min., Wet	42,446	ACFM

* 68° F (20° C) -- 29.92 inches of Mercury
 ** Value used in calculations

VOLUMETRIC FLOW RATE DETERMINATION

Company & Plant: Louisiana Pacific - Roxboro, NC

Test Location: Dryer Exhaust No. 2

Operator: Danny L. Speer

Run: D2-M2-3

Date: 8/09/96

Time: 1850 - 1855

TEST DATA

Test Point	Delta P (in H2O)	Temp. (° F)	Parameter	D2-M2-3
A-1	1.03	193	A Stack/Duct Area:	1590 sq. in.
2	1.02	193	Pbar Barometric Pressure:	29.90 in. Hg
3	1.00	193	Pg Source Gas Static Pressure:	0.61 in. H2O
4	1.03	193	Cp Pitot Tube Coefficient:	0.84
5	0.94	193	%O2 Oxygen, by vol. dry:	16.7 % O2
6	0.95	193	%CO2 Carbon Dioxide, by vol. dry:	3.8 % CO2
7	0.96	193	%N2 Nitrogen, by vol. dry:	79.5 % N2
8	0.90	193		
9	1.00	193	ts Avg Source Gas Temperature:	193.0 ° F
10	1.07	193	sqrtdp Avg Square Root Delta p:	1.0095 in. H2O
11	1.10	193	dp Average Velocity Head For 16 pts: (Squared Avg. Sq.Root Delta p)	1.0191 in. H2O
12	1.08	193		
13	1.12	193		
14	1.03	193		
15	1.07	193		
16	1.02	193		

Moisture Content Avg of Runs D2-M2/4-1 & D2-M2/4-4

RESULTS TABULATION

Vmstd	Volume of Metered Gas Sample	31.717	DSCF*
Vwstd	Volume of Water Vapor	9.485	SCF*
%H2O	Assumed Moisture Content, by volume	23.8	% **
Mfd	Dry Mole Fraction	0.762	
Md	Source Gas Molecular Wt., Dry	29.28	lb/lb-mole
Ms	Source Gas Molecular Wt., Wet	26.59	lb/lb-mole
Fo	Fuel Factor	1.11	
Ps	Absolute Flue Gas Pressure	29.94	in. Hg
vs	Source Gas Velocity	65.65	ft/sec
	<u>Volumetric Air Flow Rates</u>		
Qsd	Standard Cubic Feet/Min., Dry *	26,827	SCFM Dry
QsdH	Standard Cubic Feet/Hour, Dry *	1,609,592	SCFH Dry
Qsw	Standard Cubic Feet/Min., Wet *	35,205	SCFM Wet
QswH	Standard Cubic Feet/Hour, Wet *	2,112,325	SCFH Wet
Qmsd	Standard Cubic Meter/Min., Dry *	760	SCMM Dry
Qaw	Actual Cubic Feet/Min., Wet	43,504	ACFM

* 68° F (20° C) - 29.92 inches of Mercury

** Value used in calculations

VOLUMETRIC FLOW RATE DETERMINATION

Company & Plant: Louisiana Pacific - Roxboro, NC
 Test Location: Dryer Exhaust No. 2
 Operator: Danny L. Speer

Run: D2-M2/4-4
 Date: 8/09/96
 Time: 2115 - 2120

TEST DATA

Test Point	Delta P (in H2O)	Temp. (° F)	Parameter	D2-M2/4-4
A-1	1.00	195	A Stack/Duct Area:	1590 sq. in.
2	0.85	195	Pbar Barometric Pressure:	29.90 in. Hg
3	0.86	195	Pg Source Gas Static Pressure:	0.24 in. H2O
4	0.82	195	Cp Pitot Tube Coefficient:	0.84
5	0.96	195	%O2 Oxygen, by vol. dry:	16.7 % O2
6	0.98	195	%CO2 Carbon Dioxide, by vol. dry:	3.8 % CO2
7	1.02	195	%N2 Nitrogen, by vol. dry:	79.5 % N2
8	1.00	195		
9	0.96	195	ts Avg Source Gas Temperature:	195.0 ° F
10	1.05	195	sqrt dp Avg Square Root Delta p:	0.9932 in. H2O
11	1.07	195	dp Average Velocity Head For 16 pts: (Squared Avg. Sq.Root Delta p)	0.9865 in. H2O
12	1.05	195		
13	1.07	195		
14	1.00	195		
15	1.05	195	Theta Net Run Time:	30 Minutes
16	1.07	195	Y Dry Gas Meter Cal. Factor:	1.0068
			tm Dry Gas Meter Temperature:	107.7 ° F
			Vm Volume of Metered Gas Sample:	23.343 ACF
			Vlc Tot. Vol. of Liquid Collected:	151.8 grams
			dH Avg Meter Press. Differential:	1.88 in. H2O

RESULTS TABULATION

Vmstd	Volume of Metered Gas Sample	21.945	DSCF*
Vwstd	Volume of Water Vapor	7.145	SCF*
%H2O	Moisture Content, by volume	24.6	% **
Mfd	Dry Mole Fraction	0.754	
Md	Source Gas Molecular Wt., Dry	29.28	lb/lb-mole
Ms	Source Gas Molecular Wt., Wet	26.51	lb/lb-mole
Fo	Fuel Factor	1.11	
Ps	Absolute Flue Gas Pressure	29.92	in. Hg
vs	Source Gas Velocity	64.82	ft/sec
<u>Volumetric Air Flow Rates</u>			
Qsd	Standard Cubic Feet/Min., Dry *	26,120	SCFM Dry
QsdH	Standard Cubic Feet/Hour, Dry *	1,567,187	SCFH Dry
Qsw	Standard Cubic Feet/Min., Wet *	34,624	SCFM Wet
QswH	Standard Cubic Feet/Hour, Wet *	2,077,468	SCFH Wet
Qmsd	Standard Cubic Meter/Min., Dry *	740	SCMM Dry
Qaw	Actual Cubic Feet/Min., Wet	42,956	ACFM

- * 68° F (20° C) - 29.92 inches of Mercury
- ** Value used in calculations

APPENDIX A. TEST RESULTS

3. Dryer Exhaust No. 3

**a. Carbon Monoxide, Nitrogen Oxides
and Total Hydrocarbons**

FIELD DATA AND RESULTS TABULATION

PLANT: Roxboro OSB Plant, Roxboro, NC
 SAMPLING LOCATION: Dryer No. 3 Exhaust
 OPERATOR: Stephen B. Weiber

		D3-CEM-1	D3-CEM-2	D3-CEM-3
	Test Date	8/9/96	8/9/96	8/9/96
	Run Start Time	1720	1943	2020
	Run Finish Time	1820	1958	2120
Theta	Net Run Time, min	60.00	15.00	60.00
Pbar	Barometric Pressure, in Hg	29.90	29.90	29.90
Mfd	Dry Mole Fraction	0.762	0.762	0.762
%CO2	Carbon Dioxide, % by volume	3.80	3.80	3.80
%O2	Oxygen, % by volume	16.70	16.70	16.70
Pg	Flue Gas Static Pressure, in H2O	0.45	0.45	0.74
ts	Flue Gas Temperature, °F	187	187	189
Qsd	Volumetric Flow Rate, dry SCFM*	28,426	28,426	27,994
	<u>Carbon Monoxide</u>			
Fwt	Formula Weight, gm/gm-mole	28.01	28.01	28.01
ppmvd	Concentration, ppmvd	96.1	98.4	38.6
lb/hr	Emission Rate, lb/hr	11.9	12.2	4.71
	<u>Nitrogen Oxides as NO2</u>			
Fwt	Formula Weight, gm/gm-mole	46.01	46.01	46.01
ppmvd	Concentration, ppmvd	17.8	15.9	23.0
lb/hr	Emission Rate, lb/hr	3.63	3.24	4.61
	<u>THC as Carbon</u>			
Fwt	Formula Weight, gm/gm-mole	12.01	12.01	12.01
ppmvw	Concentration, ppmvw	367.5	435.2	358.9
ppmvd	Concentration, ppmvd	482	571	471
lb/hr	Emission Rate, lb/hr	25.6	30.4	24.7

TOTAL HYDROCARBON MEASUREMENT RESULTS SUMMARY

PLANT NAME: LOUISIAN-PACIFIC Roxboro NC
 TEST LOCATION: RTO Inlet #3
 TEST DATE: 08-09-96
 OPERATOR: T.Rogers

--- Pre-Test Calibration Error Check ---

SPAN VALUE: 1,000 (ppm as C)	CALIBRATION GAS VALUE (ppmC)*	SYSTEM CAL. ERROR RESPONSE	CAL ERROR %
THC Zero Gas	0.0	2.1	0.21
Low-Level Gas	302.7	303.2	0.17
Mid-Level Gas	518.1	519.8	0.33
High-Level Gas	837.0	838.3	0.16

* ppmC values = ppmC3H8 values x 3

--- Drift Determinations ---

Run Number	D3-M25A-1	D3-M25A-2	D3-M25A-3
Zero Sys. Cal. Response	0.5	1.1	4.9
Zero Drift Response	1.1	4.9	2.9
Zero Drift	0.1	0.4	-0.2
Upscale Sys. Cal. Resp.	302.0	299.4	302.6
Upscale Drift Response	299.4	302.6	301.2
Upscale Drift	-0.3	0.3	-0.1

RUN NO.:	D3-M25A-1	D3-M25A-2	D3-M25A-3
RUN TIME:	1720-1820	1943-1958	2020-2120
THC (ppmwC):	367.5	435.2	358.9
%H2O:	23.80	23.80	23.80
THC (ppmdC):	482.3	571.1	471.0
DSCFM:	28,426	28,426	27,994
THC (lb/hr C):	25.64	30.36	24.66

$$\text{ppmd} = \text{ppmw} / (1 - (\% \text{H}_2\text{O} / 100))$$

$$\text{lb/hr} = (\text{ppmd} \times \text{DSCFM} \times 60 \times \text{Mol.Wt.}) / 385.3 \text{ E06}$$

Where: e 12.01 lb/lb mole

$$\text{Cal. Error} = \frac{\text{System Cal. Response} - \text{Cal. Gas Value}}{\text{** Cal. Gas Value}} \times 100$$

$$\text{Drift} = \frac{\text{Drift Response} - \text{System Cal. Response}}{\text{Span Value}} \times 100$$

** For zero gas calibration error use span value

CALCULATION OF AVERAGE NOx AND CO EMISSIONS

COMPANY LOUISIANA-PACIFIC Roxboro, NC

SOURCE: RTO #3 INLET

RUN: 1 (17:20 - 18:20)

DATE: 08-09-96

GAS VALUE	INITIAL CAL	FINAL CAL	MEAN CAL
0.0 ppm NOx	0.5	2.9	1.7
46.6 ppm NOx	46.0	47.3	46.7
0.0 ppm CO	1.0	0.5	0.8
301.0 ppm CO	299.3	299.2	299.3

Uncorrected Data:

18.9 ppm NOx

96.1 ppm CO

28,426 DSCFM*

CORRECTED RESULTS

17.8 ppm NOx

96.1 ppm CO

3.6 lb/hr NOx

11.9 lb/hr CO

$$\text{Corrected Conc.} = C_{ma}(\bar{C} - C_o)/(C_m - C_o)$$

Where: $\bar{C}$ = mean reference measurement

C_o = mean zero calibration response

C_m = mean mid or upscale calibration gas response

C_{ma} = actual mid or upscale calibration gas concentration

$$\text{lb/hr} = (60)(\text{ppm pollutant})(\text{Conv. Factor})(\text{DSCFM})$$

Where: NOx Conv. Factor = 1.194E-07 lb NO2/SCF - ppm NO2

CO Conv. Factor = 7.263E-08 lb CO/SCF - ppm CO

* Flow rate from run D3-M2-3

CALCULATION OF AVERAGE NOx AND CO EMISSIONS

COMPANY LOUISIANA-PACIFIC Roxboro, NC

SOURCE: RTO #3 INLET

RUN: 2 (19:43 - 19:58)

DATE: 08-09-96

GAS VALUE	INITIAL CAL	FINAL CAL	MEAN CAL
0.0 ppm NOx	2.9	2.8	2.9
46.6 ppm NOx	47.3	46.1	46.7
0.0 ppm CO	0.5	2.9	1.7
301.0 ppm CO	299.2	300.0	299.6

Uncorrected Data: 17.8 ppm NOx

99.1 ppm CO

28,426 DSCFM

CORRECTED RESULTS

15.9 ppm NOx

3.2 lb/hr NOx

98.4 ppm CO

12.2 lb/hr CO

$$\text{Corrected Conc.} = \frac{C_m(\bar{C} - C_o)}{(C_m - C_o)}$$

Where: $\bar{C}$ = mean reference measurement

C_o = mean zero calibration response

C_m = mean mid or upscale calibration gas response

C_{ma} = actual mid or upscale calibration gas concentration

$$\text{lb/hr} = (60)(\text{ppm pollutant})(\text{Conv. Factor})(\text{DSCFM})$$

Where: NOx Conv. Factor = 1.194E-07 lb NO2/SCF - ppm NO2

CO Conv. Factor = 7.263E-08 lb CO/SCF - ppm CO

CALCULATION OF AVERAGE NOx AND CO EMISSIONS

COMPANY LOUISIANA-PACIFIC Roxboro, NC

SOURCE: RTO #3 INLET

RUN: 3 (20:20 - 21:20)

DATE: 08-09-96

GAS VALUE	INITIAL CAL	FINAL CAL	MEAN CAL
0.0 ppm NOx	2.8	2.9	2.9
46.6 ppm NOx	46.1	46.7	46.4
0.0 ppm CO	2.9	2.0	2.5
151.3 ppm CO	150.5	146.0	148.3

Uncorrected Data:

24.4 ppm NOx

39.7 ppm CO

27,994 DSCFM

CORRECTED RESULTS

23.0 ppm NOx

38.6 ppm CO

4.6 lb/hr NOx

4.7 lb/hr CO

$$\text{Corrected Conc.} = C_{ma}(\bar{C} - C_o)/(C_m - C_o)$$

Where: $\bar{C}$ = mean reference measurement

C_o = mean zero calibration response

C_m = mean mid or upscale calibration gas response

C_{ma} = actual mid or upscale calibration gas concentration

$$\text{lb/hr} = (60)(\text{ppm pollutant})(\text{Conv. Factor})(\text{DSCFM})$$

Where: NOx Conv. Factor = 1.194E-07 lb NO2/SCF - ppm NO2

CO Conv. Factor = 7.263E-08 lb CO/SCF - ppm CO

SYSTEM CALIBRATION BIAS AND DRIFT CALCULATIONS

COMPANY: LOUISIANA-PACIFIC Roxboro, NC
SOURCE: RTO #3 INLET

TEST DATE: 08-09-96

RUN NUMBER: 1 (17:20 - 18:20)

SPAN VALUES: 100.0 ppm NOx
500.0 ppm CO

	—INITIAL VALUES—			—FINAL VALUES—		
	ANALYZER CAL RESPONSE	SYSTEM CAL RESPONSE	SYSTEM CAL BIAS (% OF SPAN)	SYSTEM CAL RESPONSE	SYSTEM CAL BIAS (% OF SPAN)	DRIFT (% OF SPAN)
NOx ZERO GAS	0.2	0.5	0.30	2.9	2.70	2.40
NOx UP-SCALE	46.6	46.0	-0.60	47.3	0.70	1.30
CO ZERO GAS	0.6	1.0	0.08	0.5	-0.02	-0.10
CO UP-SCALE	299.4	299.3	-0.02	299.2	-0.04	-0.02

$$\text{SYSTEM CAL BIAS} = \frac{\text{SYSTEM CAL RESPONSE} - \text{ANALYZER CAL RESPONSE}}{\text{SPAN}} \times 100$$

$$\text{DRIFT} = \frac{\text{FINAL SYSTEM CAL RESPONSE} - \text{INITIAL CAL RESPONSE}}{\text{SPAN}} \times 100$$

SYSTEM CALIBRATION BIAS AND DRIFT CALCULATIONS

COMPANY: LOUISIANA-PACIFIC Roxboro, NC
SOURCE: RTO #3 INLET

TEST DATE: 08-09-96

RUN NUMBER: 2 (18:58 - 19:58)

SPAN VALUES: 100.0 ppm NOx
500.0 ppm CO

	—INITIAL VALUES—			—FINAL VALUES—		
	ANALYZER CAL RESPONSE	SYSTEM CAL RESPONSE	SYSTEM CAL BIAS (% OF SPAN)	SYSTEM CAL RESPONSE	SYSTEM CAL BIAS (% OF SPAN)	DRIFT (% OF SPAN)
NOx ZERO GAS	0.2	2.9	2.70	2.8	2.60	-0.10
NOx UP-SCALE	46.6	47.3	0.70	46.1	-0.50	-1.20
CO ZERO GAS	0.6	0.5	-0.02	2.9	0.46	0.48
CO UP-SCALE	299.4	299.2	-0.04	300.0	0.12	0.16

$$\text{SYSTEM CAL BIAS} = \frac{\text{SYSTEM CAL RESPONSE} - \text{ANALYZER CAL RESPONSE}}{\text{SPAN}} \times 100$$

$$\text{DRIFT} = \frac{\text{FINAL SYSTEM CAL RESPONSE} - \text{INITIAL CAL RESPONSE}}{\text{SPAN}} \times 100$$

SYSTEM CALIBRATION BIAS AND DRIFT CALCULATIONS

COMPANY: LOUISIANA-PACIFIC Roxboro, NC
SOURCE: RTO #3 INLET

TEST DATE: 08-09-96

RUN NUMBER: 3 (20:20 - 21:20)

SPAN VALUES: 100.0 ppm NOx
500.0 ppm CO

	INITIAL VALUES			FINAL VALUES		
	ANALYZER CAL RESPONSE	SYSTEM CAL RESPONSE	SYSTEM CAL BIAS (% OF SPAN)	SYSTEM CAL RESPONSE	SYSTEM CAL BIAS (% OF SPAN)	DRIFT (% OF SPAN)
NOx ZERO GAS	0.2	2.8	2.60	2.9	2.70	0.10
NOx UP-SCALE	46.6	46.1	-0.50	46.7	0.10	0.60
CO ZERO GAS	0.6	2.9	0.46	2.0	0.28	-0.18
CO UP-SCALE	151.2	150.5	-0.14	148.0	-1.04	-0.90

$$\text{SYSTEM CAL BIAS} = \frac{\text{SYSTEM CAL RESPONSE} - \text{ANALYZER CAL RESPONSE}}{\text{SPAN}} \times 100$$

$$\text{DRIFT} = \frac{\text{FINAL SYSTEM CAL RESPONSE} - \text{INITIAL CAL RESPONSE}}{\text{SPAN}} \times 100$$

APPENDIX A. TEST RESULTS

3. Dryer Exhaust No. 3

b. Volumetric Air Flow Rates

VOLUMETRIC FLOW RATE DETERMINATION

Company & Plant: Louisiana Pacific - Roxboro, NC

Test Location: Dryer Exhaust No. 3

Operator: Danny L. Speer

Run: D3-M2-3

Date: 8/09/96

Time: 1840 - 1845

TEST DATA					
Test Point	Delta P (in H2O)	Temp. (° F)	Parameter	D3-M2-3	
A-1	1.05	187	A Stack/Duct Area:	1590	sq. in.
2	1.07	187	Pbar Barometric Pressure:	29.90	in. Hg
3	1.10	187	Pg Source Gas Static Pressure:	0.45	in. H2O
4	1.12	187	Cp Pitot Tube Coefficient:	0.84	
5	1.10	187	%O2 Oxygen, by vol. dry:	16.7	% O2
6	1.08	187	%CO2 Carbon Dioxide, by vol. dry:	3.8	% CO2
7	1.17	187	%N2 Nitrogen, by vol. dry:	79.5	% N2
8	1.20	187			
9	1.15	187	ts Avg Source Gas Temperature:	187.0	° F
10	1.15	187	sqrtdp Avg Square Root Delta p:	1.0650	in. H2O
11	1.12	187	dp Average Velocity Head For 16 pts:	1.1343	in. H2O
12	1.20	187	(Squared Avg. Sq.Root Delta p)		
13	1.28	187			
14	1.18	187			
15	1.12	187			
16	1.07	187			

Moisture Content Avg of Runs D2-M2/4-1 & D2-M2/4-4

RESULTS TABULATION

Vmstd	Volume of Metered Gas Sample	31.717	DSCF*
Vwstd	Volume of Water Vapor	9.485	SCF*
%H2O	Assumed Moisture Content, by volume	23.8	% **
Mfd	Dry Mole Fraction	0.762	
Md	Source Gas Molecular Wt., Dry	29.28	lb/lb-mole
Ms	Source Gas Molecular Wt., Wet	26.59	lb/lb-mole
Fo	Fuel Factor	1.11	
Ps	Absolute Flue Gas Pressure	29.93	in. Hg
vs	Source Gas Velocity	68.95	ft/sec
<u>Volumetric Air Flow Rates</u>			
Qsd	Standard Cubic Feet/Min., Dry *	28,426	SCFM Dry
QsdH	Standard Cubic Feet/Hour, Dry *	1,705,582	SCFH Dry
Qsw	Standard Cubic Feet/Min., Wet *	37,305	SCFM Wet
QswH	Standard Cubic Feet/Hour, Wet *	2,238,297	SCFH Wet
Qmsd	Standard Cubic Meter/Min., Dry *	805	SCMM Dry
Qaw	Actual Cubic Feet/Min., Wet	45,692	ACFM

* 68° F (20° C) - 29.92 inches of Mercury

** Value used in calculations

VOLUMETRIC FLOW RATE DETERMINATION

Company & Plant: Louisiana Pacific - Roxboro, NC

Test Location: Dryer Exhaust No. 3

Operator: Danny L. Speer

Run: D3-M2-4

Date: 8/09/96

Time: 2130 - 2135

TEST DATA

Test Point	Delta P (in H2O)	Temp. (° F)	Parameter	D3-M2-4
A-1	0.99	189	A Stack/Duct Area:	1590 sq. in.
2	1.02	189	Pbar Barometric Pressure:	29.90 in. Hg
3	0.98	189	Pg Source Gas Static Pressure:	0.74 in. H2O
4	1.06	189	Cp Pitot Tube Coefficient:	0.84
5	1.11	189	%O2 Oxygen, by vol. dry:	16.7 % O2
6	1.07	189	%CO2 Carbon Dioxide, by vol. dry:	3.8 % CO2
7	1.17	189	%N2 Nitrogen, by vol. dry:	79.5 % N2
8	1.10	189		
9	1.12	189	ts Avg Source Gas Temperature:	189.0 ° F
10	1.15	189	sqrt dp Avg Square Root Delta p:	1.0501 in. H2O
11	1.17	189	dp Average Velocity Head For 16 pts: (Squared Avg. Sq.Root Delta p)	1.1026 in. H2O
12	1.21	189		
13	1.23	189		
14	1.13	189		
15	1.07	189		
16	1.08	189		

Moisture Content Avg of Runs D2-M2/4-1 & D2-M2/4-4

RESULTS TABULATION

Vmstd	Volume of Metered Gas Sample	21.945	DSCF*
Vwstd	Volume of Water Vapor	7.145	SCF*
%H2O	Moisture Content, by volume	23.8	% **
Mfd	Dry Mole Fraction	0.762	
Md	Source Gas Molecular Wt., Dry	29.28	lb/lb-mole
Ms	Source Gas Molecular Wt., Wet	26.59	lb/lb-mole
Fo	Fuel Factor	1.11	
Ps	Absolute Flue Gas Pressure	29.95	in. Hg
vs	Source Gas Velocity	68.06	ft/sec
<u>Volumetric Air Flow Rates</u>			
Qsd	Standard Cubic Feet/Min., Dry *	27,994	SCFM Dry
QsdH	Standard Cubic Feet/Hour, Dry *	1,679,638	SCFH Dry
Qsw	Standard Cubic Feet/Min., Wet *	36,737	SCFM Wet
QswH	Standard Cubic Feet/Hour, Wet *	2,204,249	SCFH Wet
Qmsd	Standard Cubic Meter/Min., Dry *	793	SCMM Dry
Qaw	Actual Cubic Feet/Min., Wet	45,104	ACFM

* 68° F (20° C) - 29.92 inches of Mercury

** Value used in calculations

APPENDIX A. TEST RESULTS

4. Dryer Exhaust No. 4

a. Carbon Monoxide, Nitrogen Oxides and Total Hydrocarbons

FIELD DATA AND RESULTS TABULATION

PLANT: Roxboro OSB Plant, Roxboro, NC

SAMPLING LOCATION: Dryer No. 4 Exhaust

OPERATOR: Stephen B. Weiber

		<u>D4-CEM-1</u>	<u>D4-CEM-2</u>	<u>D4-CEM-3</u>
	Test Date	8/9/96	8/9/96	8/9/96
	Run Start Time	1720	1858	2020
	Run Finish Time	1820	1958	2120
Theta	Net Run Time, min	60.00	60.00	60.00
Pbar	Barometric Pressure, in Hg	29.90	29.90	29.90
Mfd	Dry Mole Fraction	0.762	0.762	0.762
%CO2	Carbon Dioxide, % by volume	3.80	3.80	3.80
%O2	Oxygen, % by volume	16.70	16.70	16.70
Pg	Flue Gas Static Pressure, in H2O	0.36	0.36	0.69
ts	Flue Gas Temperature, °F	189	189	194
Qsd	Volumetric Flow Rate, dry SCFM*	24,916	24,916	24,673
	<u>Carbon Monoxide</u>			
Fwt	Formula Weight, gm/gm-mole	28.01	28.01	28.01
ppmvd	Concentration, ppmvd	109.3	80.1	60.8
lb/hr	Emission Rate, lb/hr	11.9	8.71	6.54
	<u>Nitrogen Oxides as NO2</u>			
Fwt	Formula Weight, gm/gm-mole	46.01	46.01	46.01
ppmvd	Concentration, ppmvd	30.0	25.4	26.1
lb/hr	Emission Rate, lb/hr	5.36	4.53	4.61
	<u>THC as Carbon</u>			
Fwt	Formula Weight, gm/gm-mole	12.01	12.01	12.01
ppmvw	Concentration, ppmvw	683.7	851.1	868.7
ppmvd	Concentration, ppmvd	897	1117	1140
lb/hr	Emission Rate, lb/hr	41.8	52.0	52.6

TOTAL HYDROCARBON MEASUREMENT RESULTS SUMMARY

PLANT NAME: LOUISIAN-PACIFIC Roxboro NC

TEST LOCATION: RTO Inlet #4

TEST DATE: 08-09-96

OPERATOR: T.Rogers

— Pre-Test Calibration Error Check —

SPAN VALUE: 1,000 (ppm as C)	CALIBRATION GAS VALUE (ppmC)*	SYSTEM CAL. ERROR RESPONSE	CAL ERROR %
THC Zero Gas	0.0	1.3	0.13
Low-Level Gas	302.7	304.4	0.56
Mid-Level Gas	518.1	519.6	0.29
High-Level Gas	837.0	837.1	0.01

* ppmC values = ppmC3H8 values x 3

— Drift Determinations —

Run Number	D4-M25A-1	D4-M25A-2	D4-M25A-3
Zero Sys. Cal. Response	1.0	2.1	2.7
Zero Drift Response	2.1	2.7	1.9
Zero Drift	0.1	0.1	-0.1
Upscale Sys. Cal. Resp.	303.9	300.9	301.3
Upscale Drift Response	300.9	301.3	303.2
Upscale Drift	-0.3	0.0	0.2

RUN NO.:	D4-M25A-1	D4-M25A-2	D4-M25A-3
RUN TIME:	1720-1820	1858-1958	2020-2120
THC (ppmwC):	683.7	851.1	868.7
%H2O:	23.80	23.80	23.80
THC (ppmdC):	897.2	1118.9	1140.0
DSCFM:	24,916	24,916	24,673
THC (lb/hr C):	41.81	52.05	52.61

$$\text{ppmd} = \text{ppmw} / (1 - (\% \text{H}_2\text{O}/100))$$

$$\text{lb/hr} = (\text{ppmd} \times \text{DSCFM} \times 60 \times \text{Mol.Wt.}) / 385.3 \text{ E06}$$

Where: e 12.01 lb/lb mole

$$\text{Cal. Error} = \frac{\text{System Cal. Response} - \text{Cal. Gas Value}}{\text{** Cal. Gas Value}} \times 100$$

$$\text{Drift} = \frac{\text{Drift Response} - \text{System Cal. Response}}{\text{Span Value}} \times 100$$

** For zero gas calibration error use span value

CALCULATION OF AVERAGE NOx AND CO EMISSIONS

COMPANY LOUISIANA-PACIFIC Roxboro, NC

SOURCE: RTO #4 INLET

RUN: 1 (17:20 - 18:20)

DATE: 08-09-96

GAS VALUE	INITIAL CAL	FINAL CAL	MEAN CAL
0.0 ppm NOx	1.3	2.8	2.1
46.6 ppm NOx	46.5	47.3	46.9
0.0 ppm CO	1.3	2.3	1.8
301.0 ppm CO	301.3	298.3	299.8

Uncorrected Data:

30.9 ppm NOx
110.0 ppm CO

24,916 DSCFM*

CORRECTED RESULTS

30.0 ppm NOx
109.3 ppm CO

5.4 lb/hr NOx
11.9 lb/hr CO

$$\text{Corrected Conc.} = C_{ma}(C - C_o)/(C_m - C_o)$$

Where: $\bar{C}$ = mean reference measurement

C_o = mean zero calibration response

C_m = mean mid or upscale calibration gas response

C_{ma} = actual mid or upscale calibration gas concentration

$$\text{lb/hr} = (60)(\text{ppm pollutant})(\text{Conv. Factor})(\text{DSCFM})$$

Where: NOx Conv. Factor = 1.194E-07 lb NO2/SCF - ppm NO2

CO Conv. Factor = 7.263E-08 lb CO/SCF - ppm CO

* Flow rate from run D4-M2-3

CALCULATION OF AVERAGE NOx AND CO EMISSIONS

COMPANY LOUISIANA-PACIFIC Roxboro, NC

SOURCE: RTO #4 INLET

RUN: 2 (18:58 - 19:58)

DATE: 08-09-96

GAS VALUE	INITIAL CAL	FINAL CAL	MEAN CAL
0.0 ppm NOx	2.8	2.4	2.6
46.6 ppm NOx	47.3	47.4	47.4
0.0 ppm CO	2.3	2.0	2.2
301.0 ppm CO	298.3	300.0	299.2

Uncorrected Data:

27.0 ppm NOx

81.2 ppm CO

24,916 DSCFM

CORRECTED RESULTS

25.4 ppm NOx

80.1 ppm CO

4.5 lb/hr NOx

8.7 lb/hr CO

$$\text{Corrected Conc.} = C_{ma}(\bar{C} - C_o)/(C_m - C_o)$$

Where: $\bar{C}$ = mean reference measurement

C_o = mean zero calibration response

C_m = mean mid or upscale calibration gas response

C_{ma} = actual mid or upscale calibration gas concentration

$$\text{lb/hr} = (60)(\text{ppm pollutant})(\text{Conv. Factor})(\text{DSCFM})$$

Where: NOx Conv. Factor = 1.194E-07 lb NO2/SCF - ppm NO2

CO Conv. Factor = 7.263E-08 lb CO/SCF - ppm CO

CALCULATION OF AVERAGE NOx AND CO EMISSIONS

COMPANY LOUISIANA-PACIFIC Roxboro, NC

SOURCE: RTO #4 INLET

RUN: 3 (20:20 - 21:20)

DATE: 08-09-96

GAS VALUE	INITIAL CAL	FINAL CAL	MEAN CAL
0.0 ppm NOx	2.4	1.8	2.1
46.6 ppm NOx	47.4	46.6	47.0
0.0 ppm CO	2.0	1.9	2.0
151.3 ppm CO	149.9	149.4	149.7

Uncorrected Data: 27.2 ppm NOx
61.4 ppm CO

24,673 DSCFM

26.1 ppm NOx
60.8 ppm CO

4.6 lb/hr NOx
6.5 lb/hr CO

$$\text{Corrected Conc.} = \text{Cma}(\bar{C} - C_o) / (C_m - C_o)$$

Where: $\bar{C}$ = mean reference measurement

C_o = mean zero calibration response

C_m = mean mid or upscale calibration gas response

C_{ma} = actual mid or upscale calibration gas concentration

$$\text{lb/hr} = (60)(\text{ppm pollutant})(\text{Conv. Factor})(\text{DSCFM})$$

Where: NOx Conv. Factor = 1.194E-07 lb NO2/SCF - ppm NO2

CO Conv. Factor = 7.263E-08 lb CO/SCF - ppm CO

SYSTEM CALIBRATION BIAS AND DRIFT CALCULATIONS

COMPANY: LOUISIANA-PACIFIC Roxboro, NC
SOURCE: RTO #4 INLET

TEST DATE: 08-09-96

RUN NUMBER: 1 (17:20 - 18:20)

SPAN VALUES: 100.0 ppm NOx
500.0 ppm CO

	INITIAL VALUES			FINAL VALUES		
	ANALYZER CAL RESPONSE	SYSTEM CAL RESPONSE	SYSTEM CAL BIAS (% OF SPAN)	SYSTEM CAL RESPONSE	SYSTEM CAL BIAS (% OF SPAN)	DRIFT (% OF SPAN)
NOx ZERO GAS	0.3	1.3	1.00	2.8	2.50	1.50
NOx UP-SCALE	46.6	46.5	-0.10	47.3	0.70	0.80
CO ZERO GAS	1.4	1.3	-0.02	2.3	0.18	0.20
CO UP-SCALE	300.8	301.3	0.10	298.3	-0.50	-0.60

$$\text{SYSTEM CAL BIAS} = \frac{\text{SYSTEM CAL RESPONSE} - \text{ANALYZER CAL RESPONSE}}{\text{SPAN}} \times 100$$

$$\text{DRIFT} = \frac{\text{FINAL SYSTEM CAL RESPONSE} - \text{INITIAL CAL RESPONSE}}{\text{SPAN}} \times 100$$

SYSTEM CALIBRATION BIAS AND DRIFT CALCULATIONS

COMPANY: LOUISIANA-PACIFIC Roxboro, NC
SOURCE: RTO #4 INLET

TEST DATE: 08-09-96

RUN NUMBER: 2 (18:58 - 19:58)

SPAN VALUES: 100.0 ppm NOx
500.0 ppm CO

	—INITIAL VALUES—			—FINAL VALUES—		
	ANALYZER CAL RESPONSE	SYSTEM CAL RESPONSE	SYSTEM CAL BIAS (% OF SPAN)	SYSTEM CAL RESPONSE	SYSTEM CAL BIAS (% OF SPAN)	DRIFT (% OF SPAN)
NOx ZERO GAS	0.3	2.8	2.50	2.4	2.10	-0.40
NOx UP-SCALE	46.6	47.3	0.70	47.4	0.80	0.10
CO ZERO GAS	1.4	2.3	0.18	2.0	0.12	-0.06
CO UP-SCALE	300.8	298.3	-0.50	300.0	-0.16	0.34

$$\text{SYSTEM CAL BIAS} = \frac{\text{SYSTEM CAL RESPONSE} - \text{ANALYZER CAL RESPONSE}}{\text{SPAN}} \times 100$$

$$\text{DRIFT} = \frac{\text{FINAL SYSTEM CAL RESPONSE} - \text{INITIAL CAL RESPONSE}}{\text{SPAN}} \times 100$$

SYSTEM CALIBRATION BIAS AND DRIFT CALCULATIONS

COMPANY: LOUISIANA-PACIFIC Roxboro, NC
SOURCE: RTO #4 INLET

TEST DATE: 08-09-96

RUN NUMBER: 3 (20:20 - 21:20)

SPAN VALUES: 100.0 ppm NOx
500.0 ppm CO

	---INITIAL VALUES---			---FINAL VALUES---		DRIFT (% OF SPAN)
	ANALYZER CAL RESPONSE	SYSTEM CAL RESPONSE	SYSTEM CAL BIAS (% OF SPAN)	SYSTEM CAL RESPONSE	SYSTEM CAL BIAS (% OF SPAN)	
NOx ZERO GAS	0.3	2.4	2.10	1.8	1.50	-0.80
NOx UP-SCALE	46.6	47.4	0.80	46.6	0.00	-0.80
CO ZERO GAS	1.4	2.0	0.12	1.9	0.10	-0.02
CO UP-SCALE	152.5	149.9	-0.52	149.4	-0.62	-0.10

$$\text{SYSTEM CAL BIAS} = \frac{\text{SYSTEM CAL RESPONSE} - \text{ANALYZER CAL RESPONSE}}{\text{SPAN}} \times 100$$

$$\text{DRIFT} = \frac{\text{FINAL SYSTEM CAL RESPONSE} - \text{INITIAL CAL RESPONSE}}{\text{SPAN}} \times 100$$

APPENDIX A. TEST RESULTS

4. Dryer Exhaust No. 4

b. Volumetric Air Flow Rates

VOLUMETRIC FLOW RATE DETERMINATION

Company & Plant: Louisiana Pacific - Roxboro, NC

Test Location: Dryer Exhaust No. 4

Operator: Danny L. Speer

Run: D4-M2-3

Date: 8/09/96

Time: 1835 - 1840

TEST DATA

Test Point	Delta P (in H2O)	Temp. (° F)	Parameter	D4-M2-3
A-1	0.92	189	A Stack/Duct Area:	1590 sq. in.
2	0.91	189	Pbar Barometric Pressure:	29.90 in. Hg
3	0.86	189	Pg Source Gas Static Pressure:	0.36 in. H2O
4	0.83	189	Cp Pitot Tube Coefficient:	0.84
5	0.85	189	%O2 Oxygen, by vol. dry:	16.7 % O2
6	0.81	189	%CO2 Carbon Dioxide, by vol. dry:	3.8 % CO2
7	0.85	189	%N2 Nitrogen, by vol. dry:	79.5 % N2
8	0.88	189		
9	0.90	189	ts Avg Source Gas Temperature:	189.0 ° F
10	0.95	189	sqrtdp Avg Square Root Delta p:	0.9351 in. H2O
11	0.96	189	dp Average Velocity Head For 16 pts:	0.8743 in. H2O
12	0.90	189	(Squared Avg. Sq.Root Delta p)	
13	0.90	189		
14	0.88	189		
15	0.82	189		
16	0.78	189		

Moisture Content Avg of Runs D2-M2/4-1 & D2-M2/4-4

RESULTS TABULATION

Vmstd	Volume of Metered Gas Sample	31.717	DSCF*
Vwstd	Volume of Water Vapor	9.485	SCF*
%H2O	Assumed Moisture Content, by volume	23.8	% **
Mfd	Dry Mole Fraction	0.762	
Md	Source Gas Molecular Wt., Dry	29.28	lb/lb-mole
Ms	Source Gas Molecular Wt., Wet	26.59	lb/lb-mole
Fo	Fuel Factor	1.11	
Ps	Absolute Flue Gas Pressure	29.93	in. Hg
vs	Source Gas Velocity	60.64	ft/sec
<u>Volumetric Air Flow Rates</u>			
Qsd	Standard Cubic Feet/Min., Dry *	24,916	SCFM Dry
QsdH	Standard Cubic Feet/Hour, Dry *	1,494,978	SCFH Dry
Qsw	Standard Cubic Feet/Min., Wet *	32,699	SCFM Wet
QswH	Standard Cubic Feet/Hour, Wet *	1,961,913	SCFH Wet
Qmsd	Standard Cubic Meter/Min., Dry *	706	SCMM Dry
Qaw	Actual Cubic Feet/Min., Wet	40,183	ACFM

* 68° F (20° C) - 29.92 inches of Mercury

** Value used in calculations

VOLUMETRIC FLOW RATE DETERMINATION

Company & Plant: Louisiana Pacific - Roxboro, NC

Test Location: Dryer Exhaust No. 4

Operator: Danny L. Speer

Run: D4-M2-4

Date: 8/09/96

Time: 2135 - 2140

TEST DATA

Test Point	Delta P (in. H2O)	Temp. (° F)	Parameter	D4-M2-4
A-1	0.85	194	A Stack/Duct Area:	1590 sq. in.
2	0.88	194	Pbar Barometric Pressure:	29.90 in. Hg
3	0.90	194	Pg Source Gas Static Pressure:	0.69 in. H2O
4	0.85	194	Cp Pitot Tube Coefficient:	0.84
5	0.85	194	%O2 Oxygen, by vol. dry:	16.7 % O2
6	0.88	194	%CO2 Carbon Dioxide, by vol. dry:	3.8 % CO2
7	0.83	194	%N2 Nitrogen, by vol. dry:	79.5 % N2
8	0.83	194		
9	0.87	194	ts Avg Source Gas Temperature:	194.0 ° F
10	0.87	194	sqrtdp Avg Square Root Delta p:	0.9291 in. H2O
11	0.95	194	dp Average Velocity Head For 16 pts: (Squared Avg. Sq.Root Delta p)	0.8632 in. H2O
12	0.94	194		
13	0.88	194		
14	0.85	194		
15	0.80	194		
16	0.79	194		

Moisture Content Avg of Runs D2-M2/4-1 & D2-M2/4-4

RESULTS TABULATION

Vmstd	Volume of Metered Gas Sample	21.945	DSCF*
Vwstd	Volume of Water Vapor	7.145	SCF*
%H2O	Moisture Content, by volume	23.8	% **
Mfd	Dry Mole Fraction	0.762	
Md	Source Gas Molecular Wt., Dry	29.28	lb/lb-mole
Ms	Source Gas Molecular Wt., Wet	26.59	lb/lb-mole
Fo	Fuel Factor	1.11	
Ps	Absolute Flue Gas Pressure	29.95	in. Hg
vs	Source Gas Velocity	60.46	ft/sec
<u>Volumetric Air Flow Rates</u>			
Qsd	Standard Cubic Feet/Min., Dry *	24,673	SCFM Dry
QsdH	Standard Cubic Feet/Hour, Dry *	1,480,390	SCFH Dry
Qsw	Standard Cubic Feet/Min., Wet *	32,379	SCFM Wet
QswH	Standard Cubic Feet/Hour, Wet *	1,942,769	SCFH Wet
Qmsd	Standard Cubic Meter/Min., Dry *	699	SCMM Dry
Qaw	Actual Cubic Feet/Min., Wet	40,065	ACFM

* 68° F (20° C) - 29.92 inches of Mercury

** Value used in calculations

APPENDIX A. TEST RESULTS

5. Dryer Exhaust No. 5

**a. Carbon Monoxide, Nitrogen Oxides
and Total Hydrocarbons**

FIELD DATA AND RESULTS TABULATION

PLANT: Roxboro OSB Plant, Roxboro, NC

SAMPLING LOCATION: Dryer No. 5 Exhaust

OPERATOR: Stephen B. Weiber

		D5-CEM-1	D5-CEM-2	D5-CEM-3
	Test Date	8/9/96	8/9/96	8/9/96
	Run Start Time	1720	1943	2020
	Run Finish Time	1820	1958	2120
Theta	Net Run Time, min	60.00	15.00	60.00
Pbar	Barometric Pressure, in Hg	29.90	29.90	29.90
Mfd	Dry Mole Fraction	0.762	0.762	0.762
%CO2	Carbon Dioxide, % by volume	3.80	3.80	3.80
%O2	Oxygen, % by volume	16.70	16.70	16.70
Pg	Flue Gas Static Pressure, in H2O	0.23	0.23	0.52
ts	Flue Gas Temperature, °F	198	198	196
Qsd	Volumetric Flow Rate, dry SCFM*	27,027	27,027	27,727
<u>Carbon Monoxide</u>				
Fwt	Formula Weight, gm/gm-mole	28.01	28.01	28.01
ppmvd	Concentration, ppmvd	345.7	274.1	344.5
lb/hr	Emission Rate, lb/hr	40.8	32.3	41.7
<u>Nitrogen Oxides as NO2</u>				
Fwt	Formula Weight, gm/gm-mole	46.01	46.01	46.01
ppmvd	Concentration, ppmvd	35.7	61.7	35.2
lb/hr	Emission Rate, lb/hr	6.91	11.9	6.99
<u>THC as Carbon</u>				
Fwt	Formula Weight, gm/gm-mole	12.01	12.01	12.01
ppmvw	Concentration, ppmvw	821.8	1000.2	655.3
ppmvd	Concentration, ppmvd	1078	1313	860
lb/hr	Emission Rate, lb/hr	54.5	66.3	44.6

* 68°F (20°C) -- 29.92 inches of mercury

TOTAL HYDROCARBON MEASUREMENT RESULTS SUMMARY

PLANT NAME: LOUISIAN-PACIFIC Roxboro NC

TEST LOCATION: RTO Inlet #5

TEST DATE: 08-09-96

OPERATOR: T. Rogers

--- Pre-Test Calibration Error Check ---

SPAN VALUE: 1,000 (ppm as C)	CALIBRATION GAS VALUE (ppmC)*	SYSTEM CAL. ERROR RESPONSE	CAL ERROR %
THC Zero Gas	0.0	3.0	0.30
Low-Level Gas	302.7	301.9	-0.26
Mid-Level Gas	518.1	521.8	0.71
High-Level Gas	837.0	836.4	-0.07

* ppmC values = ppmC3H8 values x 3

--- Drift Determinations ---

Run Number	D5-M25A-1	D5-M25A-2	D5-M25A-3
Zero Sys. Cal. Response	2.6	3.1	0.7
Zero Drift Response	3.1	0.7	3.7
Zero Drift	0.1	-0.2	0.3
Upscale Sys. Cal. Resp.	303.4	301.0	301.5
Upscale Drift Response	301.0	301.5	300.3
Upscale Drift	-0.2	0.1	-0.1

--- Test Results ---

RUN NO.:	D5-M25A-1	D5-M25A-2	D5-M25A-3
RUN TIME:	1720-1820	1943-1958	2020-2120
THC (ppmwC):	821.8	1000.2	655.3
%H2O:	23.80	23.80	23.80
THC (ppmdC):	1078.5	1312.6	860.0
DSCFM:	27,027	27,027	27,727
THC (lb/hr C):	54.51	66.35	44.59

$$\text{ppmd} = \text{ppmw} / (1 - (\% \text{H}_2\text{O}/100))$$

$$\text{lb/hr} = (\text{ppmd} \times \text{DSCFM} \times 60 \times \text{Mol.Wt.}) / 385.3 \text{ E06}$$

Where: e 12.01 lb/lb mole

$$\text{Cal. Error} = \frac{\text{System Cal. Response} - \text{Cal. Gas Value}}{\text{** Cal. Gas Value}} \times 100$$

$$\text{Drift} = \frac{\text{Drift Response} - \text{System Cal. Response}}{\text{Span Value}} \times 100$$

** For zero gas calibration error use span value

CALCULATION OF AVERAGE NOx AND CO EMISSIONS

COMPANY LOUISIANA-PACIFIC Roxboro, NC

SOURCE: RTO #5 INLET

RUN: 1 (17:20 - 18:20)

DATE: 08-09-96

GAS VALUE	INITIAL CAL	FINAL CAL	MEAN CAL
0.0 ppm NOx	0.3	1.7	1.0
46.6 ppm NOx	46.2	47.3	46.8
0.0 ppm CO	1.0	2.5	1.8
301.0 ppm CO	299.2	301.3	300.3

Uncorrected Data:

36.1 ppm NOx

344.6 ppm CO

27,027 DSCFM*

CORRECTED RESULTS

35.7 ppm NOx

345.7 ppm CO

6.9 lb/hr NOx

40.7 lb/hr CO

$$\text{Corrected Conc.} = C_{ma}(\bar{C} - C_o)/(C_m - C_o)$$

Where: $\bar{C}$ = mean reference measurement

C_o = mean zero calibration response

C_m = mean mid or upscale calibration gas response

C_{ma} = actual mid or upscale calibration gas concentration

$$\text{lb/hr} = (60)(\text{ppm pollutant})(\text{Conv. Factor})(\text{DSCFM})$$

Where: NOx Conv. Factor = 1.194E-07 lb NO2/SCF - ppm NO2

CO Conv. Factor = 7.263E-08 lb CO/SCF - ppm CO

* Flow rate from run D5-M2-3

CALCULATION OF AVERAGE NOx AND CO EMISSIONS

COMPANY LOUISIANA-PACIFIC Roxboro, NC

SOURCE: RTO #5 INLET

RUN: 2 (19:43 - 19:58)

DATE: 08-09-96

GAS VALUE	INITIAL CAL	FINAL CAL	MEAN CAL
0.0 ppm NOx	1.7	0.3	1.0
46.6 ppm NOx	47.3	45.7	46.5
0.0 ppm CO	2.5	4.4	3.5
301.0 ppm CO	301.3	301.3	301.3

Uncorrected Data:

61.2 ppm NOx

274.7 ppm CO

27,027 DSCFM

CORRECTED RESULTS

61.7 ppm NOx

274.1 ppm CO

11.9 lb/hr NOx

32.3 lb/hr CO

$$\text{Corrected Conc.} = \frac{C_m(C - C_o)}{(C_m - C_o)}$$

Where: $\bar{C}$ = mean reference measurement

C_o = mean zero calibration response

C_m = mean mid or upscale calibration gas response

C_{ma} = actual mid or upscale calibration gas concentration

$$\text{lb/hr} = (60)(\text{ppm pollutant})(\text{Conv. Factor})(\text{DSCFM})$$

Where: NOx Conv. Factor = 1.194E-07 lb NO2/SCF - ppm NO2

CO Conv. Factor = 7.263E-08 lb CO/SCF - ppm CO

CALCULATION OF AVERAGE NOx AND CO EMISSIONS

COMPANY LOUISIANA-PACIFIC Roxboro, NC

SOURCE: RTO #5 INLET

RUN: 3 (20:20 - 21:20)

DATE: 08-09-96

GAS VALUE	INITIAL CAL	FINAL CAL	MEAN CAL
0.0 ppm NOx	0.3	0.4	0.4
46.6 ppm NOx	45.7	46.3	46.0
0.0 ppm CO	4.4	2.9	3.7
151.3 ppm CO	155.6	150.7	153.2

Uncorrected Data: 34.8 ppm NOx
344.1 ppm CO

27,727 DSCFM

CORRECTED RESULTS

35.2 ppm NOx
344.5 ppm CO

7.0 lb/hr NOx
41.6 lb/hr CO

$$\text{Corrected Conc.} = C_{ma}(\bar{C} - C_o)/(C_m - C_o)$$

Where: $\bar{C}$ = mean reference measurement

C_o = mean zero calibration response

C_m = mean mid or upscale calibration gas response

C_{ma} = actual mid or upscale calibration gas concentration

$$\text{lb/hr} = (60)(\text{ppm pollutant})(\text{Conv. Factor})(\text{DSCFM})$$

Where: NOx Conv. Factor = 1.194E-07 lb NO2/SCF - ppm NO2

CO Conv. Factor = 7.263E-08 lb CO/SCF - ppm CO

SYSTEM CALIBRATION BIAS AND DRIFT CALCULATIONS

COMPANY: LOUISIANA-PACIFIC Roxboro, NC
SOURCE: RTO #5 INLET

TEST DATE: 08-09-86

RUN NUMBER: 1 (17:20 - 18:20)

SPAN VALUES: 100.0 ppm NOx
500.0 ppm CO

	INITIAL VALUES			FINAL VALUES		
	ANALYZER CAL RESPONSE	SYSTEM CAL RESPONSE	SYSTEM CAL BIAS (% OF SPAN)	SYSTEM CAL RESPONSE	SYSTEM CAL BIAS (% OF SPAN)	DRIFT (% OF SPAN)
NOx ZERO GAS	0.2	0.3	0.10	1.7	1.50	1.40
NOx UP-SCALE	46.3	46.2	-0.10	47.3	1.00	1.10
CO ZERO GAS	1.0	1.0	0.00	2.5	0.30	0.30
CO UP-SCALE	302.9	299.2	-0.74	301.3	-0.32	0.42

$$\text{SYSTEM CAL BIAS} = \frac{\text{SYSTEM CAL RESPONSE} - \text{ANALYZER CAL RESPONSE}}{\text{SPAN}} \times 100$$

$$\text{DRIFT} = \frac{\text{FINAL SYSTEM CAL RESPONSE} - \text{INITIAL CAL RESPONSE}}{\text{SPAN}} \times 100$$

SYSTEM CALIBRATION BIAS AND DRIFT CALCULATIONS

COMPANY: LOUISIANA-PACIFIC Roxboro, NC
SOURCE: RTO #5 INLET

TEST DATE: 08-09-86

RUN NUMBER: 2 (18:58 - 19:58)

SPAN VALUES: 100.0 ppm NOx
500.0 ppm CO

	—INITIAL VALUES—			—FINAL VALUES—		
	ANALYZER CAL RESPONSE	SYSTEM CAL RESPONSE	SYSTEM CAL BIAS (% OF SPAN)	SYSTEM CAL RESPONSE	SYSTEM CAL BIAS (% OF SPAN)	DRIFT (% OF SPAN)
NOx ZERO GAS	0.2	1.7	1.50	0.3	0.10	-1.40
NOx UP-SCALE	48.3	47.3	1.00	45.7	-0.60	-1.60
CO ZERO GAS	1.0	2.5	0.30	4.4	0.68	0.38
CO UP-SCALE	302.9	301.3	-0.32	301.3	-0.32	0.00

$$\text{SYSTEM CAL BIAS} = \frac{\text{SYSTEM CAL RESPONSE} - \text{ANALYZER CAL RESPONSE}}{\text{SPAN}} \times 100$$

$$\text{DRIFT} = \frac{\text{FINAL SYSTEM CAL RESPONSE} - \text{INITIAL CAL RESPONSE}}{\text{SPAN}} \times 100$$

SYSTEM CALIBRATION BIAS AND DRIFT CALCULATIONS

COMPANY: LOUISIANA-PACIFIC Roxboro, NC
SOURCE: RTO #5 INLET

TEST DATE: 08-09-86

RUN NUMBER: 3 (20:20 - 21:20)

SPAN VALUES: 100.0 ppm NOx
500.0 ppm CO

	ANALYZER CAL. RESPONSE	—INITIAL VALUES—		—FINAL VALUES—		DRIFT (% OF SPAN)
		SYSTEM CAL. RESPONSE	SYSTEM CAL. BIAS (% OF SPAN)	SYSTEM CAL. RESPONSE	SYSTEM CAL. BIAS (% OF SPAN)	
NOx ZERO GAS	0.2	0.3	0.10	0.4	0.20	0.10
NOx UP-SCALE	46.3	45.7	-0.60	46.3	0.00	0.60
CO ZERO GAS	1.0	4.4	0.68	2.9	0.38	-0.30
CO UP-SCALE	151.3	155.6	0.86	150.7	-0.12	-0.98

$$\text{SYSTEM CAL. BIAS} = \frac{\text{SYSTEM CAL. RESPONSE} - \text{ANALYZER CAL. RESPONSE}}{\text{SPAN}} \times 100$$

$$\text{DRIFT} = \frac{\text{FINAL SYSTEM CAL. RESPONSE} - \text{INITIAL CAL. RESPONSE}}{\text{SPAN}} \times 100$$

APPENDIX A. TEST RESULTS

5. Dryer Exhaust No. 5

b. Volumetric Air Flow Rates

VOLUMETRIC FLOW RATE DETERMINATION

Company & Plant: Louisiana Pacific - Roxboro, NC
 Test Location: Dryer Exhaust No. 5
 Operator: Danny L. Speer

Run: D5-M2-3
 Date: 8/09/96
 Time: 1830 - 1835

TEST DATA					
Test Point	Delta P (in H2O)	Temp. (° F)	Parameter	D5-M2-3	
A-1	1.08	198	A Stack/Duct Area:	1590	sq. in.
2	1.07	198	Pbar Barometric Pressure:	29.90	in. Hg
3	1.08	198	Pg Source Gas Static Pressure:	0.23	in. H2O
4	1.11	198	Cp Pitot Tube Coefficient:	0.84	
5	1.13	198	%O2 Oxygen, by vol. dry:	16.7	% O2
6	1.12	198	%CO2 Carbon Dioxide, by vol. dry:	3.8	% CO2
7	1.11	198	%N2 Nitrogen, by vol. dry:	79.5	% N2
8	1.10	198			
9	1.11	198	ts Avg Source Gas Temperature:	198.0	° F
10	1.15	198	sqrt dp Avg Square Root Delta p:	1.0214	in. H2O
11	0.96	198	dp Average Velocity Head For 16 pts: (Squared Avg. Sq.Root Delta p)	1.0433	in. H2O
12	0.97	198			
13	0.95	198			
14	0.96	198			
15	0.95	198			
16	0.87	198			

Moisture Content Avg of Runs D2-M2/4-1 & D2-M2/4-4

RESULTS TABULATION

Vmstd	Volume of Metered Gas Sample	31.717	DSCF*
Vwstd	Volume of Water Vapor	9.485	SCF*
%H2O	Assumed Moisture Content, by volume	23.8	% **
Mfd	Dry Mole Fraction	0.762	
Md	Source Gas Molecular Wt., Dry	29.28	lb/lb-mole
Ms	Source Gas Molecular Wt., Wet	26.59	lb/lb-mole
Fo	Fuel Factor	1.11	
Ps	Absolute Flue Gas Pressure	29.92	in. Hg
vs	Source Gas Velocity	66.71	ft/sec
<u>Volumetric Air Flow Rates</u>			
Qsd	Standard Cubic Feet/Min., Dry *	27,027	SCFM Dry
QsdH	Standard Cubic Feet/Hour, Dry *	1,621,592	SCFH Dry
Qsw	Standard Cubic Feet/Min., Wet *	35,468	SCFM Wet
QswH	Standard Cubic Feet/Hour, Wet *	2,128,073	SCFH Wet
Qmsd	Standard Cubic Meter/Min., Dry *	765	SCMM Dry
Qaw	Actual Cubic Feet/Min., Wet	44,205	ACFM

* 68° F (20° C) ~ 29.92 inches of Mercury

** Value used in calculations

VOLUMETRIC FLOW RATE DETERMINATION

Company & Plant: Louisiana Pacific - Roxboro, NC

Test Location: Dryer Exhaust No. 5

Operator: Danny L. Speer

Run: D5-M2-4

Date: 8/09/96

Time: 2140 - 2145

TEST DATA				
Test Point	Delta P (in H2O)	Temp. (° F)	Parameter	D5-M2-4
A-1	1.18	196	A	Stack/Duct Area: 1590 sq. in.
2	1.17	196	Pbar	Barometric Pressure: 29.90 in. Hg
3	1.16	196	Pg	Source Gas Static Pressure: 0.52 in. H2O
4	1.13	196	Cp	Pitot Tube Coefficient: 0.84
5	1.12	196	%O2	Oxygen, by vol. dry: 16.7 % O2
6	1.12	196	%CO2	Carbon Dioxide, by vol. dry: 3.8 % CO2
7	1.10	196	%N2	Nitrogen, by vol. dry: 79.5 % N2
8	1.10	196		
9	1.20	196	ts	Avg Source Gas Temperature: 196.0 ° F
10	1.22	196	sqrtdp	Avg Square Root Delta p: 1.0459 in. H2O
11	1.20	196	dp	Average Velocity Head For 16 pts: 1.0939 in. H2O
12	1.12	196		(Squared Avg. Sq.Root Delta p)
13	1.08	196		
14	0.88	196		
15	0.90	196		
16	0.87	196		

Moisture Content Avg of Runs D2-M2/4-1 & D2-M2/4-4

RESULTS TABULATION

Vmstd	Volume of Metered Gas Sample	21.945	DSCF*
Vwstd	Volume of Water Vapor	7.145	SCF*
%H2O	Moisture Content, by volume	23.8	% **
Mfd	Dry Mole Fraction	0.762	
Md	Source Gas Molecular Wt., Dry	29.28	lb/lb-mole
Ms	Source Gas Molecular Wt., Wet	26.59	lb/lb-mole
Fo	Fuel Factor	1.11	
Ps	Absolute Flue Gas Pressure	29.94	in. Hg
vs	Source Gas Velocity	68.18	ft/sec
<u>Volumetric Air Flow Rates</u>			
Qsd	Standard Cubic Feet/Min., Dry *	27,727	SCFM Dry
QsdH	Standard Cubic Feet/Hour, Dry *	1,663,612	SCFH Dry
Qsw	Standard Cubic Feet/Min., Wet *	36,387	SCFM Wet
QswH	Standard Cubic Feet/Hour, Wet *	2,183,218	SCFH Wet
Qmsd	Standard Cubic Meter/Min., Dry *	785	SCMM Dry
Qaw	Actual Cubic Feet/Min., Wet	45,180	ACFM

* 68° F (20° C) - 29.92 inches of Mercury
 ** Value used in calculations

APPENDIX A. TEST RESULTS

6. RTO No. 3 Inlet

a. Total Hydrocarbons

FIELD DATA AND RESULTS TABULATION

PLANT: Roxboro OSB Plant, Roxboro, NC

SAMPLING LOCATION: RTO No. 3 Inlet

OPERATOR: Stephen B. Weiber

		<u>I3-CEM-1</u>	<u>I3-CEM-2</u>	<u>I3-CEM-3</u>
	Test Date	8/6/96	8/6/96	8/6/96
	Run Start Time	1125	1345	1530
	Run Finish Time	1305	1503	1630
Theta	Net Run Time, min	60.00	60.00	60.00
Pbar	Barometric Pressure, in Hg	29.85	29.85	29.85
Mfd	Dry Mole Fraction	0.974	0.967	0.967
%CO2	Carbon Dioxide, % by volume	0.00	0.00	0.00
%O2	Oxygen, % by volume	20.90	20.90	20.90
Pg	Flue Gas Static Pressure, in H2O	-2.10	-2.10	-2.10
ts	Flue Gas Temperature, °F	132	133	133
Qsd	Volumetric Flow Rate, dry SCFM*	99,052	95,446	97,389
	<u>THC as Carbon</u>			
Fwt	Formula Weight, gm/gm-mole	12.01	12.01	12.01
ppmvw	Concentration, ppmvw	195.5	188.9	235.3
ppmvd	Concentration, ppmvd	201	195	243
lb/hr	Emission Rate, lb/hr	37.2	34.9	44.3

TOTAL HYDROCARBON MEASUREMENT RESULTS SUMMARY

PLANT NAME: LOUISIANA PACIFIC - ROXBORO, NC

TEST LOCATION: RTO #3 - INLET

TEST DATE: 08-06-96

OPERATOR: SBW

----- Pre-Test Calibration Error Check -----

SPAN VALUE: 1,000 (ppm as C)	CALIBRATION GAS VALUE (ppmC)*	SYSTEM CAL. ERROR RESPONSE	CAL. ERROR %
THC Zero Gas	0.0	0.6	0.06
Low-Level Gas	296.0	295.2	-0.27
Mid-Level Gas	518.4	518.4	0.00
High-Level Gas	841.8	842.3	0.06

* ppmC values = ppmC3H8 values x 3

----- Drift Determinations -----

Run Number	13-M25A-1	13-M25A-2	13-M25A-3
Zero Sys.Cal.Response	0.6	0.6	0.6
Zero Drift Response	1.6	1.1	0.1
Zero Drift	0.1	0.1	-0.1
Upscale Sys.Cal.Resp.	295.2	295.2	295.2
Upscale Drift Response	300.7	289.2	296.0
Upscale Drift	0.6	-0.6	0.1

***** Test Results*****			
RUN NO.:	13-M25A-1	13-M25A-2	13-M25A-3
RUN TIME:	1125-1305	1345-1503	1530-1630
THC (ppmC):	195.5	188.9	235.3
XH2O:	2.60	3.30	3.30
THC (ppmC):	200.7	195.3	243.3
DSCFM:	99,052	95,446	97,389
THC (lb/hr C):	37.18	34.87	44.32

$$\text{ppmC} = \text{ppmC} / (1 - (\text{XH}_2\text{O}/100))$$

$$\text{lb/hr} = (\text{ppmC} \times \text{DSCFM} \times 60 \times \text{Mol.Wt.}) / 385.3 \text{ E06}$$

$$\text{Where: Mol.Wt. Carbon} = 12.01 \text{ lb/lb mole}$$

$$\text{Cal.Error} = \frac{\text{System Cal.Response} - \text{Cal.Gas Value}}{\text{Cal.Gas Value}} \times 100$$

$$\text{Drift} = \frac{\text{Drift Response} - \text{System Cal.Response}}{\text{Span Value}} \times 100$$

** For zero gas calibration error use span value

APPENDIX A. TEST RESULTS

6. RTO No. 3 Inlet

b. Volumetric Air Flow Rates

VOLUMETRIC FLOW RATE DETERMINATION

Company & Plant: LOUISIANA PACIFIC - ROXBORO, NC
Date: 8/8/98
Run: IS-M2,4-1A
Time: 1125-1135
Personnel: PFD
Test Location: RTO#3 INLET

TEST DATA

Sample Point	Delta P (in H2O)	SQRT Delta P	Temp (deg. F)		
A-1	0.40	0.632	129	Duct Area (A):	5216.8 sq. inches
A-2	0.44	0.663	130	Barometric Pressure (Pbar):	29.85 inches Hg
A-3	0.52	0.721	130	Static Pressure (Pg):	-2.10 inches H2O
A-4	0.55	0.742	130	Pitot Tube Coefficient (Cp):	0.84
A-5	0.65	0.806	131	Percent O2 (%O2):	20.90 % O2
A-6	0.68	0.825	131	Percent CO2 (%CO2):	0.00 % CO2
A-7	0.68	0.825	131	Percent Nitrogen (%N2):	79.10 % N2
A-8	0.80	0.775	132	Meter Box Factor (Y):	1.0088
A-9	1.05	1.025	132	Average Meter Temp. (Tm):	93.2 Degrees F
A-10	1.15	1.072	133	Gas Meter Volume (Vm):	45.888 Cubic Feet
A-11	1.02	1.010	132	Tot. Moisture Catch (Wm):	25.0 grams
A-12	0.91	0.954	132	Delta H (dH):	1.88
A-13	1.00	1.000	132	Root Mean Sq. Delta P (Pavg):	0.756 inches H2O
A-14	0.95	0.975	132	Mean Temperature (Ts):	131.3 Degrees F
A-15	0.93	0.964	132		
A-16	0.85	0.922	132		

CALCULATIONS

STD GAS METER VOLUME: $V_m(std) = (V_m)(Y)(17.64)((P_{bar} + (dH/13.6))/(T_m + 460))$	$V_m(std) =$	43.986	scf
VOLUME OF WATER VAPOR CONDENSED: $V_w(std) = (4.715E-02)(W_m)$	$V_w(std) =$	1.179	cubic ft.
PERCENT MOISTURE: $\% H_2O = [V_w(std)/(V_w(std) + V_m(std))] \times 100$	$\% H_2O =$	2.6	% H2O
DRY MOLE FRACTION OF STACK GAS: $Mfd = 1 - (\%H_2O/100)$	$Mfd =$	0.974	
ABSOLUTE STACK GAS PRESSURE: $P_s = P_{bar} + (Pg/13.6)$	$P_s =$	29.70	in. Hg
DRY MOLECULAR WEIGHT OF STACK GAS: $M_d = 0.44(\%CO_2) + 0.32(\%O_2) + 0.28(\%N_2)$	$M_d =$	28.64	lb/lb-mole
WET MOLECULAR WEIGHT OF STACK GAS: $M_s = (M_d)(Mfd) + 0.18(\%H_2O)$	$M_s =$	28.56	lb/lb-mole
AVERAGE STACK GAS VELOCITY: $V_s = 85.49(C_p) \times \sqrt{((P_{avg})(T_s + 460)/((P_s)(M_s)))}$	$V_s =$	52.1	ft/sec
DRY VOLUMETRIC FLOW RATE: $Q_{sd} = 7.353(Mfd)(V_s)(A)(P_s)/(T_s + 460)$	$Q_{sd} =$	57,772	DSCFM
ACTUAL VOLUMETRIC FLOW RATE: $Q_a = (60/144)(V_s)(A)$	$Q_a =$	113,248	ACFM

VOLUMETRIC FLOW RATE DETERMINATION

Company & Plant: LOUISIANA PACIFIC - ROXBORO, NC
 Date: 8/8/86
 Run: B-M2,4-1B
 Time: 1150-1200
 Personnel: PFD
 Test Location: RTO#3 INLET

TEST DATA

Sample Point	Delta P (in H2O)	SQRT Delta P	Temp (deg. F)		
A-1	0.44	0.663	130	Duct Area (A):	5216.8 sq. inches
A-2	0.53	0.728	130	Barometric Pressure (Pbar):	29.85 inches Hg
A-3	0.60	0.775	133	Static Pressure (Pg):	-2.10 inches H2O
A-4	0.73	0.854	133	Pitot Tube Coefficient (Cp):	0.84
A-5	0.57	0.755	133	Percent O2 (%O2):	20.90 % O2
A-6	0.68	0.825	133	Percent CO2 (%CO2):	0.00 % CO2
A-7	0.63	0.794	133	Percent Nitrogen (%N2):	79.10 % N2
A-8	0.65	0.808	133	Meter Box Factor (Y):	1.0068
A-9	0.84	0.917	133	Average Meter Temp. (Tm):	83.2 Degrees F
A-10	1.06	1.030	133	Gas Meter Volume (Vm):	45.888 Cubic Feet
A-11	0.92	0.959	133	Tot. Moisture Catch (Wm):	25.0 grams
A-12	0.97	0.985	133	Delta H (dH):	1.88
A-13	1.00	1.000	133	Root Mean Sq. Delta P (Pavg):	0.798 inches H2O
A-14	1.25	1.118	134	Mean Temperature (Ts):	132.8 Degrees F
A-15	1.12	1.058	134		
A-16	1.05	1.025	134		

CALCULATIONS

STD GAS METER VOLUME: $Vm(std) = (Vm)(Y)(17.64)((Pbar + (dH/13.6))/(Tm + 460))$	$Vm(std) =$	43.986	scf
VOLUME OF WATER VAPOR CONDENSED: $Vw(std) = (4.715E-02)(Wm)$	$Vwc(std) =$	1.179	cubic ft.
PERCENT MOISTURE: $\% H2O = [Vwc(std)/(Vwc(std) + Vm(std))] \times 100$	$\% H2O =$	2.6	% H2O
DRY MOLE FRACTION OF STACK GAS: $Mfd = 1 - (\%H2O/100)$	$Mfd =$	0.974	
ABSOLUTE STACK GAS PRESSURE: $Ps = Pbar + (Pg/13.6)$	$Ps =$	29.70	in. Hg
DRY MOLECULAR WEIGHT OF STACK GAS: $Md = 0.44(\%CO2) + 0.32(\%O2) + 0.28(\%N2)$	$Md =$	28.84	lb/lb-mole
WET MOLECULAR WEIGHT OF STACK GAS: $Ms = (Md)(Mfd) + 0.18(\%H2O)$	$Ms =$	28.56	lb/lb-mole
AVERAGE STACK GAS VELOCITY: $Vs = 85.49(Cp) \times \sqrt{((Pavg)(Ts + 460)/((Ps)(Ms)))}$	$Vs =$	53.8	ft/sec
DRY VOLUMETRIC FLOW RATE: $Qsd = 7.353(Mfd)(Vs)(A)(Ps)/(Ts + 460)$	$Qsd =$	100,332	DSCFM
ACTUAL VOLUMETRIC FLOW RATE: $Qa = (60/144)(Vs)(A)$	$Qa =$	118,509	ACFM

VOLUMETRIC FLOW RATE DETERMINATION

Company & Plant: LOUISIANA PACIFIC - ROXBORO, NC
 Date: 8/6/98
 Run: 13-M2,4-2A
 Time: 1345-1405
 Personnel: PFD
 Test Location: RTO#3 INLET

TEST DATA

Sample Point	Delta P (in H2O)	SQRT Delta P	Temp (deg. F)	Duct Area (A):	5216.8 sq. inches
A-1	0.38	0.616	129	Barometric Pressure (Pbar):	29.85 inches Hg
A-2	0.44	0.663	131	Static Pressure (Pg):	-2.10 inches H2O
A-3	0.52	0.721	133	Pitot Tube Coefficient (Cp):	0.84
A-4	0.55	0.742	133	Percent O2 (%O2):	20.90 % O2
A-5	0.58	0.762	133	Percent CO2 (%CO2):	0.00 % CO2
A-6	0.60	0.775	133	Percent Nitrogen (%N2):	79.10 % N2
A-7	0.62	0.787	133	Meter Box Factor (Y):	1.0088
A-8	0.62	0.787	133	Average Meter Temp. (Tm):	100.1 Degree F
A-9	1.10	1.049	133	Gas Meter Volume (Vm):	45.278 Cubic Feet
A-10	1.08	1.039	133	Tot. Moisture Catch (Wm):	30.7 grams
A-11	1.00	1.000	133	Delta H (dH):	1.68
A-12	0.98	0.990	133	Root Mean Sq. Delta P (Pavg):	0.736 inches H2O
A-13	1.02	1.010	133	Mean Temperature (Ts):	132.6 Degree F
A-14	0.93	0.964	133		
A-15	0.86	0.927	133		
A-16	0.84	0.917	133		

CALCULATIONS

STD GAS METER VOLUME: $Vm(std) = (Vm)(Y)(17.64)/((Pbar + (dH/13.6))/(Tm + 460))$	$Vm(std) =$	43.054	cscf
VOLUME OF WATER VAPOR CONDENSED: $Vw(std) = (4.715E-02)(Wm)$	$Vwc(std) =$	1.448	cubic ft.
PERCENT MOISTURE: $\% H2O = [Vwc(std)/(Vwc(std) + Vm(std))] \times 100$	$\% H2O =$	3.3	% H2O
DRY MOLE FRACTION OF STACK GAS: $Mfd = 1 - (\%H2O/100)$	$Mfd =$	0.967	
ABSOLUTE STACK GAS PRESSURE: $Ps = Pbar + (Pg/13.6)$	$Ps =$	29.70	in. Hg
DRY MOLECULAR WEIGHT OF STACK GAS: $Md = 0.44(\%CO2) + 0.32(\%O2) + 0.28(\%N2)$	$Md =$	28.84	lb/lb-mole
WET MOLECULAR WEIGHT OF STACK GAS: $Ms = (Md)(Mfd) + 0.18(\%H2O)$	$Ms =$	28.48	lb/lb-mole
AVERAGE STACK GAS VELOCITY: $Vs = 85.49(Cp) \times \sqrt{((Pavg)(Ts + 460)/((Ps)(Ms)))}$	$Vs =$	51.6	ft/sec
DRY VOLUMETRIC FLOW RATE: $Qsd = 7.353(Mfd)(Vs)(A)(Ps)/(Ts + 460)$	$Qsd =$	95,927	DSCFM
ACTUAL VOLUMETRIC FLOW RATE: $Qa = (80/144)(Vs)(A)$	$Qa =$	112,161	ACFM

VOLUMETRIC FLOW RATE DETERMINATION

Company & Plant: LOUISIANA PACIFIC - ROXBORO, NC
 Date: 8/6/98
 Run: 13-M2,4-2B
 Time: 1455-1502
 Personnel: PFD
 Test Location: RTO#3 INLET

TEST DATA

Sample Point	Delta P (in H2O)	SQRT Delta P	Temp (deg. F)		
A-1	0.36	0.600	130	Duct Area (A):	5216.8 sq. inches
A-2	0.45	0.671	132	Barometric Pressure (Pbar):	29.85 inches Hg
A-3	0.45	0.671	133	Static Pressure (Pg):	-2.10 inches H2O
A-4	0.55	0.742	133	Pitot Tube Coefficient (Cp):	0.84
A-5	0.62	0.787	133	Percent O2 (%O2):	20.90 % O2
A-6	0.64	0.800	133	Percent CO2 (%CO2):	0.00 % CO2
A-7	0.52	0.721	133	Percent Nitrogen (%N2):	79.10 % N2
A-8	0.65	0.806	133	Meter Box Factor (Y):	1.0088
A-9	1.03	1.015	133	Average Meter Temp. (Tm):	100.1 Degrees F
A-10	1.07	1.034	133	Gas Meter Volume (Vm):	45.278 Cubic Feet
A-11	1.00	1.000	133	Tot. Moisture Catch (Wm):	30.7 grams
A-12	0.88	0.938	133	Delta H (dh):	1.88
A-13	0.95	0.975	133	Root Mean Sq. Delta P (Pavg):	0.723 inches H2O
A-14	0.95	0.975	133	Mean Temperature (Ts):	132.8 Degrees F
A-15	0.90	0.949	133		
A-16	0.85	0.922	133		

CALCULATIONS

STD GAS METER VOLUME: $V_m(std) = (V_m)(Y)(17.64)((Pbar + (dh/13.6))/(Tm + 460))$	$V_m(std) =$	43.064	scf
VOLUME OF WATER VAPOR CONDENSED: $V_w(std) = (4.715E-02)(Wm)$	$V_w(std) =$	1.448	cubic ft.
PERCENT MOISTURE: $\% H_2O = [V_w(std)/(V_w(std) + V_m(std))] \times 100$	$\% H_2O =$	3.3	% H2O
DRY MOLE FRACTION OF STACK GAS: $Mfd = 1 - (\%H_2O/100)$	$Mfd =$	0.967	
ABSOLUTE STACK GAS PRESSURE: $Ps = Pbar + (Pg/13.6)$	$Ps =$	29.70	in. Hg
DRY MOLECULAR WEIGHT OF STACK GAS: $Md = 0.44(\%CO_2) + 0.32(\%O_2) + 0.28(\%N_2)$	$Md =$	28.84	lb/lb-mole
WET MOLECULAR WEIGHT OF STACK GAS: $Ms = (Md)(Mfd) + 0.18(\%H_2O)$	$Ms =$	28.48	lb/lb-mole
AVERAGE STACK GAS VELOCITY: $V_s = 85.49(Cp) \times \sqrt{(Pavg)(Ts + 460)/[(Ps)(Ms)]}$	$V_s =$	51.1	ft/sec
DRY VOLUMETRIC FLOW RATE: $Q_{sd} = 7.353(Mfd)(V_s)(A)(Ps)/(Ts + 460)$	$Q_{sd} =$	94,985	DSCFM
ACTUAL VOLUMETRIC FLOW RATE: $Q_s = (80/144)(V_s)(A)$	$Q_s =$	111,074	ACFM

VOLUMETRIC FLOW RATE DETERMINATION

Company & Plant: LOUISIANA PACIFIC - ROXBORO, NC
 Date: 8/6/98
 Run: B-M2,4-3A
 Time: 1530-1540
 Personnel: PFD
 Test Location: RTO#3 INLET

TEST DATA

Sample Point	Delta P (in H2O)	SQRT Delta P	Temp (deg. F)		
A-1	0.35	0.592	130	Duct Area (A):	5216.8 sq. inches
A-2	0.42	0.648	131	Barometric Pressure (Pbar):	29.85 inches Hg
A-3	0.46	0.678	133	Static Pressure (Pg):	-2.10 inches H2O
A-4	0.63	0.794	133	Pitot Tube Coefficient (Cp):	0.84
A-5	0.55	0.742	133	Percent O2 (%O2):	20.90 % O2
A-6	0.70	0.837	133	Percent CO2 (%CO2):	0.00 % CO2
A-7	0.58	0.762	133	Percent Nitrogen (%N2):	78.10 % N2
A-8	0.50	0.707	133	Meter Box Factor (Y):	1.0088
A-9	1.06	1.030	133	Average Meter Temp. (Tm):	108.8 Degrees F
A-10	1.06	1.039	133	Gas Meter Volume (Vm):	45.857 Cubic Feet
A-11	1.15	1.072	133	Tot. Moisture Catch (Wm):	31.4 grams
A-12	1.07	1.034	133	Delta H (dH):	1.88
A-13	1.04	1.020	133	Root Mean Sq. Delta P (Pavg):	0.739 inches H2O
A-14	0.91	0.954	133	Mean Temperature (Ts):	132.7 Degrees F
A-15	0.95	0.975	133		
A-16	0.78	0.872	133		

CALCULATIONS

STD GAS METER VOLUME: $V_m(std) = (V_m)(Y)(17.64)((P_{bar} + (dH/13.6))/(T_m + 460))$	$V_m(std) =$	43.104	scfd
VOLUME OF WATER VAPOR CONDENSED: $V_w(std) = (4.715E-02)(W_m)$	$V_w(std) =$	1.481	cubic ft.
PERCENT MOISTURE: $\% H_2O = [V_w(std)/(V_w(std) + V_m(std))] \times 100$	$\% H_2O =$	3.3	% H2O
DRY MOLE FRACTION OF STACK GAS: $M_d = 1 - (\%H_2O/100)$	$M_d =$	0.967	
ABSOLUTE STACK GAS PRESSURE: $P_s = P_{bar} + (Pg/13.6)$	$P_s =$	29.70	in. Hg
DRY MOLECULAR WEIGHT OF STACK GAS: $M_d = 0.44(\%CO_2) + 0.32(\%O_2) + 0.28(\%N_2)$	$M_d =$	28.84	lb/lb-mole
WET MOLECULAR WEIGHT OF STACK GAS: $M_s = (M_d)(M_d) + 0.18(\%H_2O)$	$M_s =$	28.48	lb/lb-mole
AVERAGE STACK GAS VELOCITY: $V_s = 85.49(C_p) \times \sqrt{((P_{avg})(T_s + 460)/((P_s)(M_s)))}$	$V_s =$	51.7	ft/sec
DRY VOLUMETRIC FLOW RATE: $Q_{sd} = 7.353(M_d)(V_s)(A)(P_s)/(T_s + 460)$	$Q_{sd} =$	98.096	DSCFM
ACTUAL VOLUMETRIC FLOW RATE: $Q_a = (60/144)(V_s)(A)$	$Q_a =$	112.379	ACFM

VOLUMETRIC FLOW RATE DETERMINATION

Company & Plant: LOUISIANA PACIFIC - ROXBORO, NC
 Date: 8/8/88
 Run: IS-M2,4-3B
 Time: 1615-1625
 Personnel: PFD
 Test Location: RTO#3 INLET

TEST DATA

Sample Point	Delta P (in H2O)	SQRT Delta P	Temp (deg. F)		
A-1	0.50	0.707	130	Duct Area (A):	5216.8 sq. inches
A-2	0.57	0.755	132	Barometric Pressure (Pbar):	29.85 inches Hg
A-3	0.53	0.728	133	Static Pressure (Pg):	-2.10 inches H2O
A-4	0.58	0.762	133	Pitot Tube Coefficient (Cp):	0.84
A-5	0.67	0.819	133	Percent O2 (%O2):	20.90 % O2
A-6	0.65	0.806	133	Percent CO2 (%CO2):	0.00 % CO2
A-7	0.52	0.721	133	Percent Nitrogen (%N2):	79.10 % N2
A-8	0.60	0.775	133	Meter Box Factor (Y):	1.0068
A-9	1.04	1.020	133	Average Meter Temp. (Tm):	106.6 Degrees F
A-10	1.17	1.082	133	Gas Meter Volume (Vm):	45.857 Cubic Feet
A-11	1.20	1.095	133	Tot. Moisture Catch (Wm):	31.4 grams
A-12	1.12	1.058	133	Delta H (dH):	1.88
A-13	1.05	1.025	133		
A-14	0.93	0.964	133	Root Mean Sq. Delta P (Pavg):	0.781 inches H2O
A-15	0.86	0.927	133	Mean Temperature (Ts):	132.6 Degrees F
A-16	0.80	0.894	133		

CALCULATIONS

STD GAS METER VOLUME: $Vm(std) = (Vm)(Y)(17.64)((Pbar + (dH/13.6))/(Tm + 460))$	$Vm(std) =$	43.104	scf
VOLUME OF WATER VAPOR CONDENSED: $Vw(std) = (4.715E-02)(Wm)$	$Vwc(std) =$	1.481	cubic ft.
PERCENT MOISTURE: $\% H_2O = [Vwc(std)/(Vwc(std) + Vm(std))] \times 100$	$\% H_2O =$	3.3	% H2O
DRY MOLE FRACTION OF STACK GAS: $Mfd = 1 - (\%H_2O/100)$	$Mfd =$	0.967	
ABSOLUTE STACK GAS PRESSURE: $Ps = Pbar + (Pg/13.6)$	$Ps =$	29.70	in. Hg
DRY MOLECULAR WEIGHT OF STACK GAS: $Md = 0.44(\%CO_2) + 0.32(\%O_2) + 0.28(\%N_2)$	$Md =$	28.84	lb/lb-mole
WET MOLECULAR WEIGHT OF STACK GAS: $Ms = (Md)(Mfd) + 0.18(\%H_2O)$	$Ms =$	28.48	lb/lb-mole
AVERAGE STACK GAS VELOCITY: $Vs = 85.49(Cp) \times SQRT\{((Pavg)(Ts + 460))/((Ps)(Ms))\}$	$Vs =$	53.1	ft/sec
DRY VOLUMETRIC FLOW RATE: $Qsd = 7.353(Mfd)(Vs)(A)(Ps)/(Ts + 460)$	$Qsd =$	98,682	DSCFM
ACTUAL VOLUMETRIC FLOW RATE: $Qa = (60/144)(Vs)(A)$	$Qa =$	116,422	ACFM

APPENDIX A. TEST RESULTS

7. RTO No. 1 Stack

a. Chromium

FIELD DATA AND RESULTS TABULATION

PLANT: Roxboro OSB Plant, Roxboro, NC

LOCATION: RTO No. 1 Stack

RUN #		DATE	OPERATOR		
S1-M29-1		8/09/96	Jeff Kunstling		
S1-M29-2		8/09/96	Jeff Kunstling		
S1-M29-3		8/09/96	Jeff Kunstling		
			S1-M29-1	S1-M29-2	S1-M29-3
	Run Start Time		1140	1315	1445
	Run Finish Time		1248	1420	1550
	Net Traversing Points		24	24	24
Theta	Net Run Time, Minutes		60.00	60.00	60.00
Dia	Nozzle Diameter, Inches		0.251	0.270	0.251
Cp	Pitot Tube Coefficient		0.840	0.840	0.840
Y	Dry Gas Meter Calibration Factor		0.9981	0.9981	0.9981
Pbar	Barometric Pressure, Inches Hg		29.50	29.50	29.50
Delta-H	Avg. Pressure Differential of Orifice Meter, Inches H ₂ O		1.85	2.25	1.56
Vm	Volume Of Metered Gas Sample, Dry ACF		45.925	50.887	42.475
tm	Dry Gas Meter Temperature, Degrees F		88	95	94
Vmstd	Volume Of Metered Gas Sample, Dry SCF*		43.736	47.901	39.980
Vlc	Total Volume of Liquid Collected in Impingers & Silica Gel, ml		173.9	139.9	159.5
Vmstd	Volume of Water Vapor, SCF*		8.185	6.585	7.508
XH ₂ O	Moisture Content, Percent by Volume		15.8	12.1	15.8
Mfd	Dry Mole Fraction		0.842	0.879	0.842
XCO ₂	Carbon Dioxide, Percent By Volume, Dry		2.5	2.4	2.9
XO ₂	Oxygen, Percent By Volume, Dry		17.7	18.0	17.4
Fo	Fuel Factor		1.280	1.208	1.207
Md	Gas Molecular Weight, lb/lb-Mole, Dry		29.11	29.10	29.16
Ms	Gas Molecular Weight, lb/lb-Mole, Wet		27.36	27.76	27.40
Pg	Flue Gas Static Pressure, Inches H ₂ O		-0.35	-0.32	-0.33
Ps	Absolute Flue Gas Pressure, Inches Hg		29.47	29.48	29.48
ts	Flue Gas Temperature, Degrees F		272	274	272
Delta-p	Average Velocity Head, Inches H ₂ O		0.7056	0.6683	0.6240
vs	Flue Gas Velocity, Feet/Second		57.47	55.60	54.02
A	Stack/Duct Area, Square Inches		5,775	5,775	5,775
Qsd	Volumetric Air Flow Rate, Dry SCFM*		82,779	83,353	77,738
Qaw	Volumetric Air Flow Rate, Wet ACFM		138,300	133,786	129,984
XI	Isokinetic Sampling Rate, Percent		102.8	96.6	100.0

* 68° F (20° C) -- 29.92 Inches of Mercury (Hg)

FIELD DATA AND RESULTS TABULATION
(Continued)

PLANT: Roxboro OSB Plant, Roxboro, NC

		<u>S1-M29-1</u>	<u>S1-M29-2</u>	<u>S1-M29-3</u>
	<u>Chromium, Total</u>			
fwt	Formula Weight, lb/lb-Mole	52.00	52.00	52.00
ug	Catch Weight, Micrograms	2.95	10.9	3.23
mg/DSCM	Concentration, mg/DSCM *	0.00238	0.00804	0.00285
ug/DSCM	Concentration, ug/DSCM	2.38	8.04	2.85
lb/hr	Emission Rate, lb/hr	7.39E-004	2.51E-003	8.31E-004

* 68° F (20° C) -- 29.92 Inches of Mercury (Hg)

APPENDIX A. TEST RESULTS

7. RTO No. 1 Stack

b. Carbon Dioxide and Oxygen

CALCULATION OF AVERAGE O2/CO2 EMISSIONS

COMPANY: Louisiana-Pacific Corp - Roxboro OSB

SOURCE: RTO #1 OUTLET

RUN: 2 (13:15 - 14:21)

DATE: 08/09/96

GAS VALUE	INITIAL CAL	FINAL CAL	MEAN CAL
0.0 % O2	0.03	0.16	0.10
12.05 % O2	12.17	11.94	12.10
0.10 % CO2	0.04	0.05	0.05
11.02 % CO2	11.10	11.05	11.08

Uncorrected Data: 18.01 % O2
2.41 % CO2

```

::::::::::::::::::::::::::::::::::::::::
::
::      CORRECTED RESULTS      ::
::
::
::      2.36 % CO2            ::
::      17.98 % O2           ::
::
::
::
::::::::::::::::::::::::::::::::::::::::

```

$$\text{Corrected Conc.} = \bar{C}_{ma} (C - C_o) / (C_m - C_o)$$

Where: $\bar{C}$ = mean reference measurement
 C_o = mean zero calibration response
 C_m = mean mid or upscale calibration gas response
 C_{ma} = actual mid or upscale calibration gas concentration

CALCULATION OF AVERAGE O2/CO2 EMISSIONS

COMPANY: Louisiana-Pacific Corp - Roxboro OSB

SOURCE: RTO #1 OUTLET

RUN: 3 (14:45 - 15:50)

DATE: 08/09/96

GAS VALUE	INITIAL CAL	FINAL CAL	MEAN CAL
0.0 % O2	0.03	0.16	0.10
12.05 % O2	12.17	11.94	12.10
0.10 % CO2	0.04	0.05	0.05
11.02 % CO2	11.10	11.05	11.08

Uncorrected Data: 17.38 % O2
2.91 % CO2

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::::::::::::::::::::::::::::::::::::::::
::
::      CORRECTED RESULTS      ::
::
::
::      2.86 % CO2             ::
::      17.35 % O2             ::
::
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::::::::::::::::::::::::::::::::::::::::

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Corrected Conc. = $\bar{C}_{ma}(C - C_o)/(C_m - C_o)$

Where: $\bar{C}$ = mean reference measurement
 C_o = mean zero calibration response
 C_m = mean mid or upscale calibration gas response
 C_{ma} = actual mid or upscale calibration gas concentration

SYSTEM CALIBRATION BIAS AND DRIFT CALCULATIONS

COMPANY: Louisiana-Pacific Corp - Roxboro OSB
SOURCE: RTO #1 OUTLET

DATE: 08/09/96

RUN: 1 (11:41 - 12:49)

SPAN VALUES: 25.0 % O2
20.00 % CO2

	ANALYZER CAL. RESPONSE	-----INITIAL VALUES-----		-----FINAL VALUES-----		DRIFT (% OF SPAN)
		SYSTEM CAL. RESPONSE	SYSTEM CAL. BIAS (% OF SPAN)	SYSTEM CAL. RESPONSE	SYSTEM CAL. BIAS (% OF SPAN)	
O2 ZERO GAS	0.1	0.0	-0.28	0.2	0.24	0.52
O2 UP-SCALE	12.1	12.2	0.32	11.9	-0.60	-0.92
CO2 ZERO GAS	0.10	0.04	-0.30	0.05	-0.25	0.05
CO2 UP-SCALE	11.00	11.10	0.50	11.05	0.25	-0.25

$$\text{SYSTEM CAL. BIAS} = \frac{\text{SYSTEM CAL. RESPONSE} - \text{ANALYZER CAL. RESPONSE}}{\text{SPAN}} \times 100$$

$$\text{DRIFT} = \frac{\text{FINAL SYSTEM CAL. RESPONSE} - \text{INITIAL CAL. RESPONSE}}{\text{SPAN}} \times 100$$

SYSTEM CALIBRATION BIAS AND DRIFT CALCULATIONS

COMPANY: Louisiana-Pacific Corp - Roxboro OSB
 SOURCE: RTO #1 OUTLET

DATE: 08/09/96

RUN: 2 (13:15 - 14:21)

SPAN VALUES: 25.0 % O2
 20.00 % CO2

	-----INITIAL VALUES-----			-----FINAL VALUES-----		
	ANALYZER CAL. RESPONSE	SYSTEM CAL. RESPONSE	SYSTEM CAL. BIAS (% OF SPAN)	SYSTEM CAL. RESPONSE	SYSTEM CAL. BIAS (% OF SPAN)	DRIFT (% OF SPAN)
O2 ZERO GAS	0.1	0.0	-0.28	0.2	0.24	0.52
O2 UP-SCALE	12.1	12.2	0.32	11.9	-0.60	-0.92
CO2 ZERO GAS	0.10	0.04	-0.30	0.05	-0.25	0.05
CO2 UP-SCALE	11.00	11.10	0.50	11.05	0.25	-0.25

$$\text{SYSTEM CAL. BIAS} = \frac{\text{SYSTEM CAL. RESPONSE} - \text{ANALYZER CAL. RESPONSE}}{\text{SPAN}} \times 100$$

$$\text{DRIFT} = \frac{\text{FINAL SYSTEM CAL. RESPONSE} - \text{INITIAL CAL. RESPONSE}}{\text{SPAN}} \times 100$$

SYSTEM CALIBRATION BIAS AND DRIFT CALCULATIONS

COMPANY: Louisiana-Pacific Corp - Roxboro OSB
SOURCE: RTO #1 OUTLET

DATE: 08/09/96

RUN: 3 (14:45 - 15:50)

SPAN VALUES: 25.0 % O2
20.00 % CO2

	ANALYZER CAL. RESPONSE	-----INITIAL VALUES-----		-----FINAL VALUES-----		DRIFT (% OF SPAN)
		SYSTEM CAL. RESPONSE	SYSTEM CAL. BIAS (% OF SPAN)	SYSTEM CAL. RESPONSE	SYSTEM CAL. BIAS (% OF SPAN)	
O2 ZERO GAS	0.1	0.0	-0.28	0.2	0.24	0.52
O2 UP-SCALE	12.1	12.2	0.32	11.9	-0.60	-0.92
CO2 ZERO GAS	0.10	0.04	-0.30	0.05	-0.25	0.05
CO2 UP-SCALE	11.00	11.10	0.50	11.05	0.25	-0.25

$$\text{SYSTEM CAL. BIAS} = \frac{\text{SYSTEM CAL. RESPONSE} - \text{ANALYZER CAL. RESPONSE}}{\text{SPAN}} \times 100$$

$$\text{DRIFT} = \frac{\text{FINAL SYSTEM CAL. RESPONSE} - \text{INITIAL CAL. RESPONSE}}{\text{SPAN}} \times 100$$

APPENDIX A. TEST RESULTS

8. RTO No. 2 Stack

a. Chromium

FIELD DATA AND RESULTS TABULATION
(Continued)

PLANT: Roxboro OSB Plant, Roxboro, NC

		<u>S2-M29-1</u>	<u>S2-M29-2</u>	<u>S2-M29-3</u>
	<u>Chromium, Total</u>			
fwt	Formula Weight, lb/lb-Mole	52.00	52.00	52.00
ug	Catch Weight, Micrograms	3.89	4.62	5.92
mg/DSCM	Concentration, mg/DSCM *	0.00309	0.00339	0.00437
ug/DSCM	Concentration, ug/DSCM	3.09	3.39	4.37
lb/hr	Emission Rate, lb/hr	8.45E-004	1.03E-003	1.27E-003

* 68° F (20° C) -- 29.92 Inches of Mercury (Hg)

FIELD DATA AND RESULTS TABULATION

PLANT: Roxboro OSB Plant, Roxboro, NC

LOCATION: RTO No. 2 Stack

RUN #	DATE	OPERATOR			
S2-M29-1	8/09/96	Dennis D. Holzschuh			
S2-M29-2	8/09/96	Dennis D. Holzschuh			
S2-M29-3	8/09/96	Dennis D. Holzschuh			
			S2-M29-1	S2-M29-2	S2-M29-3
	Run Start Time		1140	1315	1445
	Run Finish Time		1250	1420	1550
	Net Traversing Points		24	24	24
Theta	Net Run Time, Minutes		60.00	60.00	60.00
Dia	Nozzle Diameter, Inches		0.272	0.274	0.275
Cp	Pitot Tube Coefficient		0.840	0.840	0.840
Y	Dry Gas Meter Calibration Factor		0.9978	0.9978	0.9978
Pbar	Barometric Pressure, Inches Hg		29.50	29.50	29.50
Delta-H	Avg. Pressure Differential of Orifice Meter, Inches H ₂ O		1.99	2.35	2.36
Vm	Volume Of Metered Gas Sample, Dry ACF		47.534	51.750	51.408
tm	Dry Gas Meter Temperature, Degrees F		98	102	101
Vmstd	Volume Of Metered Gas Sample, Dry SCF*		44.442	48.083	47.869
Vlc	Total Volume of Liquid Collected in Impingers & Silica Gel, ml		164.8	142.8	196.1
Vwstd	Volume of Water Vapor, SCF*		7.757	6.722	9.230
XH ₂ O	Moisture Content, Percent by Volume		14.9	12.3	16.2
Mfd	Dry Mole Fraction		0.851	0.877	0.838
XCO ₂	Carbon Dioxide, Percent By Volume, Dry		2.6	2.4	2.4
XO ₂	Oxygen, Percent By Volume, Dry		18.3	18.5	18.1
Fo	Fuel Factor		01.000	01.000	1.167
Md	Gas Molecular Weight, lb/lb-Mole, Dry		29.15	29.12	29.11
Ms	Gas Molecular Weight, lb/lb-Mole, Wet		27.49	27.76	27.31
Pg	Flue Gas Static Pressure, Inches H ₂ O		-0.34	-0.30	-0.31
Ps	Absolute Flue Gas Pressure, Inches Hg		29.48	29.48	29.48
ts	Flue Gas Temperature, Degrees F		273	280	284
Delta-p	Average Velocity Head, Inches H ₂ O		0.5406	0.6353	0.6400
vs	Flue Gas Velocity, Feet/Second		50.22	54.42	55.23
A	Stack/Duct Area, Square Inches		5,775	5,775	5,775
Qsd	Volumetric Air Flow Rate, Dry SCFM*		73,008	80,789	77,894
Qaw	Volumetric Air Flow Rate, Wet ACFM		120,835	130,961	132,891
XI	Isokinetic Sampling Rate, Percent		100.8	97.2	99.6

* 68° F (20° C) -- 29.92 Inches of Mercury (Hg)

(Continued next page)

APPENDIX A. TEST RESULTS

8. RTO No. 2 Stack

b. Carbon Dioxide and Oxygen

CALCULATION OF AVERAGE O2/CO2 EMISSIONS

COMPANY: Louisiana-Pacific Corp - Roxboro OSB

SOURCE: RTO #2 OUTLET

RUN: 1 (11:41 - 12:48)

DATE: 08/09/96

GAS VALUE	INITIAL CAL	FINAL CAL	MEAN CAL
0.0 % O2	0.12	0.25	0.20
12.06 % O2	11.88	11.94	11.90
0.10 % CO2	0.08	0.09	0.09
11.02 % CO2	10.90	10.89	10.90

Uncorrected Data: 17.97 % O2
2.59 % CO2

```

::::::::::::::::::::::::::::::::::::::::
::
::      CORRECTED RESULTS      ::
::
::
::      2.55 % CO2             ::
::      18.32 % O2             ::
::
::
::::::::::::::::::::::::::::::::::::::::

```

$$\text{Corrected Conc.} = \bar{C}_{ma}(C - C_o)/(C_m - C_o)$$

Where: $\bar{C}$ = mean reference measurement
 C_o = mean zero calibration response
 C_m = mean mid or upscale calibration gas response
 C_{ma} = actual mid or upscale calibration gas concentration

CALCULATION OF AVERAGE O2/CO2 EMISSIONS

COMPANY: Louisiana-Pacific Corp - Roxboro OSB

SOURCE: RTO #2 OUTLET

RUN: 2 (13:15 - 14:20)

DATE: 08/09/96

GAS VALUE	INITIAL CAL	FINAL CAL	MEAN CAL
0.0 % O2	0.25	0.23	0.20
12.06 % O2	11.94	11.95	11.90
0.10 % CO2	0.09	0.07	0.08
11.02 % CO2	10.89	10.86	10.88

Uncorrected Data: 18.18 % O2
2.40 % CO2

```

.....
::
::
::      CORRECTED RESULTS      ::
::
::
::
::
::      2.37 % CO2             ::
::      18.53 % O2             ::
::
::
::
::
.....

```

$$\text{Corrected Conc.} = \bar{C}_{ma} (C - C_o) / (C_m - C_o)$$

Where: $\bar{C}$ = mean reference measurement
 C_0 = mean zero calibration response
 C_m = mean mid or upscale calibration gas response
 C_{ma} = actual mid or upscale calibration gas concentration

CALCULATION OF AVERAGE O2/CO2 EMISSIONS

COMPANY: Louisiana-Pacific Corp - Rosboro OSB

SOURCE: RTO #2 OUTLET

RUN: 3 (15:20 - 15:50)

DATE: 08/09/96

GAS VALUE	INITIAL CAL	FINAL CAL	MEAN CAL
0.0 % O2	0.23	0.18	0.20
12.06 % O2	11.95	11.93	11.90
0.10 % CO2	0.07	0.33	0.20
11.02 % CO2	10.86	10.81	10.84

Uncorrected Data: 17.80 % O2
2.52 % CO2

```

::::::::::::::::::::::::::::::::::::::::
::
::      CORRECTED RESULTS      ::
::
::
::      2.40 % CO2             ::
::      18.14 % O2             ::
::
::
::::::::::::::::::::::::::::::::::::::::

```

$$\text{Corrected Conc.} = \bar{C}_{ma}(C - C_o) / (C_m - C_o)$$

Where: $\bar{C}$ = mean reference measurement
 C_o = mean zero calibration response
 C_m = mean mid or upscale calibration gas response
 C_{ma} = actual mid or upscale calibration gas concentration

SYSTEM CALIBRATION BIAS AND DRIFT CALCULATIONS

COMPANY: Louisiana-Pacific Corp - Roxboro OSB
SOURCE: RTO #2 OUTLET

DATE: 08/09/96

RUN: 1 (11:41 - 12:48)

SPAN VALUES: 25.0 % O2
20.00 % CO2

	-----INITIAL VALUES-----			-----FINAL VALUES-----		
	ANALYZER CAL. RESPONSE	SYSTEM CAL. RESPONSE	SYSTEM CAL. BIAS (% OF SPAN)	SYSTEM CAL. RESPONSE	SYSTEM CAL. BIAS (% OF SPAN)	DRIFT (% OF SPAN)
O2 ZERO GAS	0.1	0.1	0.08	0.3	0.60	0.52
O2 UP-SCALE	12.1	11.9	-0.84	11.9	-0.60	0.24
CO2 ZERO GAS	0.10	0.08	-0.10	0.09	-0.05	0.05
CO2 UP-SCALE	11.00	10.90	-0.50	10.89	-0.55	-0.05

SYSTEM CAL. RESPONSE - ANALYZER CAL. RESPONSE
SYSTEM CAL. BIAS = _____ X 100
SPAN

FINAL SYSTEM CAL. RESPONSE - INITIAL CAL. RESPONSE
DRIFT = _____ X 100
SPAN

SYSTEM CALIBRATION BIAS AND DRIFT CALCULATIONS

COMPANY: Louisiana-Pacific Corp - Roxboro OSB
 SOURCE: RTO #2 OUTLET

DATE: 08/09/96

RUN: 2 (13:15 - 14:20)

SPAN VALUES: 25.0 % O2
 20.00 % CO2

	-----INITIAL VALUES-----			-----FINAL VALUES-----		
	ANALYZER CAL. RESPONSE	SYSTEM CAL. RESPONSE	SYSTEM CAL. BIAS (% OF SPAN)	SYSTEM CAL. RESPONSE	SYSTEM CAL. BIAS (% OF SPAN)	DRIFT (% OF SPAN)
O2 ZERO GAS	0.1	0.3	0.60	0.2	0.52	-0.08
O2 UP-SCALE	12.1	11.9	-0.60	12.0	-0.56	0.04
CO2 ZERO GAS	0.10	0.09	-0.05	0.07	-0.15	-0.10
CO2 UP-SCALE	11.00	10.89	-0.55	10.86	-0.70	-0.15

SYSTEM CAL. RESPONSE - ANALYZER CAL. RESPONSE
 SYSTEM CAL. BIAS = _____ X 100
 SPAN

FINAL SYSTEM CAL. RESPONSE - INITIAL CAL. RESPONSE
 DRIFT = _____ X 100
 SPAN

SYSTEM CALIBRATION BIAS AND DRIFT CALCULATIONS

COMPANY: Louisiana-Pacific Corp - Roxboro OSB
SOURCE: RTO #2 OUTLET

DATE: 08/09/96

RUN: 3 (15:20 - 15:50)

SPAN VALUES: 25.0 % O2
20.00 %-CO2

	-----INITIAL VALUES-----			-----FINAL VALUES-----		
	ANALYZER CAL. RESPONSE	SYSTEM CAL. RESPONSE	SYSTEM CAL. BIAS (% OF SPAN)	SYSTEM CAL. RESPONSE	SYSTEM CAL. BIAS (% OF SPAN)	DRIFT (% OF SPAN)
O2 ZERO GAS	0.1	0.2	0.52	0.2	0.32	-0.20
O2 UP-SCALE	12.1	12.0	-0.56	11.9	-0.64	-0.08
CO2 ZERO GAS	0.10	0.07	-0.15	0.33	1.15	1.30
CO2 UP-SCALE	11.00	10.86	-0.70	10.81	-0.95	-0.25

$$\text{SYSTEM CAL. BIAS} = \frac{\text{SYSTEM CAL. RESPONSE} - \text{ANALYZER CAL. RESPONSE}}{\text{SPAN}} \times 100$$

$$\text{DRIFT} = \frac{\text{FINAL SYSTEM CAL. RESPONSE} - \text{INITIAL CAL. RESPONSE}}{\text{SPAN}} \times 100$$

APPENDIX A. TEST RESULTS

9. Example Calculations

NOTE

The example values shown in these calculations have been rounded for presentation purposes. Any hand calculations conducted using these example values may produce slightly different results than those presented.

CONSTANTS, DEFINITIONS, NOMENCLATURE, AND UNITS

460	0 degrees Fahrenheit in degrees Rankin. The sum of 460 and the standard temperature (60, 68, 77, etc. in °F) gives Tstd in degrees Rankin.
273	0 degrees Celsius in degrees Kelvin. The sum of 273 and the standard temperature (18, 20, 25, etc. in °C) gives Tstd in degrees Kelvin.
29.92	Standard absolute pressure (Pstd), inches of mercury. English unit.
760	Standard absolute pressure (Pstd), millimeters of mercury. Metric unit.
24.056*	Liters per gram-mole at standard conditions.
385.3*	Molar volume cubic feet/pound-mole at standard conditions.
0.04707*	Standard cubic feet per gram or mL of H ₂ O at standard conditions.
7000	Grains per pound.
453.592	Grams per pound.
0.02832	Cubic meters per cubic foot.
28.32	Liters per cubic foot.
0.03531	Cubic feet per liter.
35.31	Cubic feet per cubic meter.
1000	Conversion from milligrams to grams, milliliters to liters, and liters to cubic meters.
10 ⁶	Conversion factor for decimal fraction to parts per million.
144	Square inches per square foot.
60	Minutes per hour and seconds per minute.
13.6	Specific gravity of mercury (1 inch of mercury = 13.6 inches of H ₂ O).
20.9	Percent O ₂ by volume (dry basis) in ambient air.

85.49	Pitot tube constant (Kp):	$\frac{\text{feet}}{\text{second}} \sqrt{\frac{(\text{lb} / \text{lb} - \text{mole}) * (\text{inches Mercury})}{(\text{degrees Rankin}) * (\text{inches H}_2\text{O})}}$
-------	---------------------------	--

A Stack cross-sectional area, square inches.

* Where applicable, these constants must be corrected (if the standard temperature is not 68°F) by multiplying them by the ratio of the standard temperatures. For example to convert to 77°F: (460 + 77)/(460 + 68)

EXAMPLE TEST CALCULATIONS RUN S1-M29-1

RTO No. 1 Stack

VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS

$$Vmstd = Y * Vm * \frac{Pbar + (\Delta H/13.6)}{(460 + tm)} * \frac{460 + tstd}{Pstd}$$

$$Vmstd = 0.9981 * 45.925 * \frac{29.50 + (1.850/13.6)}{(460 + 88)} * \frac{460 + 68}{29.92} = 43.736 \text{ DSCF}$$

VOLUME OF WATER VAPOR AT STANDARD CONDITIONS

$$Vwstd = 0.04707 * Vlc * (460 + tstd)/528$$

$$Vwstd = 0.04707 * 173.9 * (460 + 68)/528 = 8.185 \text{ SCF}$$

PERCENT MOISTURE, BY VOLUME, AS MEASURED IN FLUE GAS

$$\%H_2O = 100 * Vwstd / (Vwstd + Vmstd)$$

$$\%H_2O = \frac{8.185}{8.185 + 43.736} * 100 = 15.8 \%$$

ABSOLUTE FLUE GAS PRESSURE

$$Ps = Pbar + (Pg / 13.6)$$

$$Ps = 29.50 + (-0.35/13.6) = 29.47 \text{ inches Hg}$$

DRY MOLE FRACTION OF FLUE GAS

$$Mfd = 1 - \%H_2O / 100$$

$$Mfd = 1 - 15.8/100 = 0.842$$

DRY MOLECULAR WEIGHT OF FLUE GAS

$$Md = (\%CO_2/100 * 44) + (\%O_2/100 * 32) + ((100 - \%CO_2 - \%O_2)/100 * 28)$$

$$Md = (2.5/100 * 44) + (17.7/100 * 32) + ((100 - 2.5 - 17.7)/100 * 28)$$

$$Md = 29.11 \text{ lb/lb-Mole}$$

WET MOLECULAR WEIGHT OF FLUE GAS

$$Ms = (Md * Mfd) + (0.18 * \%H_2O)$$

$$Ms = (29.11 * 0.842) + (0.18 * 15.8) = 27.36 \text{ lb/lb-Mole}$$

AVERAGE FLUE GAS VELOCITY [Note: (Delta p)avg is square of average square root]

$$v_s = 85.49 * C_p * \left[\frac{(\Delta P)_{avg} * (460 + t_s)}{P_s * M_s} \right]^{\frac{1}{2}}$$

$$v_s = 85.49 * 0.840 * \left[\frac{0.7056 * (460 + 272)}{29.47 * 27.36} \right]^{\frac{1}{2}} = 57.47 \text{ ft/sec}$$

DRY VOLUMETRIC FLUE GAS FLOW RATE AT STANDARD CONDITIONS

$$Q_{sd} = \frac{60}{144} * Mfd * v_s * A * \frac{460 + t_{std}}{460 + t_s} * \frac{P_s}{P_{std}}$$

$$Q_{sd} = \frac{60}{144} * 0.842 * 57.47 * 5,775.1 * \frac{460 + 68}{460 + 272} * \frac{29.47}{29.92}$$

$$Q_{sd} = 82,779 \text{ DSCFM}$$

WET VOLUMETRIC FLUE GAS FLOW RATE AT ACTUAL CONDITIONS

$$Q_{aw} = 60 / 144 * v_s * A$$

$$Q_{aw} = 60 / 144 * 57.47 * 5,775.1 = 138,300 \text{ ACFM}$$

PERCENT ISOKINETIC OF SAMPLING RATE

$$\%I = \frac{P_{std}}{460 + t_{std}} * \frac{100}{60} * \frac{(t_s + 460) * V_{mstd}}{P_s * v_s * Mfd * \Theta * (\pi * (NozzleDia/2)^2 / 144)}$$

$$\%I = \frac{29.92}{460 + 68} * \frac{100}{60} * \frac{(272 + 460) * 43.736}{29.47 * 57.47 * 0.842 * 60.00 * (\pi * (0.251/2)^2 / 144)}$$

$$\%I = 102.8 \%$$

CONCENTRATION, MILLIGRAMS PER DRY STANDARD CUBIC METER, CHROMIUM, TOTAL

$$mg/DSCM = \frac{(ug / 10^6)}{V_{mstd} * 0.02832} * 10^3$$

$$mg/DSCM = \frac{(2.95/10^6)}{43.736 * 0.02832} * 10^3 = 0.00238 \text{ mg/DSCM}$$

CONCENTRATION, MICROGRAMS PER DRY STANDARD CUBIC METER, CHROMIUM, TOTAL

$$\text{ug/DSCM} = \frac{(\text{ug} / 10^6)}{\text{Vmstd} * 0.02832} * 10^6$$

$$\text{ug/DSCM} = \frac{(2.95/10^6)}{43.736 * 0.02832} * 10^6 = 2.38 \text{ ug/DSCM}$$

EMISSION RATE, POUNDS PER HOUR, CHROMIUM, TOTAL

$$\text{lb/hr} = \frac{60}{453.592} * \frac{(\text{ug} / 10^6)}{\text{Vmstd}} * \text{Qsd}$$

$$\text{lb/hr} = \frac{60}{453.592} * \frac{(2.95/10^6)}{43.736} * 82,779 = 7.39\text{E-}004 \text{ lb/hr}$$

EXAMPLE TEST CALCULATIONS

Dryer No. 1 Exhaust

RUN NUMBER: D1-CEM-1

EMISSION RATE, CARBON MONOXIDE, lb/hr

$$\text{lb/hr} = (60 * \text{ppm}_{\text{vd}} * \text{fwt} * Q_{\text{sd}}) / (385.3 * (460 + t_{\text{std}}) / 528 * 10^6)$$

$$\text{lb/hr} = (60 * 274.60 * 28.01 * 31,966) / (385.3 * (460 + 68) / 528 * 10^6)$$

$$\text{lb/hr} = 38.29 \text{ lb/hr}$$

CONCENTRATION, THC AS CARBON, ppmvd

$$\text{ppm}_{\text{vd}} = (\text{ppm}_{\text{vw}} / M_{\text{fid}})$$

$$\text{ppm}_{\text{vd}} = (1,250.3 / 0.762)$$

$$\text{ppm}_{\text{vd}} = 1,641 \text{ ppmvd}$$

APPENDIX B. FIELD DATA

1. Dryer Exhausts 1 - 5

a. Carbon Monoxide, Nitrogen Oxides, and Total Hydrocarbons

CALIBRATION SUMMARY

SOURCE: LOUISIANA PACIFIC

REASON: CALIBRATION ERROR CHECK

DATE : 08-09-1996 TIME: 07:40 - 07:57

A/D CHAN	MONITOR DESCRIPTION	UNITS	GAS VALUE	MONITOR RESPONSE
9	UNIT1	ppmNOX	0.0	0.4
9	UNIT1	ppmNOX	47.1	46.3
9	UNIT1	ppmNOX	82.2	82.5
10	UNIT1	ppmCO	0.0	0.0
10	UNIT1	ppmCO	149.2	147.5
10	UNIT1	ppmCO	301.0	297.1
10	UNIT1	ppmCO	450.0	451.7
11	UNIT1	%O2	0.00	0.34
11	UNIT1	%O2	12.26	12.19
11	UNIT1	%O2	21.30	21.15
5	UNIT2	ppmNOX	0.0	0.4
5	UNIT2	ppmNOX	47.1	46.6
5	UNIT2	ppmNOX	82.2	83.0
2	UNIT2	ppmCO	0.0	1.5
2	UNIT2	ppmCO	301.0	307.5
2	UNIT2	ppmCO	450.0	445.4

CALIBRATION SUMMARY

SOURCE: LOUISIANA PACIFIC

REASON: CALIBRATION ERROR CHECK

DATE : 08-09-1996 TIME: 07:57 - 07:58

<u>A/D CHAN</u>	<u>MONITOR DESCRIPTION</u>	<u>UNITS</u>	<u>GAS VALUE</u>	<u>MONITOR RESPONSE</u>
2	UNIT2	ppmCO	149.2	148.2

CALIBRATION SUMMARY

SOURCE: LOUISIANA PACIFIC

REASON: PRE RUN 1 SYSTEM BIAS CHECK

DATE : 08-09-1996 TIME: 15:39 - 15:49

A/D CHAN	MONITOR DESCRIPTION	UNITS	GAS VALUE	MONITOR RESPONSE
9	UNIT1	ppmNOX	0.0	0.0
9	UNIT1	ppmNOX	47.1	46.0
10	UNIT1	ppmCO	0.0	0.6
10	UNIT1	ppmCO	149.2	152.9
11	UNIT1	%O2	0.00	0.04
11	UNIT1	%O2	50.12 200.00	12.04
14	UNIT1	ppmTHC	0.0	3.6
14	UNIT1	ppmTHC	296.0	300.6
14	UNIT1	ppmTHC	518.4	522.1
14	UNIT1	ppmTHC	841.8	835.9
5	UNIT2	ppmNOX	0.0	0.3
5	UNIT2	ppmNOX	47.1	46.3
2	UNIT2	ppmCO	0.0	1.5
2	UNIT2	ppmCO	149.2	151.1
7	UNIT2	ppmTHC	0.0	1.9
7	UNIT2	ppmTHC	296.0	299.6
7	UNIT2	ppmTHC	518.4	514.3
7	UNIT2	ppmTHC	841.8	842.6

LOUISIANA PACIFIC 08-09-1996

	CHAN 9	CHAN10	CHAN11	CHAN14	CHAN 5	CHAN 2	CHAN 7
	UNIT1	UNIT1	UNIT1	UNIT1	UNIT2	UNIT2	UNIT2
TIME	ppmNOX	ppmCO	%O2	ppmTHC	ppmNOX	ppmCO	ppmTHC
17:21	25.2	500.1*	16.09	1250.3*	31.8	191.0	586.5
17:22	24.1	500.1*	16.11	1250.3*	31.4	197.2	593.8
17:23	24.5	500.1*	16.08	1250.3*	31.8	197.8	595.6
17:24	24.0	474.6*	16.25	1250.3*	32.1	194.1	596.6
17:25	23.5	353.2	16.53	1250.3*	32.2	186.9	599.9
17:26	24.0	269.1	16.72	1250.3*	32.3	191.0	598.1
17:27	24.2	242.4	16.76	1250.3*	31.8	194.2	606.0
17:28	24.9	204.9	16.89	1250.3*	32.3	189.3	601.7
17:29	26.4	171.0	17.05	1250.3*	32.0	192.3	605.7
17:30	28.2	156.4	17.20	1250.3*	30.6	205.2	626.3
17:31	29.4	157.8	17.33	1250.3*	30.3	213.7	634.3
17:32	29.3	165.5	17.29	1250.3*	31.7	214.0	608.9
17:33	29.3	162.0	17.28	1250.3*	31.3	214.6	638.0
17:34	29.5	154.2	17.26	1250.3*	31.7	213.8	639.6
17:35	28.5	158.8	17.11	1250.3*	31.1	217.1	642.7

AVERAGE VALUES FOR THE LAST 15 MINUTES

17:35	26.3	278.0	16.80	1250.3	31.6	200.8	611.6
17:36	27.6	154.4	17.00	1250.3*	31.4	232.3	558.0
17:37	26.3	174.6	16.93	1250.3*	31.0	215.1	150.2
17:38	25.7	195.2	16.85	1250.3*	31.6	212.5	47.6
17:39	24.3	236.8	16.73	1250.3*	32.2	197.8	65.1
17:40	24.1	283.2	16.56	1250.3*	33.4	193.7	151.1
17:41	24.5	336.3	16.41	1250.3*	33.9	187.9	185.9
17:42	25.0	395.5	16.31	1250.3*	34.2	176.2	379.0
17:43	25.3	421.4	16.27	1250.3*	34.0	182.9	370.2
17:44	24.8	439.7	16.30	1250.3*	33.6	201.0	271.8
17:45	25.3	491.1*	16.19	1250.3*	34.7	200.8	354.0
17:46	25.6	500.1*	16.07	1250.3*	34.2	212.2	368.6
17:47	25.8	500.1*	16.12	1250.3*	35.1	207.1	67.8
17:48	26.0	500.1*	16.07	1250.3*	34.9	199.4	560.1
17:49	25.3	500.1*	16.19	1250.3*	35.2	191.6	583.5
17:50	24.6	499.5*	16.27	1250.3*	35.6	181.4	575.8

AVERAGE VALUES FOR THE LAST 15 MINUTES

17:50	25.3	375.2	16.42	1250.3	33.7	199.5	312.6
17:51	24.3	437.4	16.44	1250.3*	35.6	187.2	588.1
17:52	24.5	355.9	16.59	1250.3*	34.4	197.0	590.6
17:53	24.5	266.8	16.81	1250.3*	33.9	180.6	596.5
17:54	25.6	212.1	16.96	1250.3*	33.7	178.8	601.6
17:55	28.4	167.9	17.16	1250.3*	33.3	192.4	606.6
17:56	30.3	146.1	17.32	1250.3*	35.0	180.8	608.9
17:57	31.7	144.7	17.48	1250.3*	36.0	196.1	608.0
17:58	34.0	152.0	17.60	1250.3*	34.7	200.8	278.6
17:59	35.1	153.7	17.62	1250.3*	34.7	203.1	239.1
18:00	35.6	148.9	17.62	1250.3*	35.1	179.7	283.5
18:01	33.7	151.1	17.51	1250.3*	36.3	180.7	584.1
18:02	32.8	162.6	17.45	1250.3*	36.5	179.3	616.8
18:03	31.1	164.5	17.37	1250.3*	37.2	174.6	615.8

LOUISIANA PACIFIC

08-09-1996

	CHAN 9	CHAN10	CHAN11	CHAN14	CHAN 5	CHAN 2	CHAN 7
	UNIT1	UNIT1	UNIT1	UNIT1	UNIT2	UNIT2	UNIT2
TIME	ppmNOX	ppmCO	%O2	ppmTHC	ppmNOX	ppmCO	ppmTHC
18:04	28.9	175.0	17.23	1250.3*	37.2	186.4	623.1
18:05	26.0	188.0	17.05	1250.3*	36.1	197.7	475.9

AVERAGE VALUES FOR THE LAST 15 MINUTES

18:05	29.8	201.8	17.21	1250.3	35.3	187.7	527.8
18:06	24.6	218.3	16.91	1250.3*	36.6	177.1	559.8
18:07	23.6	238.2	16.83	1250.3*	36.2	176.3	592.1
18:08	23.0	272.8	16.68	1250.3*	35.8	192.9	634.9
18:09	22.8	321.2	16.49	1250.3*	34.5	236.8	643.9
18:10	23.5	347.8	16.45	1250.3*	34.1	279.6	616.5
18:11	24.0	338.0	16.42	1250.3*	33.5	251.2	606.4
18:12	24.0	354.8	16.45	1250.3*	32.7	258.3	658.2
18:13	23.9	351.5	16.47	1250.3*	33.1	259.9	668.8
18:14	23.6	323.6	16.57	1250.3*	34.4	261.9	613.3
18:15	24.6	264.2	16.68	1250.3*	31.9	284.9	670.9
18:16	25.0	205.5	16.94	1250.3*	34.8	262.1	625.9
18:17	26.7	181.8	17.20	1250.3*	34.7	298.5	429.1
18:18	30.0	173.0	17.42	1250.3*	34.4	294.2	522.6
18:19	34.2	162.1	17.59	1250.3*	35.9	289.0	497.3
18:20	37.1	148.0	17.69	1250.3*	35.1	278.3	456.3

AVERAGE VALUES FOR THE LAST 15 MINUTES

18:20	26.0	260.1	16.85	1250.3	34.5	253.4	586.4
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AVERAGE VALUES FOR THE LAST HOUR: 60 MINUTES OF VALID DATA

18:20	26.9	278.8	16.82	1250.3	33.8	210.3	509.6
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COMMENTS: END RUN 1

1720 - 1820

CALIBRATION SUMMARY

SOURCE: LOUISIANA PACIFIC

REASON: POST RUN 1 PRE RUN 2 SYSTEM BIAS CHECK

DATE : 08-09-1996 TIME: 18:20 - 18:37

A/D CHAN	MONITOR DESCRIPTION	UNITS	GAS VALUE	MONITOR RESPONSE
9	UNIT1	ppmNOX	0.0	0.7
9	UNIT1	ppmNOX	47.1	44.6
10	UNIT1	ppmCO	0.0	0.0
10	UNIT1	ppmCO	149.2	150.3
11	UNIT1	%O2	0.00	0.04
11	UNIT1	%O2	12.26	12.16
14	UNIT1	ppmTHC	0.0	1.6
14	UNIT1	ppmTHC	296.0	309.0
5	UNIT2	ppmNOX	0.0	0.8
5	UNIT2	ppmNOX	47.1	47.2
2	UNIT2	ppmCO	0.0	1.5
2	UNIT2	ppmCO	149.2	157.1
7	UNIT2	ppmTHC	0.0	5.3
7	UNIT2	ppmTHC	296.0	314.3

LOUISIANA PACIFIC

08-09-1996

	CHAN 9	CHAN10	CHAN11	CHAN14	CHAN 5	CHAN 2	CHAN 7
	UNIT1	UNIT1	UNIT1	UNIT1	UNIT2	UNIT2	UNIT2
TIME	ppmNOX	ppmCO	%O2	ppmTHC	ppmNOX	ppmCO	ppmTHC
18:46	34.9	146.0	17.83	315.8	33.1	267.3	606.1
18:47	35.3	138.1	17.81	327.4	34.6	285.1	596.0
18:48	34.4	149.6	17.82	464.0	32.7	301.5	600.9
18:49	32.8	156.2	17.69	471.1	31.6	284.0	598.7
18:50	31.4	155.7	17.58	474.2	31.2	267.2	598.3
18:51	30.9	154.4	17.56	475.1	30.9	264.1	597.5
18:52	28.2	161.2	17.42	487.3	29.5	254.2	601.9
18:53	25.4	174.8	17.24	510.6	28.8	233.1	612.3
18:54	23.3	182.2	17.04	536.7	28.9	212.2	614.4
18:55	22.7	198.0	16.99	551.5	28.3	204.8	621.2
18:56	22.7	219.4	16.97	556.3	28.8	202.5	618.9
18:57	22.5	231.6	16.92	563.8	30.4	210.2	608.7
18:58	22.3	260.5	16.77	588.9	29.3	218.2	610.5
18:59	22.6	286.2	16.68	591.5	29.6	220.0	607.5
19:00	22.8	285.5	16.71	594.4	29.1	243.6	598.9

AVERAGE VALUES FOR THE LAST 15 MINUTES

19:00	27.5	193.3	17.27	500.6	30.4	244.5	606.1
19:01	22.9	269.9	16.77	586.5	29.7	278.4	597.4
19:02	23.6	234.5	16.87	567.3	29.5	269.6	590.9
19:03	23.9	220.0	17.00	546.9	30.0	270.2	586.4
19:04	24.6	197.2	17.11	530.0	30.8	262.5	571.5
19:05	25.9	187.9	17.22	511.5	33.5	265.5	558.8
19:06	27.8	170.0	17.35	497.9	33.7	289.3	556.3
19:07	30.8	169.1	17.53	474.2	35.0	277.0	553.8
19:08	31.5	164.3	17.60	465.9	35.5	291.1	545.4
19:09	33.7	166.6	17.67	447.6	34.9	288.7	550.0
19:10	35.2	171.2	17.72	433.7	34.7	287.2	551.5
19:11	35.8	176.9	17.73	437.7	33.8	280.4	547.7
19:12	36.3	182.0	17.76	436.7	33.4	287.8	547.0
19:13	34.7	195.9	17.70	446.9	31.4	261.2	545.4
19:14	32.7	193.5	17.57	460.0	31.9	254.4	544.9
19:15	30.7	221.9	17.48	475.0	32.9	264.3	547.6

AVERAGE VALUES FOR THE LAST 15 MINUTES

19:15	30.0	194.7	17.41	487.9	32.7	275.2	559.6
19:16	27.7	207.2	17.29	493.5	32.9	266.3	545.7
19:17	26.1	215.5	17.15	507.5	31.0	278.3	553.1
19:18	24.8	207.0	17.03	527.7	28.1	256.4	565.7
19:19	24.2	219.5	16.92	544.1	28.0	260.7	565.2
19:20	23.7	248.6	16.79	567.5	29.2	251.3	562.5
19:21	23.6	263.3	16.76	588.2	29.5	253.9	563.6
19:22	23.9	278.7	16.65	612.7	28.8	260.4	559.5
19:23	23.5	311.9	16.58	621.3	30.5	237.4	555.2
19:24	23.8	300.8	16.60	621.7	32.0	226.8	551.4
19:25	23.5	307.1	16.61	629.6	33.4	260.6	548.5
19:26	23.8	316.4	16.60	626.4	32.7	267.6	547.1
19:27	23.9	298.7	16.62	625.2	32.8	247.7	543.2
19:28	24.0	279.3	16.75	594.2	33.2	270.7	535.8

LOUISIANA PACIFIC 08-09-1996

	CHAN 9	CHAN10	CHAN11	CHAN14	CHAN 5	CHAN 2	CHAN 7
	UNIT1	UNIT1	UNIT1	UNIT1	UNIT2	UNIT2	UNIT2
TIME	PPMNOX	PPMCO	%O2	PPMTHC	PPMNOX	PPMCO	PPMTHC
19:29	24.8	210.2	16.96	561.7	34.5	240.9	531.0
19:30	25.9	176.4	17.07	549.0	34.3	252.5	525.0

AVERAGE VALUES FOR THE LAST 15 MINUTES

19:30	24.5	256.0	16.82	578.0	31.4	255.4	550.2
19:31	28.1	156.3	17.24	520.3	32.8	254.2	527.0
19:32	29.9	160.1	17.42	497.4	34.0	228.6	523.0
19:33	31.7	155.8	17.54	477.7	34.1	251.0	517.8
19:34	32.3	158.7	17.58	469.8	34.2	231.0	512.5
19:35	32.5	156.3	17.57	468.6	32.6	232.7	515.0
19:36	32.5	156.5	17.58	466.2	32.7	234.6	519.2
19:37	33.4	147.4	17.63	459.4	32.3	259.0	511.2
19:38	32.5	167.6	17.59	457.2	31.2	244.0	521.4
19:39	30.3	158.3	17.47	464.1	31.0	244.3	518.6
19:40	28.6	162.7	17.35	480.4	31.1	254.6	519.2
19:41	26.8	173.9	17.15	496.7	30.9	236.2	517.4
19:42	25.7	172.3	17.07	509.7	30.7	221.5	510.0
19:43	24.7	188.7	16.98	527.2	29.6	237.2	509.8
19:44	24.2	206.5	16.91	546.6	30.0	250.0	505.1
19:45	24.0	237.5	16.79	564.6	31.0	252.6	508.8

AVERAGE VALUES FOR THE LAST 15 MINUTES

19:45	29.2	170.6	17.33	493.7	31.9	242.1	515.7
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AVERAGE VALUES FOR THE LAST HOUR: 60 MINUTES OF VALID DATA

19:45	27.8	203.7	17.21	515.0	31.6	254.3	557.9
19:46	24.0	262.3	16.71	580.9	30.8	224.4	506.8
19:47	23.7	284.1	16.69	590.6	29.4	247.5	515.7
19:48	23.8	326.7	16.55	606.4	27.9	236.1	535.8
19:49	23.3	358.6	16.56	604.2	28.8	218.0	556.2
19:50	23.6	332.2	16.67	587.5	28.5	217.4	560.8

COMMENTS: END RUN 2

1845 - 1945

CALIBRATION SUMMARY

SOURCE: LOUISIANA PACIFIC

REASON: POST RUN 2 PRE RUN 3 SYSTEM BIAS CHECK

DATE : 08-09-1996 TIME: 19:50 - 20:01

A/D CHAN	MONITOR DESCRIPTION	UNITS	GAS VALUE	MONITOR RESPONSE
9	UNIT1	ppmNOX	0.0	0.2
9	UNIT1	ppmNOX	47.1	46.0
10	UNIT1	ppmCO	0.0	0.6
10	UNIT1	ppmCO	149.2	150.4
11	UNIT1	%O2	0.00	0.08
11	UNIT1	%O2	12.26	12.09
14	UNIT1	ppmTHC	0.0	1.6
14	UNIT1	ppmTHC	296.0	308.1
5	UNIT2	ppmNOX	0.0	0.7
5	UNIT2	ppmNOX	47.1	47.3
2	UNIT2	ppmCO	0.0	2.6
2	UNIT2	ppmCO	149.2	149.3
7	UNIT2	ppmTHC	0.0	1.3
7	UNIT2	ppmTHC	296.0	313.8

LOUISIANA PACIFIC

08-09-1996

	CHAN 9	CHAN10	CHAN11	CHAN14	CHAN 5	CHAN 2	CHAN 7
	UNIT1	UNIT1	UNIT1	UNIT1	UNIT2	UNIT2	UNIT2
TIME	PPMNOX	PPMCO	SO2	PPMTHC	PPMNOX	PPMCO	PPMTHC
20:21	42.2	159.0	17.20	427.7	32.8	249.3	608.9
20:22	43.1	148.6	17.24	428.2	32.8	271.3	590.7
20:23	44.8	141.0	17.30	427.0	32.2	255.7	588.4
20:24	45.5	145.2	17.36	420.7	31.1	259.0	585.9
20:25	45.4	154.9	17.34	422.8	30.0	240.7	583.9
20:26	44.1	141.8	17.29	427.8	30.1	229.1	587.0
20:27	44.5	141.3	17.26	431.7	30.4	205.6	597.8
20:28	44.4	153.3	17.25	434.8	30.8	219.5	615.7
20:29	43.1	150.1	17.23	443.6	29.8	244.1	638.6
20:30	43.0	156.6	17.22	448.8	29.9	257.3	637.3
20:31	42.3	171.7	17.19	353.0	30.7	256.6	642.4
20:32	41.7	175.5	17.03	-107.4	29.5	276.9	661.2
20:33	40.7	182.3	16.95	-178.1	30.5	275.4	651.4
20:34	41.1	190.7	16.91	-375.9	31.1	256.4	622.7
20:35	40.3	208.0	16.84	-433.4	33.2	230.8	588.4

AVERAGE VALUES FOR THE LAST 15 MINUTES

20:35	43.1	161.3	17.17	241.1	31.0	248.5	613.4
20:36	41.9	216.1	16.76	-346.1	32.8	211.9	559.8
20:37	40.6	225.3	16.76	-326.9	33.3	196.8	529.7
20:38	40.5	222.9	16.75	-388.4	33.7	194.5	500.2
20:39	40.8	275.2	16.54	-243.7	36.5	194.7	478.9
20:40	41.3	258.8	16.61	-177.6	37.0	223.2	455.3
20:41	39.4	255.1	16.67	-177.8	37.5	235.0	446.5
20:42	40.3	236.4	16.77	-177.5	38.0	230.6	437.1
20:43	40.7	208.9	16.85	-177.4	38.6	249.8	428.0
20:44	40.4	210.7	16.85	-177.3	38.9	246.8	420.6
20:45	40.9	184.9	17.02	-177.3	40.0	236.3	420.0
20:46	41.2	169.4	17.11	-177.3	40.5	230.4	420.3
20:47	43.3	173.9	17.05	-177.2	41.3	200.5	423.4
20:48	47.1	165.9	17.23	-177.2	39.9	171.2	427.0
20:49	48.4	151.7	17.34	-177.1	38.8	168.8	432.4
20:50	48.3	155.2	17.38	-177.1	37.6	179.6	437.2

AVERAGE VALUES FOR THE LAST 15 MINUTES

20:50	42.3	207.4	16.91	-217.1	37.6	211.3	454.4
20:51	48.8	160.7	17.38	-177.0	35.9	179.7	450.3
20:52	49.0	161.3	17.37	-177.1	36.1	182.0	461.5
20:53	48.4	167.2	17.34	-177.0	35.3	188.9	466.9
20:54	45.4	169.3	17.18	-177.0	34.1	197.6	482.9
20:55	44.3	182.7	17.01	-177.0	34.0	215.1	493.7
20:56	43.3	183.5	16.92	-177.0	33.7	224.9	495.2
20:57	42.0	185.1	16.92	-177.0	35.6	209.2	493.0
20:58	42.1	191.4	16.92	-177.0	33.6	214.4	500.5
20:59	41.7	219.1	16.82	-177.0	33.3	213.5	494.0
21:00	40.3	236.7	16.69	-177.0	33.0	207.5	490.7
21:01	41.0	240.4	16.66	-176.9	33.3	184.6	484.0
21:02	40.9	242.9	16.68	-177.0	33.5	210.3	473.2
21:03	41.0	232.2	16.81	-177.0	35.9	197.8	465.8

Flame
out

LOUISIANA PACIFIC

08-09-1996

	CHAN 9	CHAN10	CHAN11	CHAN14	CHAN 5	CHAN 2	CHAN 7
	UNIT1	UNIT1	UNIT1	UNIT1	UNIT2	UNIT2	UNIT2
TIME	ppmNOX	ppmCO	%O2	ppmTHC	ppmNOX	ppmCO	ppmTHC
21:04	41.1	222.3	16.89	-176.9	36.7	227.1	450.6
21:05	40.9	212.9	16.90	-177.0	37.2	266.3	439.9

AVERAGE VALUES FOR THE LAST 15 MINUTES

21:05	43.4	200.5	16.97	-177.0	34.7	207.9	476.2
21:06	42.1	206.1	16.90	-176.9	39.0	261.7	424.7
21:07	42.8	197.4	17.02	-176.9	41.1	276.7	418.4
21:08	44.7	183.4	17.15	-176.9	41.0	290.2	420.1
21:09	46.0	167.9	17.20	-176.8	41.5	303.1	420.4
21:10	47.4	150.4	17.34	-176.9	41.0	300.8	424.3
21:11	50.5	147.7	17.46	-176.8	39.5	307.0	433.4
21:12	50.9	154.3	17.49	-176.9	38.8	290.6	437.3
21:13	51.5	150.4	17.47	-176.9	38.9	262.2	437.3
21:14	51.0	157.1	17.52	-176.8	37.7	267.9	439.6
21:15	52.3	164.5	17.52	-176.8	37.4	254.8	438.3
21:16	53.4	153.9	17.51	-176.8	36.5	256.5	450.5
21:17	52.6	146.1	17.44	-176.9	35.2	253.1	454.7
21:18	49.5	147.7	17.36	-176.7	34.6	239.7	460.4
21:19	49.1	160.1	17.34	-176.8	34.2	240.0	468.0
21:20	46.3	154.7	17.21	-176.8	34.2	225.8	474.4

AVERAGE VALUES FOR THE LAST 15 MINUTES

21:20	48.7	162.8	17.33	-176.8	38.0	268.7	440.1
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431.5

AVERAGE VALUES FOR THE LAST HOUR: 60 MINUTES OR VALID DATA

21:20	44.4	183.0	17.10	-176.4	35.4	234.1	496.0
21:21	44.6	164.6	17.11	-176.7	34.4	238.2	479.8
21:22	43.6	163.2	17.06	-176.7	32.8	242.2	484.7
21:23	42.3	174.2	16.99	-176.8	34.5	239.2	471.6
21:24	40.0	185.4	16.87	-176.7	34.5	277.6	467.3
21:25	26.0	146.2	18.34	-176.6	34.6	279.6	467.2
21:26	11.2	2.0	20.43	-176.5	36.3	286.1	464.4
21:27	9.6	1.2	20.41	-176.6	37.6	295.9	461.3
21:28	8.4	1.5	20.41	-176.5	37.8	298.1	461.6
21:29	7.4	1.1	20.41	-176.5	37.3	298.1	467.7
21:30	6.1	1.1	20.41	-176.5	36.7	303.5	466.9
21:31	5.8	1.1	20.41	-176.4	36.8	303.0	460.5

COMMENTS: END OF RUN 3

CALIBRATION SUMMARY

SOURCE: LOUISIANA PACIFIC

REASON: SYSTEM BIAS CHECK POST RUN 3

DATE : 08-09-1996 TIME: 21:31 - 21:42

A/D CHAN	MONITOR DESCRIPTION	UNITS	GAS VALUE	MONITOR RESPONSE
9	UNIT1	ppmNOX	0.0	0.1
9	UNIT1	ppmNOX	47.1	47.6
10	UNIT1	ppmCO	0.0	0.6
10	UNIT1	ppmCO	149.2	151.4
11	UNIT1	%O2	0.00	0.04
11	UNIT1	%O2	12.26	12.28
14	UNIT1	ppmTHC	0.0	1.3
14	UNIT1	ppmTHC	296.0	295.8
5	UNIT2	ppmNOX	0.0	0.6
5	UNIT2	ppmNOX	47.1	47.4
2	UNIT2	ppmCO	0.0	2.0
2	UNIT2	ppmCO	149.2	152.0
7	UNIT2	ppmTHC	0.0	0.7
7	UNIT2	ppmTHC	296.0	306.7

CALIBRATION SUMMARY

SOURCE: Louisiana Pacific

REASON: direct calibration pre test

DATE : 08-09-1996 TIME: 07:34 - 07:51

A/D CHAN	MONITOR DESCRIPTION	UNITS	GAS VALUE	MONITOR RESPONSE
3	INLET5	ppm CO	0.0	1.0
3	INLET5	ppm CO	151.3	151.3
3	INLET5	ppm CO	301.0	302.9
3	INLET5	ppm CO	447.0	447.8
4	INLET5	ppmNOx	0.0	0.2
4	INLET5	ppmNOx	46.6	46.3
4	INLET5	ppmNOx	88.6	88.9
5	INLET4	ppm CO	0.0	1.4
5	INLET4	ppm CO	151.3	152.5
5	INLET4	ppm CO	301.0	300.8
5	INLET4	ppm CO	447.0	447.9
6	INLET4	ppmNOx	0.0	0.3
6	INLET4	ppmNOx	46.6	46.6
6	INLET4	ppmNOx	88.6	88.5
9	INLET3	ppmNOx	0.0	0.2
9	INLET3	ppmNOx	46.6	46.6
9	INLET3	ppmNOx	88.6	88.6
8	INLET3	ppm CO	0.0	0.6
8	INLET3	ppm CO	151.3	151.2
8	INLET3	ppm CO	301.0	299.4
8	INLET3	ppm CO	447.0	447.7

CALIBRATION SUMMARY

SOURCE: Louisiana Pacific

REASON: FULL THC CALIBRATION AND SYSTEM BIAS CHECK

DATE : 08-09-1996 TIME: 07:51 - 08:18

A/D CHAN	MONITOR DESCRIPTION	UNITS	GAS VALUE	MONITOR RESPONSE
3	INLET5	ppm CO	0.0	1.0
3	INLET5	ppm CO	301.0	297.1
4	INLET5	ppmNOx	0.0	0.9
4	INLET5	ppmNOx	46.6	46.5
2	INLET5	ppmTHC	0.0	3.0
2	INLET5	ppmTHC	302.7	301.9
2	INLET5	ppmTHC	518.1	521.8
2	INLET5	ppmTHC	837.0	836.4
5	INLET4	ppm CO	0.0	0.8
5	INLET4	ppm CO	301.0	298.3
6	INLET4	ppmNOx	0.0	0.8
6	INLET4	ppmNOx	46.6	46.9
7	INLET4	ppmTHC	0.0	1.3
7	INLET4	ppmTHC	302.7	304.4
7	INLET4	ppmTHC	518.1	519.6
7	INLET4	ppmTHC	837.0	837.1
9	INLET3	ppmNOx	0.0	0.4
9	INLET3	ppmNOx	46.6	46.7
10	INLET3	ppmTHC	0.0	2.1
10	INLET3	ppmTHC	302.7	303.2
10	INLET3	ppmTHC	518.1	519.8
10	INLET3	ppmTHC	837.0	838.3
8	INLET3	ppm CO	0.0	0.6
8	INLET3	ppm CO	301.0	298.0

CALIBRATION SUMMARY

SOURCE: Louisiana Pacific

REASON: SYSTEM BIAS CHECK PRE RUN 1

DATE : 08-09-1996 TIME: 15:17 - 15:43

A/D CHAN	MONITOR DESCRIPTION	UNITS	GAS VALUE	MONITOR RESPONSE
3	INLET5	ppm CO	0.0	1.0
3	INLET5	ppm CO	301.0	299.2
4	INLET5	ppmNOx	0.0	0.3
4	INLET5	ppmNOx	46.6	46.2
2	INLET5	ppmTHC	0.0	2.6
2	INLET5	ppmTHC	302.7	303.4
5	INLET4	ppm CO	0.0	1.3
5	INLET4	ppm CO	301.0	301.3
6	INLET4	ppmNOx	0.0	1.3
6	INLET4	ppmNOx	46.6	46.5
7	INLET4	ppmTHC	0.0	1.0
7	INLET4	ppmTHC	302.7	303.9
9	INLET3	ppmNOx	0.0	0.5
9	INLET3	ppmNOx	46.6	46.0
10	INLET3	ppmTHC	0.0	0.5
10	INLET3	ppmTHC	302.7	302.0
8	INLET3	ppm CO	0.0	1.0
8	INLET3	ppm CO	301.0	299.3

Louisiana Pacific

08-09-1996

	CHAN 3	CHAN 4	CHAN 2	CHAN 5	CHAN 6	CHAN 7	CHAN 9	CHAN10	CHAN 8
	INLET5	INLET5	INLET5	INLET4	INLET4	INLET4	INLET3	INLET3	INLET3
TIME	ppm CO	ppmNOx	ppmTHC	ppm CO	ppmNOx	ppmTHC	ppmNOx	ppmTHC	ppm CO
17:21	343.0	39.9	736.4	86.7	32.3	638.5	24.4	180.7	82.8
17:22	346.5	38.2	749.9	75.7	33.4	616.2	24.6	186.0	77.4
17:23	351.0	37.4	733.8	75.5	32.4	613.8	24.3	189.0	71.2
17:24	351.7	34.8	754.6	73.4	32.5	612.1	24.1	157.8	69.0
17:25	360.9	34.7	765.8	73.0	32.5	613.3	24.7	88.8	66.8
17:26	376.8	32.8	797.2	69.0	32.0	605.8	24.5	172.8	64.7
17:27	388.9	33.2	801.0	67.5	32.5	595.7	24.3	178.9	62.8
17:28	405.3	31.7	847.4	69.0	32.1	599.7	24.1	188.2	60.9
17:29	417.9	31.7	845.1	69.6	32.0	613.5	23.6	211.9	61.4
17:30	425.1	30.9	874.2	69.7	32.2	615.3	22.9	241.4	61.4
17:31	431.2	32.3	881.4	70.1	32.6	613.3	22.0	275.6	61.2
17:32	446.5	32.3	906.2	76.7	32.2	637.8	20.7	313.9	61.6
17:33	461.1	33.7	849.4	86.1	31.6	652.2	17.8	359.5	67.0
17:34	189.1	33.5	883.5	84.8	31.1	639.6	12.8	465.5	71.0
17:35	440.7	33.4	887.2	84.0	32.1	640.8	17.6	511.3	112.2

AVERAGE VALUES FOR THE LAST 15 MINUTES

17:35	369.1	34.0	820.9	75.4	32.2	620.5	22.2	248.1	70.1
17:36	440.7*	32.6	868.6	84.6	32.9	653.6	17.6	537.6	143.4
17:37	426.9	32.6	853.1	100.5	31.8	657.3	17.0	530.8	144.7
17:38	410.6	32.6	866.9	102.1	30.8	672.9	17.1	534.6	156.3
17:39	397.1	33.0	818.2	98.8	31.5	663.4	17.2	533.4	166.7
17:40	367.3	33.9	853.8	105.5	31.6	663.6	17.4	532.7	181.3
17:41	366.3	34.5	842.4	102.8	32.7	674.2	16.8	526.6	166.0
17:42	326.1	36.2	822.6	109.2	32.3	669.0	16.5	500.7	151.2
17:43	315.2	35.8	831.8	116.0	32.3	686.9	16.2	496.5	156.4
17:44	311.8	34.9	917.2	137.1	30.5	699.3	15.9	476.3	158.8
17:45	291.3	32.9	925.4	136.5	31.1	704.6	15.8	418.8	167.0
17:46	260.0	34.8	866.9	133.4	32.3	689.8	16.2	109.0	166.1
17:47	227.3	33.7	871.4	137.3	31.5	695.7	16.2	474.6	163.4
17:48	222.4	34.3	877.8	138.5	30.4	699.6	16.2	519.5	157.2
17:49	238.2	42.0	745.4	134.0	29.7	688.1	16.3	500.2	135.7
17:50	305.2	44.8	702.8	121.9	30.8	695.0	16.0	487.1	119.3

AVERAGE VALUES FOR THE LAST 15 MINUTES

17:50	327.1	35.2	844.3	117.2	31.5	680.9	16.6	478.6	155.6
17:51	320.5	44.6	744.8	143.5	28.8	702.2	16.0	480.9	118.2
17:52	330.3	42.9	757.8	158.8	30.3	704.2	16.0	473.9	115.0
17:53	294.7	43.3	741.7	167.0	28.9	707.1	16.1	457.1	109.8
17:54	297.5	42.0	739.5	110.0	29.8	667.0	16.2	448.4	109.5
17:55	295.1	41.4	744.9	111.4	29.6	689.1	15.7	434.8	119.1
17:56	310.4	39.1	753.5	132.3	30.2	727.9	15.8	383.0	125.7
17:57	297.3	39.9	758.5	127.3	30.7	711.8	16.2	307.9	129.6
17:58	309.3	36.8	781.9	102.8	30.9	670.9	15.4	407.6	132.2
17:59	287.9	37.8	779.4	99.4	31.4	691.1	16.0	445.4	130.2
18:00	296.2	35.8	774.1	98.4	31.3	697.5	15.8	424.9	127.3
18:01	322.6	37.6	818.9	102.0	31.6	693.9	16.9	366.4	99.3
18:02	327.3	35.7	827.2	101.0	30.4	692.8	16.4	406.4	91.8
18:03	348.5	36.6	807.0	99.0	30.2	696.4	17.1	410.4	85.4

Louisiana Pacific 08-09-1996

	CHAN 3	CHAN 4	CHAN 2	CHAN 5	CHAN 6	CHAN 7	CHAN 9	CHAN10	CHAN 8
	INLET5	INLET5	INLET5	INLET4	INLET4	INLET4	INLET3	INLET3	INLET3
TIME	ppm CO	ppmNOx	ppmTHC	ppm CO	ppmNOx	ppmTHC	ppmNOx	ppmTHC	ppm CO
18:04	368.0	35.7	867.0	101.1	29.6	715.8	17.2	400.3	75.0
18:05	385.8	37.3	865.9	95.1	30.1	695.5	17.3	393.0	70.0

AVERAGE VALUES FOR THE LAST 15 MINUTES

18:05	319.4	39.1	784.1	116.6	30.3	697.6	16.3	416.0	109.2
18:06	336.6	37.2	821.9	81.5	31.2	688.9	17.5	391.1	67.8
18:07	348.4	36.4	847.6	102.3	30.3	715.4	18.4	378.1	64.0
18:08	376.9	37.4	849.1	114.4	30.2	715.0	21.1	369.5	51.9
18:09	378.4	36.3	875.8	119.9	29.6	733.7	22.1	358.3	46.8
18:10	389.3	37.1	860.0	119.3	29.5	725.1	22.2	333.3	44.5
18:11	414.1	36.6	836.4	124.7	29.8	733.8	21.7	93.9	44.8
18:12	378.2	36.4	866.2	121.1	29.7	739.0	21.8	182.6	44.8
18:13	389.5	35.7	824.5	118.4	29.2	734.9	21.0	364.6	44.8
18:14	391.3	36.7	817.3	132.1	29.4	747.0	21.3	357.6	43.4
18:15	379.6	34.7	852.4	158.5	29.4	759.9	20.8	353.7	44.3
18:16	345.1	35.7	855.4	165.6	29.7	748.0	20.5	351.3	45.4
18:17	328.0	34.7	836.9	176.5	30.5	758.9	20.4	345.3	46.4
18:18	327.0	35.2	819.0	154.8	29.7	749.6	19.9	344.6	48.9
18:19	327.3	35.0	810.6	133.3	29.0	744.5	19.3	314.2	50.7
18:20	334.6	36.3	796.6	141.5	29.0	744.7	18.8	372.2	52.6

AVERAGE VALUES FOR THE LAST 15 MINUTES

18:20	362.9	36.1	838.0	130.9	29.7	735.9	20.4	327.3	49.4
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AVERAGE VALUES FOR THE LAST HOUR: 60 MINUTES OF VALID DATA

18:20	344.6	36.1	821.8	110.0	30.9	683.7	18.9	367.5	96.1
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COMMENTS: END OF RUN 1

CALIBRATION SUMMARY

SOURCE: Louisiana Pacific

REASON: SYSTEM BIAS CHECK POST RUN 1

DATE : 08-09-1996 TIME: 18:20 - 18:37

A/D CHAN	MONITOR		GAS	
	DESCRIPTION	UNITS	VALUE	MONITOR RESPONSE
3	INLET5	ppm CO	0.0	2.5
3	INLET5	ppm CO	301.0	301.3
4	INLET5	ppmNOx	0.0	1.7
4	INLET5	ppmNOx	46.6	47.3
2	INLET5	ppmTHC	0.0	3.1
2	INLET5	ppmTHC	302.7	301.0
5	INLET4	ppm CO	0.0	2.3
5	INLET4	ppm CO	301.0	298.3
6	INLET4	ppmNOx	0.0	2.8
6	INLET4	ppmNOx	46.6	47.3
7	INLET4	ppmTHC	0.0	2.1
7	INLET4	ppmTHC	302.7	300.9
9	INLET3	ppmNOx	0.0	2.9
9	INLET3	ppmNOx	46.6	47.3
10	INLET3	ppmTHC	0.0	1.1
10	INLET3	ppmTHC	302.7	299.4
8	INLET3	ppm CO	0.0	0.5
8	INLET3	ppm CO	301.0	299.2

Louisiana Pacific 08-09-1996

	CHAN 3	CHAN 4	CHAN 2	CHAN 5	CHAN 6	CHAN 7	CHAN 9	CHAN10	CHAN 8
	INLET5	INLET5	INLET5	INLET4	INLET4	INLET4	INLET3	INLET3	INLET3
TIME	ppm CO	ppmNOx	ppmTHC	ppm CO	ppmNOx	ppmTHC	ppmNOx	ppmTHC	ppm CO
18:59	306.0	0.6	11.6	95.6	27.2	875.6	0.8	3.8	300.0
19:00	296.5	0.4	11.3	98.4	26.9	875.9	0.8	0.9	297.7
19:01	326.0	0.3	12.5	101.4	26.1	875.6	0.8	-0.8	299.4
19:02	295.1	0.2	12.0	103.3	26.6	876.1	0.8	-1.2	299.3
19:03	301.4	0.1	12.3	97.5	27.0	861.8	0.8	-0.9	299.1
19:04	315.8	-0.0	10.6	96.0	27.0	855.0	0.7	2.8	297.9
19:05	308.8	-0.1	11.2	92.8	27.2	863.7	0.7	4.3	298.9
19:06	310.3	-0.1	11.0	95.8	26.8	847.7	0.7	4.1	299.9
19:07	299.5	-0.2	10.5	97.3	26.2	840.7	0.7	3.7	297.9
19:08	308.0	-0.2	10.1	98.0	26.5	863.0	0.7	3.9	298.6
19:09	296.8	-0.3	10.5	96.6	26.4	851.8	0.7	3.7	299.5
19:10	304.7	-0.3	9.9	77.7	27.8	818.7	0.7	3.6	299.0
19:11	302.8	-0.4	9.7	64.4	28.7	802.5	0.7	3.5	298.9
19:12	302.4	-0.4	9.7	62.3	28.6	801.1	0.7	3.5	298.4
19:13	307.7	-0.4	8.9	63.8	28.2	818.0	0.7	3.0	298.7

AVERAGE VALUES FOR THE LAST 15 MINUTES

19:13	305.5	-0.1	10.8	89.4	27.2	848.5	0.7	2.5	298.9
19:14	303.5	-0.5	8.4	69.7	27.3	852.0	0.7	1.2	298.3
19:15	302.0	-0.5	8.4	63.4	29.1	841.3	0.7	-1.1	300.7
19:16	303.4	-0.5	8.1	63.2	28.3	822.7	0.6	0.4	299.5
19:17	298.8	-0.5	7.7	68.6	27.9	838.3	0.6	3.6	299.8
19:18	305.8	-0.5	8.0	70.2	27.1	841.8	0.6	3.8	299.8
19:19	345.1	-0.5	8.3	66.5	27.8	832.5	0.6	3.5	297.1
19:20	306.4	-0.5	8.0	66.0	27.9	839.7	0.6	3.1	298.0
19:21	305.1	-0.5	7.8	65.2	28.1	813.9	0.6	3.0	300.2
19:22	290.0	-0.6	7.3	65.5	28.2	806.2	0.6	3.3	301.2
19:23	296.6	-0.6	7.4	70.8	27.8	846.8	0.6	3.8	299.7
19:24	305.6	-0.6	7.2	85.5	26.8	871.6	0.6	3.5	300.6
19:25	304.0	-0.6	6.6	90.0	26.2	879.5	0.6	3.5	301.4
19:26	308.2	-0.6	6.6	89.5	26.0	889.7	0.6	3.0	300.4
19:27	305.4	-0.6	6.6	83.0	27.0	866.1	0.6	3.9	299.9
19:28	304.0	-0.6	7.1	72.0	28.4	858.6	0.6	3.6	298.7

AVERAGE VALUES FOR THE LAST 15 MINUTES

19:28	305.6	-0.5	7.6	72.6	27.6	846.7	0.6	2.8	299.7
19:29	301.6	-0.7	7.0	70.5	28.3	841.7	0.6	3.7	300.5
19:30	306.0	-0.7	6.5	71.6	27.8	841.1	0.6	3.2	300.4
19:31	302.2	-0.7	5.3	70.1	28.0	824.4	0.6	3.2	300.3
19:32	298.1	-0.7	6.1	71.2	28.3	814.9	0.6	2.2	301.0
19:33	305.9	-0.7	6.1	73.5	27.7	818.8	0.6	-1.3	299.4
19:34	304.6	-0.7	6.2	73.0	27.6	848.2	0.6	2.8	299.2
19:35	302.1	-0.7	7.4	76.2	27.4	847.2	0.6	2.2	299.4
19:36	301.9	-0.7	5.7	75.4	27.2	847.5	0.6	3.7	299.8
19:37	305.7	-0.7	7.9	75.4	27.3	834.4	0.6	3.4	300.7
19:38	310.2	1.0	275.0	78.2	26.6	843.6	0.6	3.8	298.7
19:39	318.3	9.1	922.1*	76.7	27.0	856.0	3.2	56.6	293.9
19:40	326.7	18.2	1000.2*	75.1	26.8	867.7	10.5	138.9	249.3
19:41	327.2	25.8	1000.2*	73.7	27.5	869.7	15.4	204.8	200.8

Louisiana Pacific 08-09-1996

	CHAN 3	CHAN 4	CHAN 2	CHAN 5	CHAN 6	CHAN 7	CHAN 9	CHAN 10	CHAN 8
	INLET5	INLET5	INLET5	INLET4	INLET4	INLET4	INLET3	INLET3	INLET3
TIME	ppm CO	ppmNOx	ppmTHC	ppm CO	ppmNOx	ppmTHC	ppmNOx	ppmTHC	ppm CO
19:42	325.9	37.8	1000.2*	74.3	27.3	861.9	20.1	378.9	159.7
19:43	304.2	46.3	1000.2*	75.7	26.8	856.6	23.4	358.2	86.6

AVERAGE VALUES FOR THE LAST 15 MINUTES

19:43	309.4	8.8	350.4	74.0	27.4	844.9	5.2	77.6	266.0
19:44	265.2	51.2	1000.2*	75.5	26.6	846.5	22.3	434.8	86.3
19:45	255.0	53.3	1000.2*	86.2	26.0	884.2	21.0	476.7	87.9
19:46	268.7	55.2	1000.2*	91.2	25.3	889.3	19.9	472.8	92.7
19:47	285.6	56.9	1000.2*	87.5	25.8	882.4	18.8	472.8	98.5
19:48	275.9	58.2	1000.2*	90.1	25.6	876.3	17.3	471.7	113.5
19:49	265.6	61.8	1000.2*	90.6	25.4	879.9	17.5	460.6	117.2
19:50	287.9	64.1	1000.2*	92.3	25.8	883.8	16.4	457.9	120.7
19:51	288.2	65.4	1000.2*	90.6	25.9	882.8	16.3	450.0	123.1
19:52	278.0	67.6	1000.2*	89.9	26.2	864.2	16.3	418.7	120.7
19:53	279.5	64.9	1000.2*	93.2	26.0	874.2	16.7	337.6	104.7
19:54	271.5	63.9	1000.2*	92.9	25.9	852.9	16.4	297.4	95.8
19:55	262.6	65.5	1000.2*	89.0	26.0	837.3	16.5	454.3	95.8
19:56	250.4	63.4	1000.2*	88.5	25.6	849.4	16.5	445.0	83.7
19:57	266.7	62.5	1000.2*	86.8	25.7	834.0	17.1	442.5	75.0
19:58	320.3*	63.6	1000.2*	85.1	26.2	829.6	17.7	435.2	70.2

AVERAGE VALUES FOR THE LAST 15 MINUTES

19:58	274.7	61.2	1000.2	88.6	25.9	864.4	17.8	435.2	99.1
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AVERAGE VALUES FOR THE LAST HOUR: 60 MINUTES OF VALID DATA

19:58	288.2	17.3	343.3	81.2	27.0	851.1	6.1	129.5	240.9
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COMMENTS: END OF RUN 2

CALIBRATION SUMMARY

SOURCE: Louisiana Pacific

REASON: SYSTEM BIAS CHECK OST RUN 2

DATE : 08-09-1996 TIME: 19:58 - 20:08

A/D CHAN	MONITOR DESCRIPTION	UNITS	GAS VALUE	MONITOR RESPONSE
3	INLET5	ppm CO	0.0	4.4
3	INLET5	ppm CO	151.3	155.6
4	INLET5	ppmNOx	0.0	0.3
4	INLET5	ppmNOx	46.6	45.7
2	INLET5	ppmTHC	0.0	0.7
2	INLET5	ppmTHC	302.7	301.5
5	INLET4	ppm CO	0.0	2.0
5	INLET4	ppm CO	151.3	149.9
6	INLET4	ppmNOx	0.0	2.4
6	INLET4	ppmNOx	46.6	47.4
7	INLET4	ppmTHC	0.0	2.7
7	INLET4	ppmTHC	302.7	301.3
9	INLET3	ppmNOx	0.0	2.8
9	INLET3	ppmNOx	46.6	46.1
10	INLET3	ppmTHC	0.0	4.9
10	INLET3	ppmTHC	302.7	302.6
8	INLET3	ppm CO	0.0	2.9
8	INLET3	ppm CO	151.3	150.5

Louisiana Pacific 08-09-1996

	CHAN 3	CHAN 4	CHAN 2	CHAN 5	CHAN 6	CHAN 7	CHAN 9	CHAN10	CHAN 8
	INLET5	INLET5	INLET5	INLET4	INLET4	INLET4	INLET3	INLET3	INLET3
TIME	PPM CO	PPMNOX	PPMTHC	PPM CO	PPMNOX	PPMTHC	PPMNOX	PPMTHC	PPM CO
20:21	335.2	34.7	822.6	64.5	25.8	788.8	20.2	397.1	51.0
20:22	338.6	33.6	816.1	54.6	27.3	770.8	19.6	383.8	50.2
20:23	326.3	34.1	819.8	55.1	27.2	735.0	19.2	359.6	50.3
20:24	345.4	33.8	821.7	55.6	27.0	709.8	19.8	322.0	50.3
20:25	333.5	34.7	800.1	57.1	26.3	734.5	21.2	316.4	46.1
20:26	345.1	33.5	777.7	60.4	25.4	766.4	20.4	309.4	46.1
20:27	349.0	35.2	745.2	58.7	27.1	764.7	21.4	293.2	45.8
20:28	342.7	34.3	712.5	62.4	26.2	771.9	21.4	364.4	47.0
20:29	361.0	34.7	668.0	65.3	25.3	782.1	21.4	373.8	48.5
20:30	338.6	35.7	618.2	76.9	22.7	796.0	22.7	368.8	45.4
20:31	367.1	35.1	523.8	88.4	22.2	823.6	22.8	360.1	44.2
20:32	365.1	35.3	596.4	91.1	22.4	828.7	24.1	355.4	42.1
20:33	386.3	35.6	592.3	94.4	22.5	856.1	23.0	358.4	41.6
20:34	398.9	35.3	585.2	104.7	22.3	863.8	23.7	340.9	41.9
20:35	390.6	34.9	576.7	108.4	22.9	855.4	23.8	315.5	40.9

AVERAGE VALUES FOR THE LAST 15 MINUTES

20:35	354.9	34.7	698.4	73.2	24.8	789.9	21.6	347.9	46.1
20:36	363.5	35.7	581.3	106.3	23.3	862.7	23.4	285.2	40.1
20:37	341.8	34.8	592.1	88.6	24.2	859.2	23.4	364.9	40.4
20:38	327.0	34.2	603.5	81.5	25.5	848.1	23.2	381.5	41.2
20:39	318.7	34.7	588.3	61.1	26.8	785.0	21.7	387.3	44.2
20:40	320.0	34.2	583.9	51.4	29.0	748.1	21.2	388.2	47.8
20:41	313.4	33.0	589.4	48.7	29.8	735.3	21.2	390.5	49.4
20:42	302.9	34.1	600.4	48.8	30.4	744.7	21.2	386.4	51.3
20:43	298.6	33.6	648.3	45.1	32.0	731.0	20.9	380.3	51.7
20:44	283.1	32.8	704.4	42.7	33.6	709.9	20.0	376.3	54.3
20:45	278.0	33.8	720.8	43.4	33.5	709.3	20.2	356.0	54.7
20:46	284.7	34.1	741.0	43.8	33.7	718.0	19.9	350.0	54.6
20:47	274.8	34.6	731.9	45.1	32.3	738.9	19.9	318.0	54.7
20:48	308.5	33.3	741.7	46.4	31.9	748.1	22.5	362.0	48.4
20:49	304.8	35.3	707.2	50.2	30.2	770.8	23.1	366.2	41.8
20:50	309.6	35.5	717.1	51.3	29.8	786.1	22.8	360.9	40.2

AVERAGE VALUES FOR THE LAST 15 MINUTES

20:50	308.6	34.3	656.8	57.0	29.7	766.4	21.6	363.6	47.6
20:51	327.1	36.1	739.2	51.6	29.9	800.3	23.4	382.3	39.5
20:52	337.1	36.1	776.6	61.6	26.9	863.3	25.5	391.2	37.3
20:53	345.7	36.2	798.4	67.3	25.3	894.2	27.0	383.5	33.4
20:54	349.7	35.9	692.2	71.1	24.5	923.4	29.2	372.5	29.8
20:55	342.5	36.1	757.2	72.8	25.0	935.5	29.8	373.7	28.5
20:56	348.7	36.6	762.9	73.8	24.4	937.8	30.2	370.6	27.9
20:57	369.8	36.9	750.2	76.5	23.9	961.0	30.6	367.6	27.5
20:58	354.0	37.4	674.2	75.8	23.8	982.5	30.7	363.9	27.5
20:59	414.1*	37.1	537.0	70.0	23.9	978.9	30.4	352.6	26.8
21:00	390.6	37.2	561.2	67.9	24.2	991.3*	29.4	347.7	27.8
21:01	414.1	36.0	513.8	53.8	26.9	968.4	27.6	328.7	28.8
21:02	394.8	37.5	462.9	50.5	28.4	967.8	27.0	326.8	29.8
21:03	354.0	37.5	423.7	47.7	29.2	966.6	26.4	369.1	31.9

Louisiana Pacific

08-09-1996

	CHAN 3	CHAN 4	CHAN 2	CHAN 5	CHAN 6	CHAN 7	CHAN 9	CHAN10	CHAN 8
	INLET5	INLET5	INLET5	INLET4	INLET4	INLET4	INLET3	INLET3	INLET3
TIME	ppm CO	ppmNOx	ppmTHC	ppm CO	ppmNOx	ppmTHC	ppmNOx	ppmTHC	ppm CO
21:04	432.6	36.6	405.9	41.9	31.3	943.5	26.0	385.7	32.7
21:05	445.6*	36.8	386.2	36.9	33.1	924.2	25.2	399.5	34.2

AVERAGE VALUES FOR THE LAST 15 MINUTES

21:05	374.7	36.7	616.1	61.3	26.7	935.9	27.9	367.7	30.9
21:06	428.4	36.5	386.7	37.0	33.1	943.0	25.2	405.5	34.6
21:07	319.0	34.0	468.5	41.0	31.1	968.2	23.8	410.6	37.7
21:08	390.3	34.7	604.8	40.6	31.0	960.3	23.0	410.5	40.6
21:09	388.0	33.6	694.4	40.9	31.2	954.6	23.6	398.0	40.8
21:10	377.8	32.3	761.5	41.7	31.6	951.6	23.0	371.5	42.6
21:11	302.0	31.5	808.3	44.3	30.2	965.9	24.2	339.4	41.3
21:12	304.7	30.7	837.6	47.3	28.6	993.2*	24.4	345.9	40.1
21:13	285.5	31.6	822.9	52.3	26.7	999.0*	25.6	338.3	37.7
21:14	320.6	32.2	820.7	56.6	25.8	1000.2*	27.2	306.1	32.8
21:15	350.8	33.3	785.6	61.0	25.3	1000.2*	27.9	310.8	31.1
21:16	324.7	34.5	719.0	59.8	25.6	1000.2*	29.5	288.0	28.6
21:17	326.7	35.0	625.2	73.6	24.8	1000.2*	29.8	274.0	26.0
21:18	325.5	34.4	529.8	80.0	23.0	1000.2*	29.5	312.7	25.7
21:19	336.7	34.9	454.7	74.7	23.3	1000.2*	30.6	417.0	25.9
21:20	290.8	34.4	427.9	62.6	24.0	1000.2*	30.2	419.5	25.1

AVERAGE VALUES FOR THE LAST 15 MINUTES

21:20	338.1	33.6	649.8	54.2	27.7	982.5	26.5	356.5	34.1
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AVERAGE VALUES FOR THE LAST HOUR: 60 MINUTES OF VALID DATA

21:20	344.1	34.8	655.3	61.4	27.2	868.7	24.4	358.9	39.7
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COMMENTS: END OF RUN 3

CALIBRATION SUMMARY

SOURCE: Louisiana Pacific

REASON: SYSTEM BIAS CHECK POST RUN 3

DATE : 08-09-1996 TIME: 21:20 - 21:30

A/D CHAN	MONITOR DESCRIPTION	UNITS	GAS VALUE	MONITOR RESPONSE
3	INLET5	PPM CO	0.0	2.9
3	INLET5	PPM CO	151.3	150.7
4	INLET5	PPMNOx	0.0	0.4
4	INLET5	PPMNOx	46.6	46.3
2	INLET5	PPMTHC	0.0	3.7
2	INLET5	PPMTHC	302.7	300.3
5	INLET4	PPM CO	0.0	1.9
5	INLET4	PPM CO	151.3	149.4
6	INLET4	PPMNOx	0.0	1.8
6	INLET4	PPMNOx	46.6	46.6
7	INLET4	PPMTHC	0.0	1.9
7	INLET4	PPMTHC	302.7	303.2
9	INLET3	PPMNOx	0.0	2.9
9	INLET3	PPMNOx	46.6	46.7
10	INLET3	PPMTHC	0.0	2.9
10	INLET3	PPMTHC	302.7	301.2
8	INLET3	PPM CO	0.0	2.0
8	INLET3	PPM CO	151.3	146.0

APPENDIX B. FIELD DATA

1. Dryer Exhausts 1 - 5

b. Volumetric Air Flow Rates

Client LA. PACIFIC CORP. Job No. 15575
Plant ROXBORO OSB PLANT Run No. 01-MZ-22
City/State ROXBORO, NC Date 8-09-96
Test Location DRYER EXHAUST #1 Personnel DLS, TCM
Barometric Pressure (Pbar) 29.90 "Hg Static Pressure (Pg) +0.38 "H₂O
Pitot/Orifice ID 30 Pitot Coef. (Cp) .84 Pres. Gauge Set ID M533
Thermocouple ID R430 Duct Depth/Diameter 45" Width N/A
---Specify inches (") or feet (')---

[illegible]

ORSAT DATA						
Sampling Time	Analysis Time	CO ₂ (A) Reading	O ₂ (B) Reading	tO ₂ (B-A)	CO (C) Reading	tCO (C-B)
Average						
Orsat ID _____		Bag ID _____		F _O _____		

HYDRATE DATA. % CO₂				
---	--	--	--	--

MOISTURE DATA (WET BULB/DRY BULB)					
PORT	Time	Dry Bulb °F	Wet Bulb °F	Diff.	t H ₂ O

MOISTURE DATA (STOICHIOMETRIC)	
Free Water in Fuel, %	
Water from Fuel Combustion, %	
Ambient Water, %	
Relative Humidity, %	
Ambient Temperature, °F	
Total %	

VOLUMETRIC AIR FLOW RATES	
Dry at Standard Conditions, Q _{sd} =	SCFM
Wet at Stack Conditions, Q _{sw} =	ACFM

ADDITIONAL DATA

146

AIR FLOW RATE DETERMINATIONS

Client LA PACIFIC CORP. Job No. 15575
Plant ROXBORO OSB PLANT Run No. D1-MR-3
City/State ROXBORO, NC Date 8-09-96
Test Location DRYER EXHAUST #1 Personnel DLS, JMMTR
Barometric Pressure (Pbar) 29.90 "Hg Static Pressure (Pg) +0.39 "H₂O
Pitot/Orifice ID 30 Pitot Coef. (C_p) .84 Pres. Gauge Set ID M533
Thermocouple ID R430 Duct Depth/Diameter 45" Width N/A
---Specify inches (") or feet (')---

[illegible]

ORSAT DATA						
Sampling Time	Analysis Time	CO ₂ (A) Reading	O ₂ (B) Reading	%O ₂ (B-A)	CO (C) Reading	%CO (C-B)
Average						
Orsat ID _____		Bag ID _____		F _O _____		

FYRITE DATA, % CO ₂				
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MOISTURE DATA (WET BULB/DRY BULB)					
Port	Time	Dry Bulb °F	Wet Bulb °F	Diff.	t H ₂ O

NDISTURB DATA (STOICHIOMETRIC)		
Free Water in Fuel, %		
Water from Fuel Combustion, %		
Ambient Water, %		
Relative Humidity, %		
Ambient Temperature, °F		
Total %		

VOLUMETRIC AIR FLOW RATES	
Dry at Standard Conditions, Q _{sd} =	SCFM
Wet at Stack Conditions, Q _{aw} =	ACFM

ADDITIONAL DATA

* ΔP average is square of average square root.

AIR FLOW RATE DETERMINATIONS

Client LA PACIFIC CORP Job No. 15575
Plant ROXBORO OSB PLANT Run No. D1-M2-4
City/State ROXBORO, NC Date 8-09-96
Test Location DRYER EXHAUST #1 Personnel DLS, JSC
Barometric Pressure (Pbar) 29.90 "Hg Static Pressure (Pg) +0.45 "H₂O
Pitot/Orifice ID 30 Pitot Coef. (C_p) .84 Pres. Gauge Set ID MS-33
Thermocouple ID R430 Duct Depth/Diameter 45" Width N/A
---Specify inches (") or feet (')---

[illegible]

ORSAT DATA						
Sampling Time	Analysis Time	CO ₂ (A) Reading	O ₂ (B) Reading	tO ₂ (B-A)	CO (C) Reading	tCO (C-B)
Average						
Orsat ID _____		Bag ID _____		F ₀ _____		

PYRITE DATA. % CO ₂				
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MOISTURE DATA (WET BULB/DRY BULB)					
Port	Time	Dry Bulb °F	Wet Bulb °F	Diff.	% H ₂ O

MOISTURE DATA (STOICHIOMETRIC)		
Free Water in Fuel, %		
Water from Fuel Combustion, %		
Ambient Water, %		
Relative Humidity, %		
Ambient Temperature, °F		
Total %		

VOLUMETRIC AIR FLOW RATES	
Dry at Standard Conditions, Q _{sd} =	SCFM
Wet at Stack Conditions, Q _{sw} =	ACFM

ADDITIONAL DATA

* ΔP average is square of average square root.

F-1023 rev. 9-93

149

Client LA PACIFIC CORP. Job No. 15575
Plant ROXBORO NC OSB PLANT Run No. DZ-MZ-15575 DLS
City/State ROXBORO, NC Date 8-09-96 2
Test Location DRYER EXHAUST #2 Personnel DLS
Barometric Pressure (Pbar) 29.90 "Hg Static Pressure (Pg) +0.61 "H₂O
Pitot/Orifice ID 30 Pitot Coef. (C_p) .84 Pres. Gauge Set ID MS33
Thermocouple ID R430 Duct Depth/Diameter 45" Width N/A
---Specify inches (") or feet (')---

VELOCITY TRAVERSES		
Start-Finish Times: <u>1725</u> - <u>1730</u>		
Point No.	AP In. H₂O	Temp. °F
A 1	0.75	192
2	0.78	
3	0.80	
4	0.86	
5	0.88	
6	0.87	
7	0.85	
8	0.85	
9	1.05	
10	1.10	
11	1.12	
12	1.15	
13	1.17	
14	1.17	
15	1.14	
16	1.16	↓
Avg. °		

ORSAT DATA						
Sampling Time	Analysis Time	CO ₂ (A) Reading	O ₂ (B) Reading	%O ₂ (B-A)	CO (C) Reading	%CO (C-B)
Average						
Orsat ID _____		Bag ID _____		F _O _____		

FERITE DATA, % CO ₂				
--------------------------------	--	--	--	--

MOISTURE DATA (WET BULB/DRY BULB)					
Port	Time	Dry Bulb °F	Wet Bulb °F	Diff.	t H ₂ O

MOISTURE DATA (STOICHIOMETRIC)		
Free Water in Fuel, %		
Water from Fuel Combustion, %		
Ambient Water, %		
Relative Humidity, %		
Ambient Temperature, °F		
Total %		

VOLUMETRIC AIR FLOW RATES	
Dry at Standard Conditions, Q _{sd} =	SCFM
Wet at Stack Conditions, Q _{sw} =	ACFM

ADDITIONAL DATA

F-1023 rev. 9-93

AIR FLOW RATE DETERMINATIONS

Client LA. PACIFIC CORP.

Job No. 15575

Plant ROXBORO OSB PLANT

Form No. ~~8-60~~ DZ-MZ-*

City/State Roxboro, NC

Date 8-09-96

Test Location Denver EXHAUST #2

Personal DLS, TCM

Barometric Pressure (Pbar) 29.90 "Hg

Static Pressure (Pg) ± 0.44 "H₂O

Pilot/Office ID 30

Pitot Coef. (C_p) .84

Pres. Gauge Set ID MS 33

Thermocouple ID R430

Duct Depth/Diameter

Width N/A

---Specify inches (") or feet (')--

ORSAT DATA						
Sampling Time	Analysis Time	CO ₂ (A) Reading	O ₂ (B) Reading	%O ₂ (B-A)	CO (C) Reading	%CO (C-B)
Average						

Orsat ID _____ Bag ID _____ F_O _____

FYRITE DATA, % CO ₂				
--------------------------------	--	--	--	--

MOISTURE DATA (WET BULB/DRY BULB)					
Port	Time	Dry Bulb °F	Wet Bulb °F	Diff.	% H ₂ O

MOISTURE DATA (STOICHIOMETRIC)	
Free Water in Fuel, %	
Water from Fuel Combustion, %	
Ambient Water, %	
Relative Humidity, %	
Ambient Temperature, °F	
Total %	

VOLUMETRIC AIR FLOW RATES	
Dry at Standard Conditions, Q _{sd} =	SCFM
Wet at Stack Conditions, Q _{aw} =	ACFM

ADDITIONAL DATA

* ΔP average is square of average square root.

F-1023 rev. 9-93

AIR FLOW RATE DETERMINATIONS

Client LA PACIFIC CORP Job No. 15575
Plant ROXBORO OSB PLANT Run No. DZ-M2-4
City/State ROXBORO, NC Date 8-09-96
Test Location DRYER EXHAUST #2 Personnel DLS, JSC
Barometric Pressure (Pbar) 29.90 "Hg Static Pressure (Pg) +0.24 "H₂O
Pitot/Orifice ID 30 Pitot Coef. (C_p) .84 Pres. Gauge Set ID MS 33
Thermocouple ID R 430 Duct Depth/Diameter 45" Width N/A
---Specify inches (") or feet (')--

[illegible]

ORSAT DATA						
Sampling Time	Analysis Time	CO ₂ (A) Reading	O ₂ (B) Reading	tO ₂ (B-A)	CO (C) Reading	tCO (C-B)
Average						
Orsat ID _____		Bag ID _____		Fo _____		

FERTILE DATA, % CO ₂				
---------------------------------	--	--	--	--

MOISTURE DATA (WET BULB/DRY BULB)					
Port	Time	Dry Bulb °F	Wet Bulb °F	Diff.	% H ₂ O

MOISTURE DATA (STOICHIOMETRIC)	
Free Water in Fuel, %	
Water from Fuel Combustion, %	
Ambient Water, %	
Relative Humidity, %	
Ambient Temperature, °F	
Total %	

VOLUMETRIC AIR FLOW RATES	
Dry at Standard Conditions, Q _{sd} =	SCFM
Wet at Stack Conditions, Q _{sw} =	ACFM

ADDITIONAL DATA

* AP average is square of average square root. 152

SAMPLING DATA - METHOD(S) EPA 4

CLIENT LA. PACIFIC CORP.
 PLANT ROXBORO OSB PLANT
 CITY/STATE ROXBORO, NC
 SAMPLING LOC. DEYER EXHAUST #2
 BAROMETRIC PRESSURE, IN. HG 29.90 STATIC PRESSURE, IN. H₂O N/A
 LEAK V, VACUUM IN. HG 15 10 TEST PERSONNEL DL5
 LEAK RATE, CFM .000 .000 POSTTEST POS PRESS LEAK / OK? N/A

RUN NO. D2-M4-1
 JOB NO. 15575 DATE 8-09-96
 TIME START 1720
 TIME FINISH 1820

• CONDUCT POSTTEST POSITIVE PRESSURE LEAK CHECK FOLLOWING THE LAST RUN PER LOCATION. FOR OTHER RUNS, ENTER "N/A".

EQUIPMENT CHECKS		EQUIPMENT I.D. NUMBERS		LEAK CHECKS						
<u>N/A</u> PITOT, PRETEST	REAGENT BOX <u>N/A</u>	METER BOX <u>N29</u>	V <u>1.0068</u>	B	B					
PITOT, POSTTEST	PITOT <u>N/A</u>	NOZ'L <u>N/A</u>	DIA. <u>N/A</u>	E	E					
NOZZLE, PRE/POST	TC READOUT <u>N/A</u>	TC PROBE <u>N/A</u>	UMBILICAL <u>U110</u>	B	B					
TC °F PRE	SAMPL'G BOX <u>82</u>	ORSAT PUMP <u>N/A</u>	TEDLAR BAG <u>N/A</u>	E	E					
TC °F POST	MONOGRAPH DATA				B	B				
ORSAT SYSTEM					DELTA-HG <u>1.876</u>	B	B			
FILTER/XAD	TARE WT.	METER TEMP.	EST. XH ₂ O	"C" FACTOR	STACK TEMP.	REF DELTA-P	"K" FACTOR	Fyrites, %	YOB	% OF CAL'D Y?
<u>N/A</u>	<u>N/A</u>							<u>4.0</u>	<u>1750</u>	
								<u>4.0</u>	<u>1805</u>	
								<u>4.0</u>	<u>1815</u>	(Y) (N)

L N E	SAMPLE POINT	CLOCK TIME, MINUTES	DRY GAS METER READING, CUBIC FEET	PITOT READING, IN. H ₂ O	GAS METER TEMP., °F	STACK TEMP., °F	ORIFICE SETTING, IN. H ₂ O		GAUGE VACUUM, IN. HG	GAS TEMPERATURES, °F			✓
							ACTUAL	IDEAL		FILTER	IMPING. EXIT	PROBE OR COND EXIT**	
1	A	0	923.519	N/A	104	N/A	1.00	1.00	2	N/A	54	N/A	
2		5	924.08		104				2		55		
3		10	924.19		104				2		55		
4		15	932.69		105				2		55		
5		20	934.80		106				2		55		
6		25	937.70		108				2		55		
7		30	940.53		108				2		55		
8		35	948.31		109				4		55		
9		40	946.20		110				5		56		
10		45	949.02		111				7		56		
11		50	951.69		111				8		57		
12	↓	55	954.71	↓	111	↓	↓	↓	8	↓	57	↓	
13	OFF	60	957.324										
14													
15													
16													
17													
18													
19													
20													
21													
22													
23													
24													
25													

FINAL

* FILTER EXIT for NJ Method 1. FILTER BOX for all others.

** PROBE EXIT & / (probe & filter heat off) apply to NJ Method 1. COND EXIT applies if sampling train has a condenser.

100 33.805 107.6 1.00 153
 Min. (θ) Vm (√ΔP)² TS ΔH

SAMPLING DATA - METHOD(S) EPA 4

CLIENT PACIFIC CORP.
 PLANT ROXBORO OSA PLANT
 CITY/STATE ROXBORO, NC
 SAMPLING LOC. DRYER EXHAUST #2
 BAROMETRIC PRESSURE, IN. HG 29.90 STATIC PRESSURE, IN. H₂O N/A
 LEAK J, VACUUM IN. HG 15 10
 LEAK RATE, CFM 0.000 0.000
 RUN NO. 02-M4-2
 JOB NO. 15575 DATE 8-09-96
 TIME START 2030
 TIME FINISH 2100
 TEST PERSONNEL PLS
 POSTTEST POS PRESS LEAK / OK? N/A

• CONDUCT POSTTEST POSITIVE PRESSURE LEAK CHECK FOLLOWING THE LAST RUN PER LOCATION. FOR OTHER RUNS, ENTER "N/A".

EQUIPMENT CHECKS		EQUIPMENT I.D. NUMBERS		LEAK CHECKS		
<u>N/A</u> PITOT, PRETEST	REAGENT BOX <u>N/A</u>	METER BOX <u>N29</u>	V <u>1.0068</u>	B	B	
PITOT, POSTTEST	PITOT <u>N/A</u> CP <u>N/A</u>	NOZ'L <u>N/A</u>	DIA. <u>N/A</u>	E	E	
NOZZLE, PRE/POST	TC READOUT <u>N/A</u>	TC PROBE <u>N/A</u>	UNBILICAL <u>U116</u>	B	B	
TC °F PRE	SAMPL'G BOX <u>Q2</u>	ORSAT PUMP <u>N/A</u>	TEDLAR BAG <u>N/A</u>	E	E	
TC °F POST					B	B
ORSAT SYSTEM					E	E
		NOMOGRAPH DATA				
FILTER/XAD	TARE WT.	METER TEMP.				
<u>N/A</u>	<u>N/A</u>	EST. XH ₂ O				
		"C" FACTOR				
		STACK TEMP.				
		REF DELTA-P				
		"K" FACTOR				
		DELTA-H ₂	<u>1.876</u>			
		Fyrites, % <u>4.0</u> <u>2030</u> <u>4.0</u> <u>2040</u> <u>4.0</u> <u>2050</u>				
		Y ₉₈ %52 OF CAL'D Y? (Y) (N)				

LINE	SAMPLE POINT	CLOCK TIME, MINUTES	DRY GAS METER READING, CUBIC FEET	PITOT READING, IN. H ₂ O	GAS METER TEMP., °F	STACK TEMP., °F	ORIFICE SETTING, IN. H ₂ O		GAUGE VACUUM, IN. HG	GAS TEMPERATURES, °F		
							ACTUAL	IDEAL		FILTER °	IMPING. EXIT	PROBE OR COND. EXIT**
1	A	0	982.407	N/A	106	N/A	1.88	1.88	2	N/A	62	N/A
2		5	986.38		106				3		60	
3		10	990.03		107				3		58	
4		15	993.78		108				3		58	
5		20	997.52		109				3		58	
6	✓	25	1001.23	✓	110	✓	✓	✓	3	✓	58	✓
7	OFF	30	1005.750									
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												

FINAL

* FILTER EXIT for NJ Method 1. FILTER BOX for all others.
 ** PROBE EXIT & / (probe & filter heat off) apply to NJ Method 1. COND EXIT applies if sampling train has a condenser.

30 23.343 107.7 1.88 204
 Min. (θ) Vm (ΔP)² cm ts ΔH

MOISTURE ANALYTICAL RESULTS

Client LA PACIFIC CORP

Plant Name ROXBORO OSB PLANT

Job No. 15575

City/State ROXBORO, NC

Sampling Loc. _____

Run Number

DRYER #2

DRYER #3

DZM4-1

D3M4-7

DZ-M4-2

Sampling Date

8-09-96

8-09-96

8-09-96

Analysis Date

8-09-96

8-09-96

8-09-96

Analyst

DLS

DLS

DLS

Reagent 1 (<u>200 mL D₂O</u>)			
Final Weight, g	<u>384.0</u>	<u>260.0</u>	<u>342.0</u>
Tared Weight, g	<u>200.0</u>	<u>200.0</u>	<u>200.0</u>
Water Catch, g	<u>184.0</u>	<u>60.0</u>	<u>142.0</u>
Reagent 2 (_____)		<u>BAD</u>	
Final Weight, g	_____	_____	_____
Tared Weight, g	_____	<u>LEAK</u>	_____
Water Catch, g	_____	_____	_____
Reagent 3 (_____)		<u>✓</u>	
Final Weight, g	_____	_____	_____
Tared Weight, g	_____	_____	_____
Water Catch, g	_____	_____	_____
CONDENSED WATER, g	_____	_____	_____

Silica Gel			
Final Weight, g	<u>219.0</u>	<u>212.3</u>	<u>210.0</u>
Tared Weight, g	<u>201.5</u>	<u>203.6</u>	<u>200.2</u>
ADSORBED WATER, g	<u>17.5</u>	<u>8.7</u>	<u>9.8</u>

TOTAL WATER COLLECTED, g	<u>201.5 ✓</u>	<u>68.7</u>	<u>151.8 ✓</u>
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Balance No. 14 Type ☒ Triple Beam ☒ Electronic _____ Reagent Box No. N/A

Balance located in stable, draft-free area ☒ Yes ☐ No _____ (If "No", explain below.)

Comments _____

AIR FLOW RATE DETERMINATIONS

Client LA. PACIFIC CORP. Job No. 15575
Plant ROXBORO OSB PLANT Run No. D3-M2-3
City/State ROXBORO, NC Date 8-09-96
Test Location DRYER EXHAUST #3 Personnel DLS, MTR
Barometric Pressure (Pbar) 29.90 "Hg Static Pressure (Pg) +0.45 "H₂O
Pitot/Orifice ID 30 Pitot Coef. (C_p) .84 Pres. Gauge Set ID MS33
Thermocouple ID R430 Duct Depth/Diameter 45" Width N/A
---Specify inches (") or feet (')---

[illegible]

ORSAT DATA						
Sampling Time	Analysis Time	CO ₂ (A) Reading	O ₂ (B) Reading	tO ₂ (B-A)	CO (C) Reading	tCO (C-B)
Average						
Orsat ID _____		Bag ID _____		F _O _____		

PERITE DATA. & CO ₂				
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MOISTURE DATA (WET BULB/DRY BULB)					
Port	Time	Dry Bulb °F	Wet Bulb °F	Diff.	t H ₂ O

MOISTURE DATA (STOICHIOMETRIC)	
Free Water in Fuel, %	
Water from Fuel Combustion, %	
Ambient Water, %	
Relative Humidity, %	
Ambient Temperature, °F	
Total %	

VOLUMETRIC AIR FLOW RATES	
Dry at Standard Conditions, Q _{sd} =	SCFM
Wet at Stack Conditions, Q _{sw} =	ACFM

ADDITIONAL DATA

* ΔP average is square of average square root.

F-1023 rev. 9-93

Client LA. PACIFIC CORP. Job No. 15575
Plant ROXBORO OSB PLANT Run No. 03-M2-4
City/State ROXBORO, NC Date 8-09-96
Test Location DRYER EXHAUST # 3 Personnel DL5, TCM
Barometric Pressure (Pbar) 29.90 "Hg Static Pressure (Pg) +0.74 "H₂O
Pitot/Griffie ID 30 Pitot Coef. (Cp) .84 Pres. Gauge Set ID M333
Thermocouple ID R430 Duct Depth/Diameter 45" Width N/A
---Specify inches (") or feet (')---

[illegible]

ORSAT DATA						
Sampling Time	Analysis Time	CO ₂ (A) Reading	O ₂ (B) Reading	tO ₂ (B-A)	CO (C) Reading	tCO (C-B)
Average						
Orsat ID _____		Bag ID _____		F _O _____		

FYRITE DATA. % CO ₂				
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MOISTURE DATA (WET BULB/DRY BULB)					
Port	Time	Dry Bulb °F	Wet Bulb °F	Diff.	% H ₂ O

MOISTURE DATA (STOICHIOMETRIC)	
Free Water in Fuel, %	
Water from Fuel Combustion, %	
Ambient Water, %	
Relative Humidity, %	
Ambient Temperature, °F	
Total %	

VOLUMETRIC AIR FLOW RATES	
Dry at Standard Conditions, Q _{sd} =	SCFM
Wet at Stack Conditions, Q _{aw} =	ACFM

ADDITIONAL DATA

157

AIR FLOW RATE DETERMINATIONS

Client LA. PACIFIC CORP. Job No. 15575
Plant ROXBORO OSB PLANT Run No. D4-M23
City/State ROXBORO, NC Date 8-09-96
Test Location DRYER EXHAUST # 4 Personnel ALS, MTR
Barometric Pressure (Pbar) 29.90 "Hg Static Pressure (Pg) +0.36 "H₂O
Pitot/Orifice ID 30 Pitot Coef. (C_p) .84 Pres. Gauge Set ID MS 33
Thermocouple ID R430 Duct Depth/Diameter 45" Width N/A
---Specify inches (") or feet (')--

[illegible]

ORSAT DATA						
Sampling Time	Analysis Time	CO ₂ (A) Reading	O ₂ (B) Reading	tO ₂ (B-A)	CO (C) Reading	tCO (C-B)
Average						
Orsat ID _____		Bag ID _____		F _O _____		

FLYITE DATA. % CO ₂				
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MOISTURE DATA (WET BULB/DRY BULB)					
Port	Time	Dry Bulb °F	Wet Bulb °F	Diff.	+ H ₂ O

MOISTURE DATA (STOICHIOMETRIC)	
Free Water in Fuel, %	
Water from Fuel Combustion, %	
Ambient Water, %	
Relative Humidity, %	
Ambient Temperature, °F	
Total %	

VOLUMETRIC AIR FLOW RATES	
Dry at Standard Conditions, Q _{sd} =	SCFM
Wet at Stack Conditions, Q _{aw} =	ACFM

ADDITIONAL DATA

* ΔP average is square of average square root.

AIR FLOW RATE DETERMINATIONS

Client LA. PACIFIC CORP.

Job No. 15575

Plant ROXBORO OSB PLANT

Run No. D4-M2-4

City/State Roxboro, NC

Date 8-09-96

Test Location DRYER EXHAUST #4

Personal DLS, FEAR JSC

Barometric Pressure (Pbar) 29.90 "Hg

Static Pressure (Pg) +0.69 "H₂O

Pilot/Office ID 30

Pitot Coef. (C_p) .84

Pres. Gauge Set ID MS 33

Thermocouple ID R430

Duct Depth/Diameter 45" Width N/A

---Specify inches (") or feet (')--

VELOCITY TRAVERSES		
Start-Finish Times: <u>2135 - 2140</u>		
Point No.	AP In. H₂O	Temp. °F
A 1	0.85	194
2	0.88	
3	0.90	
4	0.85	
5	0.85	
6	0.88	
7	0.83	
8	0.83	
9	0.87	
10	0.87	
11	0.95	
12	0.94	
13	0.88	
14	0.85	
15	0.80	
16	0.79	↓
Avg. =		-

ORSAT DATA						
Sampling Time	Analysis Time	CO ₂ (A) Reading	O ₂ (B) Reading	tO ₂ (B-A)	CO (C) Reading	tCO (C-B)
Average						
Orsat ID _____		Bag ID _____		F _O _____		

FURITE DATA. % CO ₂				
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MOISTURE DATA (WET BULB/DRY BULB)					
Port	Time	Dry Bulb °F	Wet Bulb °F	Diff.	% H ₂ O

MOISTURE DATA (STOICHIOMETRIC)	
Free Water in Fuel, %	
Water from Fuel Combustion, %	
Ambient Water, %	
Relative Humidity, %	
Ambient Temperature, °F	
Total %	

VOLUMETRIC AIR FLOW RATES	
Dry at Standard Conditions, Q _{sd} =	SCFM
Wet at Stack Conditions, Q _{sw} =	ACFM

ADDITIONAL DATA

* ΔP average is square of average square root.

F-1023 rev. 9-93

AIR FLOW RATE DETERMINATIONS

Client LA PACIFIC Corp Job No. 15575
Plant ROXBORO OSB PLANT Run No. 05-MZ-3
City/State ROXBORO, NC Date 8-09-96
Test Location DRYER EXHAUST #5 Personnel DLS, MTR
Barometric Pressure (Pbar) 29.90 "Hg Static Pressure (Pg) +0.23 "H₂O
Pitot/Orifice ID 50 Pitot Coef. (C_p) .84 Pres. Gauge Set ID MS 33
Thermocouple ID R 430 Duct Depth/Diameter 30" 45" Width N/A
---Specify inches (") or feet (')---

[illegible]

ORSAT DATA						
Sampling Time	Analysis Time	CO ₂ (A) Reading	O ₂ (B) Reading	%O ₂ (B-A)	CO (C) Reading	%CO (C-B)
Average						
Orsat ID _____		Bag ID _____		F _o _____		

PHYRITE DATA. % CO ₂				
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MOISTURE DATA (WET BULB/DRY BULB)					
Port	Time	Dry Bulb °F	Wet Bulb °F	Diff.	t H ₂ O

MOISTURE DATA (STOICHIOMETRIC)	
Free Water in Fuel, %	
Water from Fuel Combustion, %	
Ambient Water, %	
Relative Humidity, %	
Ambient Temperature, °F	
Total %	

VOLUMETRIC AIR FLOW RATES	
Dry at Standard Conditions, Q _{sd} =	SCFM
Wet at Stack Conditions, Q _{sw} =	ACFM

ADDITIONAL DATA

Client LA. PACIFIC CORP. Job No. 15575
Plant ROXBORO OSB PLANT Run No. D5-M2-54
City/State ROXBORO, NC Date 8-09-96
Test Location DRYER EXHAUST #5 Personnel DLS, FEM JSC
Barometric Pressure (Pbar) 29.90 "Hg Static Pressure (Pg) +0.52 "H₂O
Pitot/Orifice ID 30 Pitot Coef. (Cp) .84 Pres. Gauge Set ID MS33
Thermocouple ID R430 Duct Depth/Diameter 45" Width N/A
---Specify inches (") or feet (')---

ORSAT DATA						
Sampling Time	Analysis Time	CO ₂ (A) Reading	O ₂ (B) Reading	tO ₂ (B-A)	CO (C) Reading	tCO (C-B)
Average						
Orsat ID _____		Bag ID _____		F _O _____		

HYDRATE DATA, % CO ₂				
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MOISTURE DATA (WET BULB/DRY BULB)					
Port	Time	Dry Bulb °F	Wet Bulb °F	Diff.	% H ₂ O

MOISTURE DATA (STOICHIOMETRIC)	
Free Water in Fuel, %	
Water from Fuel Combustion, %	
Ambient Water, %	
Relative Humidity, %	
Ambient Temperature, °F	
Total %	

VOLUMETRIC AIR FLOW RATES	
Dry at Standard Conditions, Qsd =	SCFM
Wet at Stack Conditions, Qaw =	ACFM

ADDITIONAL DATA

161

APPENDIX B. FIELD DATA

2. RTO No. 3 Inlet

a. Total Hydrocarbons

CALIBRATION SUMMARY

SOURCE: LOUISIANA PACIFIC

REASON: CALIBRATION ERROR CHECK

DATE : 08-06-1996 TIME: 08:29 - 08:46

A/D CHAN	MONITOR DESCRIPTION	UNITS	GAS VALUE	MONITOR RESPONSE
9	STACK	ppmNOX	0.0	0.4
9	STACK	ppmNOX	47.1	47.0
9	STACK	ppmNOX	82.2	83.4
10	STACK	ppmCO	0.0	-0.1
10	STACK	ppmCO	30.1	28.2
10	STACK	ppmCO	59.4	57.9
10	STACK	ppmCO	90.1	91.0
11	STACK	%O2	0.00	0.13
11	STACK	%O2	12.26	12.38
11	STACK	%O2	21.30	21.31
12	STACK	%CO2	0.00	0.03
12	STACK	%CO2	11.03	11.02
12	STACK	%CO2	17.40	17.61

SGH
8/6/96

CALIBRATION SUMMARY

SOURCE: LOUISIANA PACIFIC

REASON: PRE RUN 1 SYSTEM CAL

DATE : 08-06-1996 TIME: 09:18 - 10:01

A/D CHAN	MONITOR DESCRIPTION	UNITS	GAS VALUE	MONITOR RESPONSE
9	STACK	ppmNOX	0.0	0.1
9	STACK	ppmNOX	47.1	45.5
10	STACK	ppmCO	0.0	-0.1
10	STACK	ppmCO	30.1	27.4
11	STACK	%O2	0.00	0.17
11	STACK	%O2	12.26	12.22
12	STACK	%CO2	0.00	0.03
12	STACK	%CO2	11.03	10.85
7	STACK	ppmTHC	0.0	0.5
7	STACK	ppmTHC	30.1	30.7
7	STACK	ppmTHC	51.2	52.8
7	STACK	ppmTHC	84.3	84.6
14	INLET	ppmTHC	296.0	292.4

SCH
8/6/96

CALIBRATION SUMMARY

SOURCE: LOUISIANA PACIFIC

REASON: PRE RUN 1 SYSTEM CAL

DATE : 08-06-1996 TIME: 10:27 - 10:32

A/D CHAN	MONITOR DESCRIPTION	UNITS	GAS VALUE	MONITOR RESPONSE
14	INLET	ppmTHC	0.0	0.6
14	INLET	ppmTHC	296.0	295.2
14	INLET	ppmTHC	518.4	518.4
14	INLET	ppmTHC	841.8	842.3

LOUISIANA PACIFIC

08-06-1996

	CHAN 9	CHAN10	CHAN11	CHAN12	CHAN 7	CHAN14
	STACK	STACK	STACK	STACK	STACK	INLET
TIME	ppmNOX	ppmCO	%O2	%CO2	ppmTHC	ppmTHC
11:26	1.9	2.0	20.31	0.35	3.0	157.5
11:27	2.7	6.7	20.24	0.42	10.8	169.1
11:28	5.3	5.5	20.18	0.48	11.6	225.7
11:29	6.4	2.7	20.22	0.42	7.6	243.4
11:30	3.1	1.3	20.28	0.35	3.7	225.7
11:31	1.9	1.0	20.30	0.34	3.0	197.8
11:32	2.2	4.7	20.24	0.40	9.2	190.5
11:33	3.1	7.8	20.20	0.44	12.1	206.9
11:34	6.5	3.3	20.18	0.47	10.3	262.2
11:35	4.7	0.9	20.26	0.37	3.5	241.3
11:36	2.4	0.9	20.29	0.34	3.5	212.7
11:37	2.0	3.6	20.28	0.35	6.6	191.5
11:38	2.6	7.3	20.21	0.42	11.3	193.0
11:39	4.5	6.8	20.19	0.45	11.3	230.8
11:40	7.4	1.4	20.21	0.42	4.5	251.3

AVERAGE VALUES FOR THE LAST 15 MINUTES

11:40	3.8	3.7	20.24	0.40	7.5	213.3
11:41	3.6	0.6	20.28	0.34	3.3	226.7
11:42	2.1	3.8	20.29	0.34	5.0	201.6
11:43	2.1	8.9	20.25	0.38	12.0	187.4
11:44	2.9	7.2	20.20	0.44	12.2	193.0
11:45	5.1	4.5	20.19	0.45	5.7	238.0

COMMENTS: INTERRUPT FOR PLANT PROBLEMS

LOUISIANA PACIFIC

08-06-1996

	CHAN 9	CHAN10	CHAN11	CHAN12	CHAN 7	CHAN14
	STACK	STACK	STACK	STACK	STACK	INLET
TIME	ppmNOX	ppmCO	%O2	%CO2	ppmTHC	ppmTHC
12:21	2.8	12.2	20.18	0.42	10.9	134.2
12:22	4.0	3.2	20.17	0.44	4.7	166.2
12:23	6.1	0.3	20.17	0.41	3.5	168.6
12:24	3.0	3.4	20.22	0.35	5.2	156.3
12:25	1.8	10.9	20.21	0.35	12.7	149.4
12:26	1.6	11.7	20.19	0.37	12.2	145.2
12:27	2.5	8.1	20.19	0.39	5.6	148.0
12:28	2.8	1.0	20.18	0.41	3.6	161.3
12:29	4.9	1.1	20.14	0.44	3.2	186.5
12:30	3.5	8.8	20.17	0.38	12.3	166.8
12:31	1.9	10.5	20.19	0.36	12.0	161.0
12:32	2.0	10.7	20.20	0.36	7.8	159.7
12:33	3.0	2.7	20.20	0.39	3.5	167.1
12:34	3.6	0.6	20.17	0.41	3.1	193.7
12:35	5.2	3.0	20.14	0.42	9.2	189.9

AVERAGE VALUES FOR THE LAST 15 MINUTES

12:35	3.3	5.9	20.18	0.39	7.3	163.6
12:36	2.7	11.4	20.17	0.38	13.4	176.1
12:37	1.8	11.9	20.19	0.36	10.4	170.7
12:38	2.1	3.0	20.19	0.36	3.3	171.8
12:39	3.0	0.8	20.17	0.41	3.4	175.8
12:40	4.7	2.0	20.12	0.45	6.8	217.3
12:41	4.5	6.2	20.14	0.40	12.6	192.9
12:42	2.3	13.2	20.18	0.36	11.7	185.1
12:43	1.9	5.5	20.21	0.34	5.1	181.0
12:44	2.5	0.9	20.20	0.37	3.3	185.7
12:45	3.3	1.8	20.17	0.41	4.2	205.0
12:46	5.8	3.1	20.10	0.46	12.9	223.1
12:47	3.5	7.7	20.16	0.39	13.2	198.7
12:48	2.1	8.5	20.21	0.34	6.1	189.4
12:49	2.0	1.5	20.21	0.35	3.6	189.1
12:50	2.5	1.1	20.18	0.39	3.0	191.4

AVERAGE VALUES FOR THE LAST 15 MINUTES

12:50	3.0	5.3	20.17	0.39	7.5	190.2
12:51	4.0	5.8	20.12	0.45	11.6	222.9
12:52	5.6	5.2	20.11	0.43	13.4	208.4
12:53	2.8	8.0	20.19	0.36	8.5	196.9
12:54	2.0	2.7	20.22	0.34	3.7	192.8
12:55	2.4	0.8	20.20	0.37	3.0	197.7
12:56	3.0	3.9	20.14	0.43	8.8	204.1
12:57	5.9	6.0	20.09	0.47	12.2	239.7
12:58	4.9	6.7	20.15	0.39	10.6	209.5
12:59	2.3	2.6	20.21	0.34	3.3	201.2
13:00	2.1	0.9	20.22	0.34	3.3	198.7
13:01	2.7	2.1	20.18	0.40	6.2	203.8
13:02	3.3	6.1	20.14	0.45	11.5	228.1
13:03	7.6	7.7	20.11	0.46	11.0	231.9

SGH
8/6/96

LOUISIANA PACIFIC 08-06-1996

	CHAN 9	CHAN10	CHAN11	CHAN12	CHAN 7	CHAN14
	STACK	STACK	STACK	STACK	STACK	INLET
TIME	dpmNOX	dpmCO	%O2	%CO2	dpmTHC	dpmTHC
13:04	3.9	3.0	20.21	0.36	5.0	212.1
13:05	2.1	0.9	20.25	0.34	3.3	205.1

AVERAGE VALUES FOR THE LAST 15 MINUTES

13:05	3.6	4.2	20.17	0.40	7.7	210.2
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COMMENTS: END RUN 1

1125 -1140

1220 - 1305

SGH
8/6/96

CALIBRATION SUMMARY

SOURCE: LOUISIANA PACIFIC

REASON: POST RUN 1 PRE RUN 2 SYSTEM BIAS CHECK

DATE : 08-06-1996 TIME: 13:05 - 13:20

A/D CHAN	MONITOR DESCRIPTION	UNITS	GAS VALUE	MONITOR RESPONSE
9	STACK	ppmNOX	0.0	0.1
9	STACK	ppmNOX	47.1	45.4
10	STACK	ppmCO	0.0	-0.6
10	STACK	ppmCO	30.1	27.4
11	STACK	%O2	0.00	0.15
11	STACK	%O2	12.26	12.12
12	STACK	%CO2	0.00	0.01
12	STACK	%CO2	11.03	10.96
7	STACK	ppmTHC	0.0	0.3
7	STACK	ppmTHC	30.1	29.3
14	INLET	ppmTHC	0.0	1.6
14	INLET	ppmTHC	296.0	300.7

8/6/96
SSH

LOUISIANA PACIFIC

08-06-1996

	CHAN 9	CHAN10	CHAN11	CHAN12	CHAN 7	CHAN14
STACK	STACK	STACK	STACK	STACK	STACK	INLET
TIME	DDMNOX	DDMCO	%O2	%CO2	DDMTHC	DDMTHC
13:46	2.5	3.8	20.21	0.33	4.4	96.8
13:47	2.5	0.8	20.21	0.34	3.0	99.6
13:48	3.5	1.4	20.16	0.39	3.6	107.5
13:49	5.1	4.3	20.10	0.45	10.5	142.2
13:50	6.3	3.8	20.10	0.42	12.7	121.3
13:51	3.3	5.5	20.18	0.34	6.6	109.2
13:52	2.2	0.9	20.20	0.32	4.3	104.4
13:53	2.5	0.9	20.18	0.35	3.7	108.3
13:54	3.4	5.1	20.12	0.42	11.7	118.9
13:55	6.6	2.7	20.06	0.47	12.8	156.5
13:56	5.6	3.3	20.13	0.38	8.9	122.3
13:57	2.9	1.6	20.19	0.33	4.7	117.2
13:58	2.3	0.6	20.20	0.32	4.1	112.9
13:59	2.8	3.5	20.16	0.37	9.2	117.5
14:00	3.8	7.0	20.10	0.43	12.4	132.3

AVERAGE VALUES FOR THE LAST 15 MINUTES

14:00	3.7	3.0	20.15	0.38	7.5	117.8
14:01	7.2	2.8	20.07	0.46	11.3	155.6
14:02	5.1	0.7	20.15	0.36	4.4	128.2
14:03	2.7	0.7	20.19	0.33	4.3	121.1
14:04	2.4	3.2	20.18	0.34	7.1	119.1
14:05	3.0	6.2	20.12	0.41	12.5	123.2
14:06	4.5	7.6	20.09	0.44	12.1	156.2
14:07	8.0	1.5	20.09	0.43	5.8	145.3
14:08	4.0	0.2	20.17	0.34	4.2	130.3
14:09	2.4	2.6	20.18	0.33	5.2	139.7
14:10	2.3	8.3	20.15	0.35	12.3	157.4
14:11	3.0	6.7	20.10	0.41	12.4	185.4
14:12	4.3	4.0	20.10	0.43	6.5	239.9

COMMENTS: INTERRUPT FOR PLANT PROBLEMS

LOUISIANA PACIFIC

08-06-1996

	CHAN 9	CHAN10	CHAN11	CHAN12	CHAN 7	CHAN14
	STACK	STACK	STACK	STACK	STACK	INLET
TIME	ppmNOX	ppmCO	%O2	%CO2	ppmTHC	ppmTHC
14:31	2.2	8.8	20.15	0.33	12.5	248.4
14:32	1.9	9.5	20.13	0.34	12.4	208.9
14:33	2.3	8.9	20.14	0.34	6.4	180.2
14:34	2.4	1.1	20.13	0.36	4.2	175.1
14:35	2.5	0.5	20.11	0.40	3.7	202.8
14:36	4.4	2.0	20.04	0.46	11.6	307.7
14:37	5.0	3.6	20.07	0.40	13.5	309.8
14:38	2.9	6.4	20.14	0.33	8.8	247.7
14:39	2.3	2.0	20.16	0.31	4.5	197.2
14:40	2.5	0.5	20.15	0.33	3.9	177.1
14:41	3.0	2.6	20.09	0.40	9.5	200.9
14:42	5.4	4.6	20.01	0.47	12.8	323.4
14:43	6.1	3.1	20.06	0.41	11.7	330.0
14:44	3.2	1.3	20.13	0.33	4.4	253.2
14:45	2.4	0.5	20.15	0.32	4.2	193.2

AVERAGE VALUES FOR THE LAST 15 MINUTES

14:45	3.2	3.7	20.11	0.37	8.3	237.0
14:46	2.7	2.1	20.12	0.35	7.0	182.5
14:47	3.2	5.2	20.06	0.41	12.4	221.5
14:48	6.0	5.6	20.01	0.46	12.1	341.7
14:49	5.4	0.9	20.08	0.37	5.8	305.6
14:50	2.6	0.2	20.13	0.32	4.1	216.3
14:51	2.3	2.6	20.12	0.32	4.9	160.3
14:52	2.8	6.0	20.07	0.38	12.6	165.3
14:53	3.5	5.3	20.03	0.43	12.7	245.1
14:54	8.2	3.8	20.00	0.45	7.1	375.6
14:55	4.7	0.3	20.08	0.35	4.4	284.3
14:56	2.4	0.7	20.11	0.32	3.8	194.5
14:57	2.5	8.5	20.07	0.34	11.5	153.3
14:58	3.2	6.6	20.02	0.40	12.0	187.2
14:59	4.5	4.2	20.00	0.43	9.2	296.7
15:00	7.3	-0.0	20.00	0.41	4.5	350.3

AVERAGE VALUES FOR THE LAST 15 MINUTES

15:00	4.1	3.5	20.06	0.38	8.3	245.4
15:01	3.6	0.2	20.06	0.33	3.9	236.6
15:02	2.2	4.1	20.06	0.33	9.3	159.1
15:03	2.7	10.6	20.02	0.37	12.2	136.0

COMMENTS: END RUN 2

1345 - 1503

CALIBRATION SUMMARY

SOURCE: LOUISIANA PACIFIC

REASON: POST RUN 2 PRE RUN 3 SYSTEM BIAS CHECK

DATE : 08-06-1996 TIME: 15:04 - 15:16

A/D CHAN	MONITOR DESCRIPTION	UNITS	GAS VALUE	MONITOR RESPONSE
9	STACK	ppmNOX	0.0	0.0
9	STACK	ppmNOX	47.1	46.0
10	STACK	ppmCO	0.0	0.1
10	STACK	ppmCO	30.1	27.7
11	STACK	%O2	0.00	0.25
11	STACK	%O2	12.26	12.00
12	STACK	%CO2	0.00	0.00
12	STACK	%CO2	11.03	10.80
7	STACK	ppmTHC	0.0	0.1
7	STACK	ppmTHC	30.1	29.9
14	INLET	ppmTHC	0.0	1.1
14	INLET	ppmTHC	296.0	289.2

LOUISIANA PACIFIC

08-06-1996

	CHAN 9	CHAN10	CHAN11	CHAN12	CHAN 7	CHAN14
	STACK	STACK	STACK	STACK	STACK	INLET
TIME	ppmNOX	ppmCO	%O2	%CO2	ppmTHC	ppmTHC
15:31	2.7	3.5	20.11	0.32	5.7	159.4
15:32	2.6	0.5	20.11	0.32	4.2	125.1
15:33	2.7	2.9	20.09	0.34	5.5	102.5
15:34	2.2	8.9	20.06	0.36	14.1	89.6
15:35	1.7	9.7	20.04	0.37	13.5	84.4
15:36	2.4	7.0	20.05	0.39	6.7	126.5
15:37	3.0	0.5	20.04	0.41	4.3	215.5
15:38	5.4	0.2	20.02	0.44	3.8	404.0
15:39	5.1	4.4	20.06	0.38	11.5	292.4
15:40	2.6	7.5	20.10	0.34	12.3	179.9
15:41	2.1	8.4	20.12	0.33	8.5	138.6
15:42	3.2	1.8	20.11	0.36	4.2	185.5
15:43	3.7	0.2	20.09	0.39	3.8	295.9
15:44	6.5	0.4	20.02	0.45	8.9	404.4
15:45	4.0	7.3	20.06	0.39	13.0	258.6

AVERAGE VALUES FOR THE LAST 15 MINUTES

15:45	3.3	4.2	20.07	0.37	8.0	204.1
15:46	2.4	8.5	20.10	0.35	11.7	165.1
15:47	2.4	2.0	20.13	0.34	4.3	144.0
15:48	3.3	0.5	20.11	0.38	4.2	197.2
15:49	5.0	1.3	20.05	0.44	7.0	389.8
15:50	6.6	1.9	20.04	0.44	11.7	387.4
15:51	3.5	7.6	20.10	0.37	10.5	238.1
15:52	2.5	3.7	20.14	0.33	6.0	165.5
15:53	2.9	0.4	20.14	0.35	4.3	188.6
15:54	3.8	1.0	20.10	0.40	4.6	269.5
15:55	5.9	1.3	20.03	0.45	13.5	411.3
15:56	4.6	4.1	20.07	0.39	13.9	292.1
15:57	2.9	6.2	20.13	0.35	7.2	188.2
15:58	2.5	0.9	20.14	0.34	4.6	145.5
15:59	2.8	0.6	20.13	0.37	3.9	188.4
16:00	3.8	4.3	20.07	0.43	11.8	319.3

AVERAGE VALUES FOR THE LAST 15 MINUTES

16:00	3.7	3.0	20.10	0.38	8.0	246.0
16:01	7.0	2.9	20.02	0.47	13.0	426.1
16:02	4.2	4.3	20.12	0.37	9.5	267.2
16:03	2.5	1.2	20.17	0.33	4.6	171.7
16:04	2.3	0.5	20.17	0.32	3.9	131.7
16:05	2.7	3.3	20.13	0.37	9.2	169.7
16:06	3.4	7.1	20.07	0.43	12.5	275.4
16:07	7.0	2.5	20.03	0.47	11.6	431.1
16:08	4.4	0.3	20.13	0.37	4.4	278.6
16:09	2.6	0.5	20.16	0.33	4.3	179.2
16:10	2.4	2.8	20.15	0.34	7.0	144.3
16:11	2.9	6.7	20.09	0.40	12.4	200.7
16:12	4.6	6.8	20.05	0.45	11.9	349.0
16:13	-7.2	1.2	20.07	0.43	5.9	400.9

LOUISIANA PACIFIC

08-06-1996

	CHAN 9 STACK ppmNOX	CHAN10 STACK ppmCO	CHAN11 STACK %O2	CHAN12 STACK %CO2	CHAN 7 STACK ppmTHC	CHAN14 INLET ppmTHC
16:14	3.8	0.2	20.14	0.34	4.2	244.7
16:15	2.3	2.3	20.16	0.33	5.0	160.5

AVERAGE VALUES FOR THE LAST 15 MINUTES

16:15	4.0	2.8	20.11	0.38	8.0	255.4
16:16	2.3	8.5	20.13	0.36	12.5	131.1
16:17	2.8	7.8	20.09	0.41	12.3	183.0
16:18	3.8	4.2	20.10	0.42	6.7	291.0
16:19	6.8	0.2	20.08	0.44	4.2	406.8
16:20	3.8	0.5	20.15	0.35	3.7	252.6
16:21	2.4	7.6	20.15	0.35	11.3	164.3
16:22	2.4	9.4	20.13	0.36	12.1	136.6
16:23	3.1	6.6	20.12	0.39	8.6	187.7
16:24	4.5	0.9	20.12	0.42	4.3	336.0
16:25	7.0	0.2	20.09	0.43	3.8	404.6
16:26	3.7	2.9	20.14	0.36	8.9	241.5
16:27	2.3	11.1	20.13	0.36	12.7	155.7
16:28	2.4	9.3	20.14	0.36	11.0	131.0
16:29	3.2	1.7	20.13	0.38	3.9	183.4
16:30	4.2	0.5	20.10	0.42	4.0	330.1

AVERAGE VALUES FOR THE LAST 15 MINUTES

16:30	3.6	4.8	20.12	0.39	8.0	235.7
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AVERAGE VALUES FOR THE LAST HOUR: 60 MINUTES OF VALID DATA

16:30	3.6	3.7	20.10	0.38	8.0	235.3
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COMMENTS: END RUN 3
1530 - 1630

CALIBRATION SUMMARY

SOURCE: LOUISIANA PACIFIC

REASON: POST RUN 3 SYSTEM BIAS CHECK

DATE : 08-06-1996 TIME: 16:30 - 16:47

A/D CHAN	MONITOR DESCRIPTION	UNITS	GAS VALUE	MONITOR RESPONSE
9	STACK	ppmNOX	0.0	0.1
9	STACK	ppmNOX	47.1	46.5
10	STACK	ppmCO	0.0	-0.6
10	STACK	ppmCO	30.1	26.9
11	STACK	%O2	0.00	0.17
11	STACK	%O2	12.26	12.09
12	STACK	%CO2	0.00	0.01
12	STACK	%CO2	11.03	10.81
7	STACK	ppmTHC	0.0	0.4
7	STACK	ppmTHC	30.1	28.5
14	INLET	ppmTHC	0.0	0.1
14	INLET	ppmTHC	296.0	296.0

APPENDIX B. FIELD DATA

2. RTO No. 3 Inlet

b. Volumetric Air Flow Rates

AIR FLOW RATE DETERMINATIONS

Client LOUISIANA-PACIFIC CORP.

Job No. 15575

Plant ROXERO OGB PLANT

Run No. I3-M2-1A

City/State ROXBORO, N.C.

Date 8/6/96

Test Location RTO#3 INLET

Personal PFI

Barometric Pressure (Pbar) 29.85 "Hg

Static Pressure (Pg) 2.10 "H₂O

Pitot/Orifice ID DP-108-3 Pitot Coef. (C_p) .84 Pres. Gauge Set ID MS-33

Thermocouple ID R451

Duct Depth/Diameter 8 1/2" Width N/A

---Specify inches (") or feet (')--

[illegible]

ORSAT DATA						
Sampling Time	Analysis Time	CO ₂ (A) Reading	O ₂ (B) Reading	%O ₂ (B-A)	CO (C) Reading	%CO (C-B)
Average						
Orsat ID _____		Bag ID _____		F ₀ _____		

FINITE DATA, % CO ₂	0%			
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MOISTURE DATA (WET BULB/DRY BULB)					
Part	Time	Dry Bulb °F	Wet Bulb °F	Diff.	% H ₂ O

MOISTURE DATA (STOICHIOMETRIC)	
Free Water in Fuel, %	
Water from Fuel Combustion, %	
Ambient Water, %	
Relative Humidity, %	
Ambient Temperature, °F	
Total %	

VOLUMETRIC AIR FLOW RATES	
Dry at Standard Conditions, Q _{sd} =	SCFM
Wet at Stack Conditions, Q _{sw} =	ACFM

ADDITIONAL DATA

* ΔP average is square of average square root.

AIR FLOW RATE DETERMINATIONS

Client LOUISIANA-PACIFIC CORP.

Job No. 15575

Plant ROXBORO OSB PLANT

Form No. I 3-M2-1B

City/State Roxboro, N.C.

Date 8/6/96

Test Location RTO #3 INLET

Personnel PFO

Barometric Pressure (Pbar) 29.85 "Hg

Static Pressure (Pg) - 2.10

 H_2O

Pilot/Office ID DP-100-3

Pitot Coef. (C_p)

Pres. Gauge Set ID: 33

Thermocouple ID R451

Duct Depth/Diameter

Widch

---Specify inches (") or feet (')--

[illegible]

ORSAT DATA						
Sampling Time	Analysis Time	CO ₂ (A) Reading	O ₂ (B) Reading	tO ₂ (B-A)	CO (C) Reading	tCO (C-B)
Average						

Orsat ID _____ Bag ID _____ F_o _____

PERITE DATA, % CO ₂				
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MOISTURE DATA (WET BULB/DRY BULB)					
Port	Time	Dry Bulb °F	Wet Bulb °F	Diff.	g H ₂ O

MOISTURE DATA (STOICHIOMETRIC)	
Free Water in Fuel, %	
Water from Fuel Combustion, %	
Ambient Water, %	
Relative Humidity, %	
Ambient Temperature, °F	
Total %	

VOLUMETRIC AIR FLOW RATES	
Dry at Standard Conditions, Q _{sd} =	SCFM
Wet at Stack Conditions, Q _{sw} =	ACFM

ADDITIONAL DATA

* ΔP average is square of average square root.

SAMPLING DATA - METHOD(S) A

CLIENT LOUISIANA - PACIFIC CORP.
 PLANT ROXBORO OSR PLANT
 CITY/STATE ROXBORO, N.C. JOB NO. 15575 RUN NO. I-3-M41
 SAMPLING LOC. RTD #3 INLET DATE 8/6/96
 BAROMETRIC PRESSURE, IN. HG 29.85 STATIC PRESSURE, IN. H₂O -2.10 TIME START 1125
 LEAK J, VACUUM IN. HG 15.0 4.0 TIME FINISH 1300
 LEAK RATE, CFM 0.000 0.000 TEST PERSONNEL DD
 POSTTEST POS PRESS LEAK J OK? •

♦ CONDUCT POSTTEST POSITIVE PRESSURE LEAK CHECK FOLLOWING THE LAST RUN PER LOCATION. FOR OTHER RUNS, ENTER "N/A".											
EQUIPMENT CHECKS				EQUIPMENT I.D. NUMBERS				LEAK CHECKS			
✓ PITOT, PRETEST				REAGENT BOX <u>N/A</u> METER BOX <u>N-20</u> V <u>1.00169</u>				B _____			
PITOT, POSTTEST				PITOT <u>DP-108-3</u> CP <u>.84</u> NOZ'L <u>N/A</u> DIA. <u>N/A</u>				E _____			
<u>N/A</u> NOZZLE, PRE/POST				TC READOUT <u>E127</u> TC PROBE <u>R-451</u> UMBILICAL <u>N/A</u>				B _____			
✓ TC <u>87</u> °F PRE				SAMPL'G BOX <u>182</u> ORSAT PUMP <u>N/A</u> TEDLAR BAG <u>N/A</u>				E _____			
✓ TC <u>88</u> °F POST								B _____			
<u>N/A</u> ORSAT SYSTEM								E _____			
				MONOGRAPH DATA							
FILTER/XAD		TARE WT.		DELTA-WG <u>1.876</u>				Fyrites, %		YGR	
				METER TEMP.				<u>0.00</u> <u>200</u>			
				EST. ZH ₂ O				<u>0.00</u> <u>200</u>		**5% OF CAL'D Y?	
				"C" FACTOR				<u>0.00</u> <u>200</u>		(Y) (N)	
				STACK TEMP.							
				REF DELTA-P							
				"K" FACTOR							

LINE	SAMPLE POINT	CLOCK TIME, MINUTES	DRY GAS METER READING, CUBIC FEET	PITOT READING, IN. H ₂ O	GAS METER TEMP., °F	STACK TEMP., °F	ORIFICE SETTING, IN. H ₂ O		GAUGE VACUUM, IN. HG	GAS TEMPERATURES, °F			✓
							ACTUAL	IDEAL		FILTER *	IMPING. EXIT	PROBE OR COND EXIT**	
1	A	0	786.476		86		1.876	1.876	1	N/A	62	N/A	
2		5	788.03		88				1		62		
3		10	793.56		90				1		62		
4		15	797.57		91				1		62		
5		20	801.53		91				1		60		
6		25	805.48		92				1		60		
7		30	809.27		93				1		60		
8		35	813.12		94				1		60		
9		40	816.96		95				1		60		
10		45	820.73		98				1		60		
11		50	824.57		100				1		60		
12		55	828.52		100				1		60		
13		60/1220	832.164										
14													
15													
16													
17													
18													
19													
20													
21													
22													
23													
24													
25													

FINAL

* FILTER EXIT for NJ Method 1. FILTER BOX for all others.
 ** PROBE EXIT & ✓ (probe & filter heat off) apply to NJ Method 1. COND EXIT applies if sampling train has a condenser.

60 45.668 93.2 1.876
 Min. (θ) Vm (√ΔP)² tm ts ΔH 183

Client LOUISIANA-PACIFIC CORP.

Job No. 15575

Plant Roxboro OSB Plant

Exam No. I 3-M2-2A

City/State Roxboro, N.C.

Date 8/6/96

Test Location RTO #3 INLET

Personal PFD

Barometric Pressure (Pbar) 29.85 "Hg

Static Pressure (Pg) -2.10 "H₂O

Pitot/Orifice ID DP-108-3

Pitot Coef. (C_p) .84

Pres. Gauge Set ID NK-33

Thermocouple ID R451

Duct Depth/Diameter

Wieder

---Specify inches (") or feet (')--

[illegible]

ORSAT DATA						
Sampling Time	Analysis Time	CO ₂ (A) Reading	O ₂ (B) Reading	%O ₂ (B-A)	CO (C) Reading	%CO (C-B)
Average						

Orsat ID _____ Bag ID _____ Fc _____

FLYITE DATA. % CO ₂				
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MOISTURE DATA (WET BULB/DRY BULB)					
Part	Time	Dry Bulb °F	Wet Bulb °F	Diff.	± H ₂ O

MOISTURE DATA (STOICHIOMETRIC)	
Free Water in Fuel, %	
Water from Fuel Combustion, %	
Ambient Water, %	
Relative Humidity, %	
Ambient Temperature, °F	
Total %	

VOLUMETRIC AIR FLOW RATES	
Dry at Standard Conditions, Q _{sd} =	SCFM
Wet at Stack Conditions, Q _{sw} =	ACFM

ADDITIONAL DATA

* AP average is square of average square root.

Client LOUISIANA-PACIFIC Job No. 15575
Plant ROXBORO OSB PLANT Run No. I3-M2-2B
City/State ROXBORO, N.C. Date 8/6/96
Test Location RTD #3 INLET Personnel PEO
Barometric Pressure (Pbar) 29.85 "Hg Static Pressure (Pg) -2.10 "H₂O
Pitot/Orifice ID DP-108-3 Pitot Coef. (C_p) .84 Pres. Gauge Set ID MS 33
Thermocouple ID RA51 Duct Depth/Diameter 8 1/2" Width _____
---Specify inches (") or feet (')---

ORSAT DATA						
Sampling Time	Analysis Time	CO ₂ (A) Reading	O ₂ (B) Reading	tO ₂ (B-A)	CO (C) Reading	tCO (C-B)
Average						
Orsat ID _____		Bag ID _____		F _O _____		

PYRITE DATA, % CO ₂				
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MOISTURE DATA (WET BULB/DRY BULB)					
Port	Time	Dry Bulb °F	Wet Bulb °F	Diff.	t H ₂ O

MOISTURE DATA (STOICHIOMETRIC)	
Free Water in Fuel, %	
Water from Fuel Combustion, %	
Ambient Water, %	
Relative Humidity, %	
Ambient Temperature, °F	
Total %	

VOLUMETRIC AIR FLOW RATES	
Dry at Standard Conditions, Q _{sd} =	SCFM
Wet at Stack Conditions, Q _{aw} =	ACFM

ADDITIONAL DATA

185

SAMPLING DATA - METHOD(S) 4

CLIENT LOUISIANA-PACIFIC CORP.
 PLANT ROXBORO OSB PLANT RUN NO. I3-M4-2
 CITY/STATE ROXBORO, N.C. JOB NO. 15575 DATE 8/6/96
 SAMPLING LOC. RTO #3 INLET TIME START 1345
 BAROMETRIC PRESSURE, IN. HG 29.85 STATIC PRESSURE, IN. H₂O -2.10 TIME FINISH 1502
 LEAK J, VACUUM IN. HG 15.0 7.0 TEST PERSONNEL PD
 LEAK RATE, CFM 0.000 0.000 POSTTEST POS PRESS LEAK / OK? •

• CONDUCT POSTTEST POSITIVE PRESSURE LEAK CHECK FOLLOWING THE LAST RUN PER LOCATION. FOR OTHER RUNS, ENTER "N/A".

EQUIPMENT CHECKS		EQUIPMENT I.D. NUMBERS				LEAK CHECKS	
☒ PITOT, PRETEST	REAGENT BOX <u>N/A</u>	METER BOX <u>N-29</u>	V <u>1.0068</u>	B <u>_____</u>	B <u>_____</u>	E <u>_____</u>	E <u>_____</u>
☒ PITOT, POSTTEST	PITOT <u>DR-108-3</u>	Cp <u>0.94</u>	NOZ'L <u>N/A</u>	DIA. <u>N/A</u>	B <u>_____</u>	B <u>_____</u>	E <u>_____</u>
☒ NOZZLE, PRE/POST	TC READOUT <u>F127</u>	TC PROBE <u>R451</u>	UMBILICAL <u>N/A</u>	B <u>_____</u>	B <u>_____</u>	E <u>_____</u>	E <u>_____</u>
☒ TC <u>87</u> °F PRE	SAMPL'G BOX <u>B2</u>	ORSAT PUMP <u>N/A</u>	TEDLAR BAG <u>N/A</u>	B <u>_____</u>	B <u>_____</u>	E <u>_____</u>	E <u>_____</u>
☒ TC <u>86</u> °F POST				B <u>_____</u>	B <u>_____</u>	E <u>_____</u>	E <u>_____</u>
<u>N/A</u> ORSAT SYSTEM				B <u>_____</u>	B <u>_____</u>	E <u>_____</u>	E <u>_____</u>
		NOMOGRAPH DATA					
FILTER/XAD	TARE WT.	DELTA-HG <u>1.876</u>			Fvrites, Z <u>0.02 20.0</u>		YGR <u>_____</u>
<u>N/A</u>	<u>N/A</u>	METER TEMP. <u>_____</u>			<u>0.02 20.0</u>		25% OF CAL'D Y7 <u>_____</u>
		EST. XH ₂ O <u>_____</u>			<u>0.02 20.0</u>		(Y) <u>_____</u> (N) <u>_____</u>
		"C" FACTOR <u>_____</u>			<u>0.02 20.0</u>		
		STACK TEMP. <u>_____</u>					
		REF DELTA-P <u>_____</u>					
		"K" FACTOR <u>_____</u>					

L I N E	SAMPLE POINT	CLOCK TIME, MINUTES	DRY GAS METER READING, CUBIC FEET	PITOT READING, IN. H ₂ O	GAS METER TEMP., °F	STACK TEMP., °F	ORIFICE SETTING, IN. H ₂ O		GAUGE VACUUM, IN. HG	GAS TEMPERATURES, °F			✓
							ACTUAL	IDEAL		FILTER °	IMPING. EXIT	PROBE OR COND EXIT**	
1		0	832.354		97		1.876	1.876		N/A	60	N/A	
2		5	836.16		98						60		
3		10	840.01		100						60		
4		15	843.74		101						60		
5		20	847.62		101						60		
6		25	850.94		103						62		
7		30	854.73		97						62		
8		35	858.60		99						60		
9		40	862.38		100						60		
10		45	866.19		101						60		
11		50	870.01		102						60		
12		55	873.69		102						60		
13		60/AA	877.632										
14													
15													
16													
17													
18													
19													
20													
21													
22													
23													
24													
25													

FINAL

* FILTER EXIT for NJ Method 1. FILTER BOX for all others.

** PROBE EXIT & / (probe & filter heat off) apply to NJ Method 1. COND EXIT applies if sampling train has a condenser.

60 45.278 — 100.1 — 1.876
 Min. (θ) Vm (ΔP)² cm ts ΔH 186

AIR FLOW RATE DETERMINATIONS

Client LOUISIANA - PACIFIC CORP.

Job No. 15575

Plant ROXBORO OSB PLANT

Run No. I3-M2-34

City/State Roxboro, N.C.

Date 8/6/96

Test Location RTD #3 INLET

Personnel PFD

Barometric Pressure (Pbar) 29.85 "Hg

Static Pressure (Pg) -2.10 "H₂O

Pitot/Orifice ID DP-108-3 Pitot Coef. (C_p) 0.84 Pres. Gauge Set ID MS-33

Thermocouple ID R45

Dust Depth/Diameter 8 1/2" Width

---Specify inches (") or feet (')--

VELOCITY TRAVERSES		
Start-Finish Times: <u>1.530</u> - <u>1.540</u>		
Point No.	ΔP In. H₂O	Temp. °F
1	0.35	130
2	0.42	131
3	0.46	133
4	0.63	133
5	0.55	133
6	0.70	133
7	0.58	133
8	0.50	133
9	1.06	133
10	1.08	133
11	1.15	133
12	1.07	133
13	1.04	133
14	0.91	133
15	0.95	133
16	0.76	133
Avg. *		

ORSAT DATA						
Sampling Time	Analysis Time	CO ₂ (A) Reading	O ₂ (B) Reading	%O ₂ (B-A)	CO (C) Reading	%CO (C-B)
Average						
Orsat ID _____		Bag ID _____		F ₀ _____		

FLYING DATA, % CO ₂				
--------------------------------	--	--	--	--

MOISTURE DATA (WET BULB/DRY BULB)					
Port	Time	Dry Bulb °F	Wet Bulb °F	Diff.	+ H ₂ O

MOISTURE DATA (STOICHIOMETRIC)	
Free Water in Fuel, %	
Water from Fuel Combustion, %	
Ambient Water, %	
Relative Humidity, %	
Ambient Temperature, °F	
Total %	

VOLUMETRIC AIR FLOW RATES	
Dry at Standard Conditions, Q _{sd} =	SCFM
Wet at Stack Conditions, Q _{sw} =	ACFM

ADDITIONAL DATA :

* ΔP average is square of average square root.
F-1023 rev. 9-93

AIR FLOW RATE DETERMINATIONS

Client LOUISIANA-PACIFIC CORP.

Job No. 15575

Plant ROXBORO ESB PLANT

Form No. I3-M2-3B

City/State Roxboro, N.C.

Date 8/6/96

Test Location RTO #3 INLET

Personnel PFD

Barometric Pressure (Pbar) 29.85 "Hg

Static Pressure (Pg) -2.10 "H₂O

Pitot/Orifice ID PP-108-3

Pitot Coef. (C_p) 0.94 Pres. Gauge Set ID MS-33

Thermocouple ID P-451

Duct Depth/Diameter 8 1/2" Width

---Specify inches (") or feet (')--

[illegible]

ORSAT DATA						
Sampling Time	Analysis Time	CO ₂ (A) Reading	O ₂ (B) Reading	%O ₂ (B-A)	CO (C) Reading	%CO (C-B)
Average						
Orsat ID _____		Bag ID _____		F _O _____		

FLYITE DATA, % CO ₂				
--------------------------------	--	--	--	--

MOISTURE DATA (WET BULB/DRY BULB)					
Port	Time	Dry Bulb °F	Wet Bulb °F	Diff.	% H ₂ O

MOISTURE DATA (STOICHIOMETRIC)		
Free Water in Fuel, %		
Water from Fuel Combustion, %		
Ambient Water, %		
Relative Humidity, %		
Ambient Temperature, °F		
Total %		

VOLUMETRIC AIR FLOW RATES	
Dry at Standard Conditions, Q _{sd} =	SCFM
Wet at Stack Conditions, Q _{sw} =	ACFM

ADDITIONAL DATA

* ΔP average is square of average square root.

SAMPLING DATA - METHOD(S) 4

CLIENT LOUISIANA - PACIFIC CORP.

PLANT ROXBORO OSB PLANT

CITY/STATE ROXBORO, N.C.

SAMPLING LOC. RTO #3 INLET

BAROMETRIC PRESSURE, IN. HG 29.85

STATIC PRESSURE, IN. H₂O -2.10

LEAK V, VACUUM IN. HG 15.0

LEAK RATE, CFM 0.00

RUN NO. I-3-MA-3

JOB NO. 15575

DATE 8/6/96

TIME START 1530

TIME FINISH 1630

TEST PERSONNEL PFD

POSTTEST POS PRESS LEAK ✓ OK? •

• CONDUCT POSTTEST POSITIVE PRESSURE LEAK CHECK FOLLOWING THE LAST RUN PER LOCATION. FOR OTHER RUNS, ENTER "N/A".

EQUIPMENT CHECKS		EQUIPMENT I.D. NUMBERS			LEAK CHECKS	
✓ PITOT, PRETEST	REAGENT BOX <u>N/A</u>	METER BOX <u>N29</u>	V <u>10069</u>	B	B	
✓ PITOT, POSTTEST	PITOT <u>DP-108-3</u>	C _p <u>0.84</u>	NOZ'L <u>N/A</u>	DIA. <u>N/A</u>	E	E
✓ NOZZLE, PRE/POST	TC READOUT <u>F-07</u>	TC PROBE <u>R451</u>	UMBILICAL <u>N/A</u>	B	B	
✓ TC <u>87</u> °F PRE	SAMPL'G BOX <u>82</u>	ORSAT PUMP <u>N/A</u>	TEDLAR BAG <u>N/A</u>	E	E	
✓ TC <u>87</u> °F POST				B	B	
✓ <u>N/A</u> ORSAT SYSTEM				E	E	
		MONOGRAPH DATA				
		DELTA-H ₂	<u>1.876</u>			
FILTER/XAD	TARE WT.	METER TEMP.				
		EST. ZH ₂ O				
		"C" FACTOR				
		STACK TEMP.				
		REF DELTA-P				
		"K" FACTOR				
		Fyrites, %			YGR	
		<u>0 CO₂ 20 O₂</u>				
		<u>0 CO₂ 20 O₂</u>			±5% OF CAL'D Y?	
		<u>0 CO₂ 20 O₂</u>			(Y) (N)	

LINE	SAMPLE POINT	CLOCK TIME, MINUTES	DRY GAS METER READING, CUBIC FEET	PITOT READING, IN. H ₂ O	GAS METER TEMP., °F	STACK TEMP., °F	ORIFICE SETTING, IN. H ₂ O		GAUGE VACUUM, IN. HG	GAS TEMPERATURES, °F		PRIME OR COND. EXIT**	✓
							ACTUAL	IDEAL		FILTER *	IMPING. EXIT		
1		0	877.81A		100		1.876	1.876	1	N/A	60	N/A	
2		5	881.63		102				1		56		
3		10	885.47		102				1		56		
4		15	889.28		104				1		58		
5		20	893.08		106				1		58		
6		25	896.70		109				1		58		
7		30	900.43		109				1		58		
8		35	904.23		109				1		58		
9		40	908.00		109				1		58		
10		45	911.94		109				1		58		
11		50	915.72		110				1		58		
12		55	919.03		110				1		58		
13		60/04	923.671										
14													
15													
16													
17													
18													
19													
20													
21													
22													
23													
24													
25													
FINAL													

FINAL

** PROBE EXIT & ✓ (probe & filter heat off) apply to NJ Method 1. COND EXIT applies if sampling train has a condenser.

60 45.957 106.6 1.876 189
Min. (θ) Vm (√ΔP)² ts ts ΔH

MOISTURE ANALYTICAL RESULTS

Client LOUISIANA-PACIFIC CORP.

Plant Name ROXBORO OSB PLANT

Job No. 15575

City/State ROXBORO, N.C.

Sampling Loc. RTO #3 INLET

Run Number

I3-M4-1

I3-M4-2

I3-M4-3

Sampling Date

Analysis Date

Analyst

<u>Reagent 1 (DI H₂O)</u>			
Final Weight, g	<u>212 ml</u>	<u>220 ml</u>	<u>220 ml</u>
Tared Weight, g ml	<u>200 ml</u>	<u>200 ml</u>	<u>200 ml</u>
Water Catch, g	<u>12 ml</u>	<u>20</u>	
<u>Reagent 2 ()</u>			
Final Weight, g			
Tared Weight, g			
Water Catch, g			
<u>Reagent 3 ()</u>			
Final Weight, g			
Tared Weight, g			
Water Catch, g			
<u>CONDENSED WATER, g</u>			

<u>Silica Gel</u>			
Final Weight, g	<u>213.2</u>	<u>217.0</u>	<u>218.3</u>
Tared Weight, g	<u>200.2</u>	<u>206.3</u>	<u>206.9</u>
<u>ADSORBED WATER, g</u>	<u>13 g</u>	<u>10.7</u>	<u>11.4</u>

<u>TOTAL WATER COLLECTED, g</u>	<u>25</u>	<u>30.7</u>	<u>31.4</u>
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Balance No. _____ Type (✓) Triple Beam _____ Electronic _____ Reagent Box No. _____

Balance located in stable, draft-free area (✓)? Yes _____ No _____ (If "No", explain below.)

Comments _____

APPENDIX B. FIELD DATA

3. RTO No. 1 Stack

a. Chromium

SAMPLING DATA - METHOD(S)

CLIENT Louisiana-Pacific Corporation RUN NO. 52-M29-1
 PLANT Louisiana-Pacific JOB NO. 15575 DATE 8-9-96
 CITY/STATE Roxboro North Carolina TIME START 1140
 SAMPLING LOC. RTO #2 TIME FINISH 1250
 BAROMETRIC PRESSURE, IN. HG 29.60 STATIC PRESSURE, IN. H₂O -.34
 LEAK J, VACUUM IN. HG 15" 10" TEST PERSONNEL DDH, CEH
 LEAK RATE, CFM 0.000 POSTTEST POS PRESS LEAK / OK? ✓

• CONDUCT POSTTEST POSITIVE PRESSURE LEAK CHECK FOLLOWING THE LAST RUN PER LOCATION. FOR OTHER RUNS, ENTER "N/A".

EQUIPMENT CHECKS		EQUIPMENT I.D. NUMBERS		LEAK CHECKS	
☒ PITOT, PRETEST	REAGENT BOX <u>22457</u>	METER BOX <u>N-24</u>	V <u>.9978</u>	B	B
☒ PITOT, POSTTEST	PITOT <u>4-23</u>	NOZ'L <u>.84</u>	DIA. <u>.272</u>	E	E
☒ NOZZLE, PRE/POST	TC READOUT <u>F122</u>	TC PROBE <u>R454</u>	UMBILICAL <u>U126</u>	B	B
☒ TC <u>8</u> °F PRE	SAMPL'G BOX <u>130</u>	ORSAT PUMP <u>21</u>	TEDLAR BAG <u>46</u>	E	E
☒ TC <u>82</u> °F POST				B	B
<u>N/A</u> ORSAT SYSTEM				E	E
		NOMOGRAPH DATA			
		DELTA-H ₂	<u>1.839</u>		
FILTER/XAD	TARE WT.	METER TEMP.	<u>90</u>		
<u>Unnumbered</u>	<u>Unnumbered</u>	EST. XH ₂ O	<u>12.5</u>		
<u>Quartz</u>		"C" FACTOR	<u>0.868</u>		
		STACK TEMP.	<u>270</u>		
		REF DELTA-P	<u>.513</u>		
		"K" FACTOR	<u>3.585</u>		
				Pyrites, %	Y _{CO}
					<u>1.000</u>
				≤5% OF CAL'D Y _T	
				(Y) <u>✓</u> (N) <u> </u>	

LINE	SAMPLE POINT	CLOCK TIME, MINUTES	DRY GAS METER READING, CUBIC FEET	PITOT READING, IN. H ₂ O	GAS METER TEMP., °F	STACK TEMP., °F	ORIFICE SETTING, IN. H ₂ O		GAUGE VACUUM, IN. HG	GAS TEMPERATURES, °F			✓
							ACTUAL	IDEAL		FILTER	IMPING. EXIT	PROBE OR COND. EXIT	
1	A1	0	343.056	.45	90	358	1.68	1.68	2	250	99	N/A	
2	2	2 1/2	344.800	.47	92	278	1.70	1.70	2	250	90		
3	3	5	346.645	.40	92	279	1.95	1.45	2	260	51		
4	4	7 1/2	348.410	.50	94	290	1.74	1.74	2	260	51		
5	5	10	350.600	.50	94	290	1.79	1.79	2	260	51		
6	6	12 1/2	352.310	.50	94	290	1.79	1.79	2	260	51		
7	7	15	354.034	.55	95	274	2.01	2.01	2	260	51		
8	8	17 1/2	356.100	.60	96	287	2.16	2.16	7	260	51		
9	9	20	357.930	.65	97	281	2.36	2.36	7	260	50		
10	10	22 1/2	360.080	.60	98	283	2.18	2.18	5	260	50		
11	11	25	362.336	.60	98	284	2.18	2.18	6	260	50		
12	12	27 1/2	364.520	.60	98	284	2.18	2.18	6	260	51		
13	B1	30 1/2	366.660	.44	96	246	1.68	1.68	6	260	50		
14	2	32 1/2	368.410	.45	98	242	1.73	1.73	6	260	99		
15	3	35	370.516	.45	98	242	1.73	1.73	6	260	99		
16	4	37 1/2	372.421	.45	98	292	1.73	1.73	6	260	99		
17	5	40	374.115	.40	102	242	1.43	1.43	6	260	99		
18	6	42 1/2	375.760	.35	102	242	1.25	1.25	6	260	98		
19	7	45	377.400	.70	102	285	2.50	2.50	6	260	99		
20	8	47 1/2	379.690	.70	102	285	2.50	2.50	6	260	99		
21	9	50	382.000	.65	106	286	2.33	2.33	6	260	99		
22	10	52 1/2	384.170	.70	106	287	2.50	2.50	6	260	99		
23	11	55	386.260	.70	106	287	2.50	2.50	6	260	99		
24	12	57 1/2	388.360	.70	106	287	2.50	2.50	6	260	50		
25		60	390.590										

FINAL

• FILTER EXIT for NJ Method 1. FILTER BOX for all others.
 ** PROBE EXIT & / (probe & filter heat off) apply to NJ Method 1. COND. EXIT applies if sampling train has a condenser.

1.0 47.534 0.5406 98.33 272.94 1.99 193
 Min. (θ) Vm (ΔP)² Tm Ts ΔH

SAMPLING DATA - METHOD(S) 29

CLIENT Louisiana-Pacific
 PLANT Louisiana-Pacific RUN NO. 52-M29-2
 CITY/STATE ROXBORO, N.H. JOB NO. 15575 DATE 8-9-96
 SAMPLING LOC. RTO #2 TIME START 1445
 BAROMETRIC PRESSURE, IN. HG 29.80 STATIC PRESSURE, IN. H₂O -31 TIME FINISH 1550
 LEAK /, VACUUM IN. HG 15" 10" TEST PERSONNEL DDH
 LEAK RATE, CFM 0.000 0.000 POSTTEST POS PRESS LEAK / OK? ☒

• CONDUCT POSTTEST POSITIVE PRESSURE LEAK CHECK FOLLOWING THE LAST RUN PER LOCATION. FOR OTHER RUNS, ENTER "N/A".

EQUIPMENT CHECKS		EQUIPMENT I.D. NUMBERS		LEAK CHECKS	
☒ PITOT, PRETEST	REAGENT BOX <u>M157</u>	METER BOX <u>N24</u>	<u>.9478</u>	B	B
☒ PITOT, POSTTEST	PITOT <u>9-23</u>	NOZ'L <u>GL2280</u>	DIA. <u>.25</u>	E	E
☒ NOZZLE, PRE/POST	TC READOUT <u>F122</u>	TC PROBE <u>R454</u>	UNBILICAL <u>U126</u>	B	B
☒ TC <u>76</u> °F PRE	SAMPL'G BOX <u>130</u>	ORSAT PUMP <u>21</u>	TEDLAR BAG <u>N/A</u>	E	E
☒ TC <u>75</u> °F POST				B	B
☒ ORSAT SYSTEM				E	E
		NOMOGRAPH DATA			
DELTA-HG <u>1.839</u>					
METER TEMP. <u>100</u>					
EST. H ₂ O <u>15</u>					
"K" FACTOR <u>.858</u>					
STACK TEMP. <u>280</u>					
REF DELTA-P <u>.490</u>					
"K" FACTOR <u>3.754</u>					
				Pyrites, %	
				YGR <u>1.004</u>	
				%% OF CAL'D T? (Y) ☒ (N) ☐	

L I N E	SAMPLE POINT	CLOCK TIME, MINUTES	DRY GAS METER READING, CUBIC FEET	PITOT READING, IN. H ₂ O	GAS METER TEMP., °F	STACK TEMP., °F	ORIFICE SETTING, IN. H ₂ O ACTUAL IDEAL	GAUGE VACUUM, IN. HG	GAS TEMPERATURES, °F FILTER * IMPING. EXIT PROBE OR COND. EXIT**			✓
1	A1	0	442.945	.65	98	286	2.35 2.35	3	250	48	N/A	
2	2	2 1/2	445.030	.64	98	285	2.31 2.31	3	260	48		
3	3	5	447.185	.55	98	285	1.98 1.98	3	260	49		
4	4	7 1/2	449.200	.70	100	286	2.53 2.53	3	260	50		
5	5	10	451.440	.55	100	286	1.99 1.99	3	260	51		
6	6	12 1/2	453.440	.70	102	284	2.55 2.55	5	260	49		
7	7	15	455.700	.70	102	285	2.54 2.54	4	260	49		
8	8	17 1/2	458.000	.65	102	287	2.35 2.35	4	260	50		
9	9	20	460.170	.65	102	278	2.38 2.38	4	260	49		
10	10	22 1/2	462.364	.70	103	281	2.56 2.56	4	260	49		
11	11	25	464.355	.70	104	286	2.55 2.55	4	260	50		
12	12	27 1/2	466.700	.70	104	280	2.57 2.57	4	260	50		
13	13	30/10	468.880	.41	100	280	1.49 1.49	4	260	51		
14	2	32 1/2	470.640	.43	100	280	1.57 1.57	4	260	50		
15	3	35	472.410	.41	100	284	1.49 1.49	4	260	51		
16	4	37 1/2	474.140	.41	100	284	1.49 1.49	4	260	51		
17	5	40	476.000	.53	100	285	1.92 1.92	4	260	51		
18	6	42 1/2	478.078	.45	102	286	1.63 1.63	4	260	50		
19	7	45	479.740	.85	102	286	3.09 3.09	4	260	50		
20	8	47 1/2	482.410	.80	102	287	2.89 2.89	4	260	50		
21	9	50	484.570	.80	102	287	2.89 2.89	4	260	50		
22	10	52 1/2	487.010	.90	102	282	3.28 3.28	4	260	49		
23	11	55	489.620	.90	102	283	3.27 3.27	4	260	49		
24	12	57 1/2	491.780	.80	102	283	2.91 2.91	4	260	50		
25		60	494.353									

FINAL

* FILTER EXIT for NJ Method 1. FILTER BOX for all others.
 ** PROBE EXIT & / (probe & filter heat off) apply to NJ Method 1. COND EXIT applies if sampling train has a condenser.

60 51.486 .6400 101.1 2840 2.233 195
 Min. (θ) Vm (√ΔP)² tm ts ΔH

**MOISTURE ANALYTICAL RESULTS FOR MULTIMETAL SAMPLING TRAINS
AND/OR SAMPLING TRAINS USING KMnO₄ REAGENT FOR Hg**

Client LA. PACIFIC

Plant Name ROXBORO OGB

Job No. 15575

City/State ROXBORO, N.C.

Sampling Loc. RTO #2 OUTLET

Run Number

52-M29-1

52-M29-2

52-M29-3

Sampling Date

8/9/96

8/9/96

8/9/96

Analysis Date

8/9/96

8/9/96

8/9/96

Analyst

gsk

gsk

gsk

Reagent (5% HNO ₃ /10% H ₂ O ₂)			
Final Weight, g	<u>425.0</u>	<u>400.5</u>	<u>454.5</u>
Tared Weight, g	<u>272.5</u>	<u>270.2</u>	<u>271.7</u>
Water Catch, g	<u>152.5</u>	<u>130.3</u>	<u>182.8</u>
Reagent ()			
Final Weight, g			
Tared Weight, g			
Water Catch, g			
Reagent (4% KMnO ₄ /10% H ₂ SO ₄)			
Final Weight, g			
Empty Tared Weight, g			
Difference, g			
mL used, KMnO ₄ , g *	(<u> </u> mL) - <u> </u>	(<u> </u> mL) - <u> </u>	(<u> </u> mL) - <u> </u>
Water Catch, g			
CONDENSED WATER, g	<u>152.5</u>	<u>130.3</u>	<u>182.8</u>

* Since 4% KMnO₄/10% H₂SO₄ weighs 1.1 g/mL, multiply mL KMnO₄ used * 1.1 g/mL = total g tare to be subtracted. Enter/deduct actual mL KMnO₄ used.

Silica Gel			
Final Weight, g	<u>206.5</u>	<u>206.0</u>	<u>208.0</u>
Tared Weight, g	<u>194.2</u>	<u>193.5</u>	<u>194.7</u>
ADSORBED WATER, g	<u>12.3</u>	<u>12.5</u>	<u>13.3</u>

TOTAL WATER COLLECTED, g	<u>164.8</u>	<u>142.8</u>	<u>196.1</u>
---------------------------------	--------------	--------------	--------------

Balance No. 56 Type (✓) Triple Beam ☒ Electronic ☐ Reagent Box No. M157

Balance located in stable, draft-free area (✓)? Yes ☒ No ☐ (If "No", explain below.)

Comments

196

RECORD OF CUSTODY, CONTAINER No. M157

Client LA. PACIFIC Job No. 15575
 Plant Name ROXBORO OGB
 City/State ROXBORO, N.C.
 Sampling Method(s) 29 (EPA, NIOSH, etc.)
 Container Type (v) Reagent Box ☒ Cooler ☐ Other (specify) _____

Seal No. or "PC"	Date	Time	*	Full Signature	Reason for Breaking Seal**
1253	7/31	1333	S	<i>[Signature]</i>	
	8/5	1430	B	<i>Jeffrey S. Coffey</i>	LABEL
3662	8/9	1645	S	<i>Jeffrey S. Coffey</i>	
			B		
			S		
			B		
			S		
			B		
			S		
			B		
			S		
			B		
			S		
			B		

PC = Personal Custody * S = Sealed By; B = Broken By ** Use "REMARKS" Section if more space needed.

Container Received by Entropy Sample Custodian <i>Seem D. Long</i> <u>8/12/96</u> <u>1407</u> Signature Date Time			Seal Intact? ** Yes ☒ No ☐ NA ☐
---	--	--	--

As Applicable:

All liquid levels at mark (✓) YES ☐ NO ☐ (Estimate loss if not at mark; describe in "REMARKS")

As Applicable:

TUBE SAMPLES put in freezer by _____ Date _____ Time _____

CONDENSATE SAMPLES put in refrige. by _____ Date _____ Time _____

REMARKS _____

197

FIELD SAMPLE RECOVERY QUALITY CONTROL

Box No. M157 Assembly Date 7-31-96 Assembled By JVS
 Client LA. PACIFIC Job No. 15575
 Plant ROXBORO OSB City/State ROXBORO, N.C.
 Sampling Loc. RTO #2 OUTLET Method 29
 Individual Tare Of Reagent 200 (ML) (gm) of 5% HNO₃/H₂O₂ lot R
 Individual Tare Of Reagent _____ (ML) (gm) Of _____
 Individual Tare Of Reagent _____ (ML) (gm) Of _____
 Individual Tare Of Sil. Gel ~200 Gm _____ other (specify) _____

Run Number	Run Date	Filter or XAD Number	XAD Tare, grams	Liquid Tare at Mark? @	Init.	Sample Recov. Date	% Sil. Gel Spent	Liquid Level Marked?	Init.
S2-M29-1	8/9	-	-	✓	gsc	8/9	30	✓	gsc
				Filter Appearance* <u>BEIGE</u>					
				Reagents Appearance* <u>CLEAR</u>					
S2-M29-2	8/9	-	-	✓	gsc	8/9	30	✓	gsc
				Filter Appearance* <u>BEIGE</u>					
				Reagents Appearance* <u>CLEAR</u>					
S2-M29-3	8/9	-	-	✓	gsc	8/9	30	✓	gsc
				Filter Appearance* <u>BEIGE</u>					
				Reagents Appearance* <u>CLEAR</u>					
				Filter Appearance* _____					
				Reagents Appearance* _____					

* Use "REMARKS" section if needed.

@ All liquid levels at mark? (check) YES _____ NO _____ (estimate loss if not at mark; use "REMARKS" section).

REMARKS _____

RECORD OF CUSTODY, CONTAINER No. M152

client LA. PACIFIC

Job No. 15575

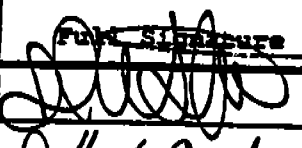
Plant Name ROXBORO OSB

City/State ROXBORO, N.C.

Sampling Method(s) 29

(EPA, NIOSH, etc.)

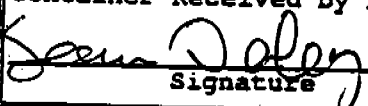
Container Type (V) Reagent Box ☒ Cooler ☐ Other (specify) _____

Seal No. or "PC"	Date	Time	*	Full Signature	Reason for Breaking Seal**
1232	7/31	1333	S		
	8/6	1150	B	Jeffrey S. Coffey	LABEL
3940	8/9	1250	S	Jeffrey S. Coffey	
			B		
			S		
			B		
			S		
			B		
			S		
			B		
			S		
			B		
			S		
			B		

PC = Personal Custody

* S = Sealed By; B = Broken By

** Use "REMARKS" Section if more space needed.

Container Received by Entropy Sample Custodian			Seal Intact? **	
 Signature	<u>8/12/96</u> Date	<u>1412</u> Time	Yes ☒ No ☐ NA ☐	

As Applicable:

All liquid levels at mark (✓) YES ☐ NO ☐ (Estimate loss if not at mark; describe in "REMARKS")

As Applicable:

TUBE SAMPLES put in freezer by _____ Date _____ Time _____

CONDENSATE SAMPLES put in refrige. by _____ Date _____ Time _____

REMARKS _____

FIELD SAMPLE RECOVERY QUALITY CONTROL

Box No. M152 Assembly Date 7-31-96 Assembled By JVS
 Client LA. PACIFIC Job No. 15575
 Plant ROXBORO DSB City/State ROXBORO, N.C.
 Sampling Loc. RTO #2 ~~ST~~ OUTLET Method 29
 Individual Tare Of Reagent 200 (ML) (~~gm~~) of 5% HNO₃/H₂O₂ lot R
 Individual Tare Of Reagent _____ (ML) (gm) of _____
 Individual Tare Of Reagent _____ (ML) (gm) of _____
 Individual Tare Of Sil. Gel ~200 Gm _____
 other (specify) _____

Run Number	Run Date	Filter or XAD Number	Tare, grams	Liquid Tare at Mark? @	Init.	Sample Recov. Date	%Sil. Gel Spent	Liquid Level Marked?	Init.
62-MAR-FB	8/9	—	—	✓	gsc	8/9	—	✓	gsc
				Filter Appearance*					
				Reagents Appearance*					
REAGENT BLANKS	8/6	—	—	✓	gsc	8/6	—	✓	gsc
				Filter Appearance*					
				Reagents Appearance*					
				Filter Appearance*					
				Reagents Appearance*					
				Filter Appearance*					
				Reagents Appearance*					

* Use "REMARKS" section if needed.

@ All liquid levels at mark? (check) YES ___ NO ___ (estimate loss if not at mark; use "REMARKS" section).

REMARKS _____

200

APPENDIX B. FIELD DATA

3. RTO No. 1 Stack

b. Carbon Dioxide and Oxygen

CALIBRATION SUMMARY

SOURCE: Louisiana-Pacific Corp - Roxboro OSB

REASON: DIRECT CALIBRATION

DATE : 08-09-1996 TIME: 07:17 - 07:31

A/D CHAN	MONITOR DESCRIPTION	UNITS	GAS VALUE	MONITOR RESPONSE
3	RTOS-1	ppmNOx	0.0	0.5
3	RTOS-1	ppmNOx	26.0	26.3
3	RTOS-1	ppmNOx	44.0	44.4
3	RTOS-1	ppmNOx	80.2	80.0
2	RTOS-1	ppm CO	0.0	0.9
2	RTOS-1	ppm CO	60.5	59.5
2	RTOS-1	ppm CO	90.1	90.8
2	RTOS-1	ppm CO	150.6	149.7
4	RTOS-1	% O2	0.00	0.03
4	RTOS-1	% O2	12.05	12.17
4	RTOS-1	% O2	20.34	19.85
1	RTOS-1	% CO2	0.00	0.04
1	RTOS-1	% CO2	11.02	11.10
1	RTOS-1	% CO2	17.21 17.20	17.23

LOUISIANA-PACIFIC - ROXBORO OSB 08-09-1996

	CHAN 3	CHAN 2	CHAN 4	CHAN 1	CHAN 6
	RTOS-1	RTOS-1	RTOS-1	RTOS-1	RTOS-1
TIME	ppmNOx	ppm CO	% O2	% CO2	ppm C
11:42	18.0	25.1	18.32	2.19	6.9
11:43	19.2	23.1	18.32	2.26	6.1
11:44	18.4	4.5	18.33	2.21	6.5
11:45	28.2	11.5	17.38	3.15	7.7
11:46	30.7	49.5	16.88	3.48	11.7
11:47	30.7	46.3	16.91	3.46	9.3
11:48	30.8	59.9	16.94	3.44	6.1
11:49	30.5	15.8	16.81	3.52	6.9
11:50	30.0	22.1	16.82	3.51	7.4
11:51	29.2	29.0	16.77	3.54	11.9
11:52	29.0	60.0	16.78	3.55	9.7
11:53	29.0	61.3	16.81	3.5	.8
11:54	29.6	19.4	16.76		3
11:55	28.8	24.3	16.75		
11:56	28.0	19.9			
11:57	27.8	67.3			
11:58	28.6				9.9
11:59	29.5				7.5
12:00	29			2.23	8.4
12:01				3.14	9.3
12:02			16	3.06	8.8
12:03			17.48	2.97	6.4
12:04			17.55	2.90	5.7
12:05		4.1	17.55	2.89	6.8
12:06		9.3	17.51	2.93	6.3
12:07	28.9	37.1	17.47	2.95	10.2
12:08	29.7	29.3	17.53	2.91	8.1
12:09	29.7	33.9	17.53	2.92	6.5
12:10	29.9	6.2	17.46	2.97	7.2
12:11	29.3	11.7	17.46	2.98	7.5

ENGINEERING
#15575
DATA
8-9-96
MLW

AVERAGE VALUES FOR THE LAST 30 MINUTES

12:11	28.3	29.3	17.25	3.15	8.2
12:12	28.2	19.7	17.41	3.01	10.8
12:13	28.0	42.9	17.41	3.02	9.5
12:14	18.2	43.0	18.25	1.96	6.1
12:15	2.3	4.1	20.22	0.13	4.4
12:16	2.0	1.4	20.23	0.11	4.2
12:17	8.7	2.5	19.72	0.89	8.8
12:18	27.2	34.7	17.58	2.86	7.6
12:19	27.6	30.1	17.72	2.74	7.6
12:20	27.3	13.9	17.83	2.63	6.5
12:21	26.4	3.5	17.95	2.51	7.1
12:22	25.2	5.1	18.09	2.39	8.0
12:23	24.5	27.2	18.12	2.34	6.9
12:24	24.7	15.7	18.16	2.31	5.0
12:25	24.5	15.5	18.21	2.27	5.1
12:26	24.4	2.3	18.18	2.28	5.9
12:27	24.3	4.1	18.19	2.27	5.4
12:28	24.4	20.1	18.14	2.32	8.1

LOUISIANA-PACIFIC - ROXBORO OSB 08-09-1996

	CHAN 3	CHAN 2	CHAN 4	CHAN 1	CHAN 6
	RTOS-1	RTOS-1	RTOS-1	RTOS-1	RTOS-1
TIME	ppmNOx	ppm CO	% O2	% CO2	ppm C
12:29	24.8	17.0	18.12'	2.35	6.5
12:30	25.7	19.3	18.06'	2.40	5.6
12:31	26.6	3.0	17.94'	2.52	6.3
12:32	27.0	5.7	17.89'	2.57	6.4
12:33	26.7	13.7	17.86'	2.59	8.9
12:34	27.2	28.7	17.86'	2.58	7.8
12:35	27.0	26.7	17.92'	2.55	6.2
12:36	26.9	5.6	17.92'	2.54	6.0
12:37	26.7	2.7	17.95'	2.52	7.1
12:38	26.1	6.0	17.97'	2.49	8.7
12:39	25.4	29.8	18.02'	2.44	6.8
12:40	24.2	26.6	18.17'	2.30	6.4
12:41	23.3	10.6	18.22'	2.26	6.2

AVERAGE VALUES FOR THE LAST 30 MINUTES

12:41	23.5	16.0	18.18	2.27	6.9
12:42	22.5	2.8	18.26'	2.21	6.8
12:43	21.9	3.4	18.31'	2.16	8.0
12:44	21.2	22.9	18.33'	2.13	6.9
12:45	21.3	14.7	18.37'	2.10	6.0
12:46	21.6	14.2	18.37'	2.12	6.3
12:47	21.8	2.1	18.31'	2.17	6.5
12:48	22.4	2.9	18.26'	2.22	5.8
12:49	22.6	21.0	18.21'	2.26	8.8

COMMENTS: END OF RUN 1
 ENGINEERING DATA
 RTOS-1

17.67

17.71

2.77

2.52

7.4

CALIBRATION SUMMARY

SOURCE: LOUISIANA-PACIFIC - ROXBORO OSB

REASON: SYSTEM BIAS CHECK - POST RUN 1 ENGINEERING

DATE : 08-09-1996 TIME: 12:49 - 13:06

A/D CHAN	MONITOR DESCRIPTION	UNITS	GAS VALUE	MONITOR RESPONSE
3	RTOS-1	ppmNOx	0.0	1.6
3	RTOS-1	ppmNOx	26.0	24.6
2	RTOS-1	ppm CO	0.0	1.3
2	RTOS-1	ppm CO	60.5	59.4
4	RTOS-1	% O2	0.00	0.16
4	RTOS-1	% O2	12.05	11.94
1	RTOS-1	% CO2	0.00	0.05
1	RTOS-1	% CO2	11.02	11.05
6	RTOS-1	ppm C	0.0	0.3
6	RTOS-1	ppm C	30.1	30.2

LOUISIANA-PACIFIC - ROXBORO OSB 08-09-1996

	CHAN 3	CHAN 2	CHAN 4	CHAN 1	CHAN 6
	RTOS-1	RTOS-1	RTOS-1	RTOS-1	RTOS-1
TIME	ppmNOx	ppm CO	% O2	% CO2	ppm C
13:16	25.0	26.8	17.95	2.50	8.6
13:17	25.0	29.0	17.98	2.48	6.4
13:18	25.2	6.2	17.97	2.48	6.1
13:19	25.0	5.1	17.97	2.48	6.8
13:20	24.8	8.5	17.96	2.48	9.4
13:21	25.3	34.4	17.94	2.51	7.2
13:22	26.2	29.3	17.92	2.54	7.7
13:23	26.4	12.1	17.89	2.56	6.2
13:24	25.9	4.2	17.90	2.55	6.9
13:25	25.8	5.5	17.90	2.55	9.6
13:26	26.0	35.8	17.90	2.55	7.4
13:27	26.6	27.3	17.88	2.57	7.8
13:28	27.3	23.6	17.85	2.61	6.8
13:29	26.6	4.0	17.86	2.58	7.0
13:30	25.7	5.6	17.90	2.54	6.8
13:31	25.0	33.4	17.95	2.49	10.8
13:32	24.5	21.2	18.02	2.44	7.7
13:33	24.8	28.3	18.04	2.43	6.6
13:34	24.7	3.8	18.01	2.45	6.9
13:35	24.5	4.2	18.00	2.45	6.2
13:36	24.4	20.9	17.99	2.46	9.8
13:37	24.2	29.2	18.04	2.42	9.0
13:38	24.0	34.6	18.08	2.39	6.4
13:39	24.2	6.8	18.05	2.41	6.2
13:40	24.1	6.0	18.04	2.41	6.8
13:41	23.8	8.9	18.03	2.41	9.9
13:42	24.1	35.6	18.02	2.42	7.7
13:43	24.6	34.9	18.03	2.43	8.0
13:44	24.5	10.8	18.00	2.44	6.2
13:45	23.9	4.9	18.03	2.42	7.2

AVERAGE VALUES FOR THE LAST 30 MINUTES

13:45	25.1	18.0	17.97	2.48	7.5
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COMMENTS: PORT CHANGE

RTOS-1

ENG.2

LOUISIANA-PACIFIC - ROXBORO OSB 08-09-1996

	CHAN 3	CHAN 2	CHAN 4	CHAN 1	CHAN 6
	RTOS-1	RTOS-1	RTOS-1	RTOS-1	RTOS-1
TIME	ppmNOx	ppm CO	% O2	% CO2	ppm C
13:52	22.3	28.5	18.11	2.30	10.1
13:53	22.5	22.1	18.12	2.30	7.9
13:54	22.9	28.9	18.13	2.29	6.7
13:55	23.0	5.1	18.10	2.31	6.9
13:56	22.8	5.6	18.08	2.33	6.1
13:57	22.9	18.3	18.06	2.34	9.9
13:58	23.3	29.2	18.06	2.34	9.2
13:59	23.0	34.9	18.11	2.31	6.4
14:00	23.3	6.3	18.06	2.34	6.4
14:01	23.0	6.4	18.07	2.33	6.8
14:02	23.0	8.8	18.05	2.35	9.7
14:03	23.0	36.3	18.08	2.32	7.9
14:04	23.1	35.2	18.13	2.29	8.1
14:05	23.4	13.1	18.08	2.33	6.0
14:06	23.2	6.3	18.07	2.33	7.1
14:07	23.3	6.1	18.03	2.37	9.4
14:08	23.2	34.5	18.03	2.36	7.7
14:09	23.0	31.1	18.09	2.30	7.9
14:10	23.6	21.6	18.08	2.34	6.5
14:11	23.8	4.3	18.02	2.37	6.9
14:12	23.9	7.4	18.01	2.38	7.6
14:13	23.8	32.2	18.02	2.37	9.6
14:14	24.2	26.5	18.02	2.39	8.1
14:15	25.0	37.4	18.00	2.41	7.1
14:16	25.0	6.9	17.97	2.42	7.1
14:17	24.5	8.9	17.97	2.41	6.1
14:18	24.6	22.1	18.00	2.42	9.9
14:19	25.4	31.7	17.99	2.43	9.2
14:20	25.2	35.3	18.02	2.41	6.5
14:21	25.2	9.4	18.02	2.40	6.6

AVERAGE VALUES FOR THE LAST 30 MINUTES

14:21	23.6	20.0	18.05	2.35	7.7
	<u>24.4</u>	<u>19.0</u>	<u>18.01</u>	<u>2.41</u>	<u>7.4</u>

COMMENTS: END OF RUN 2
ENGINEERING DATA
RTOS-1

LOUISIANA-PACIFIC - ROXBORO OSB 08-09-1996

	CHAN 3	CHAN 2	CHAN 4	CHAN 1	CHAN 6
	RTOS-1	RTOS-1	RTOS-1	RTOS-1	RTOS-1
TIME	ppmNOx	ppm CO	% O2	% CO2	ppm C
14:46	25.2	43.1	18.01	2.40	6.5
14:47	25.4	13.8	17.98	2.42	5.1
14:48	25.6	10.6	17.97	2.42	6.6
14:49	25.0	8.6	17.96	2.41	9.1
14:50	25.2	41.2	17.97	2.41	7.3
14:51	25.2	42.8	18.02	2.38	8.1
14:52	25.3	26.5	18.01	2.38	6.1
14:53	25.5	8.5	17.99	2.40	6.8
14:54	25.4	10.8	17.98	2.41	8.1
14:55	26.1	38.2	17.91	2.48	8.2
14:56	26.3	32.7	17.93	2.47	8.1
14:57	26.8	41.1	17.93	2.47	6.1
14:58	26.9	6.5	17.89	2.50	7.1
14:59	27.5	13.7	17.82	2.57	5.6
15:00	28.0	32.2	17.72	2.66	10.3
15:01	28.8	37.1	17.70	2.69	8.4
15:02	29.1	48.0	17.67	2.72	6.1
15:03	29.4	11.3	17.65	2.73	6.8
15:04	28.9	14.5	17.67	2.71	6.3
15:05	28.2	14.0	17.71	2.67	9.1
15:06	28.5	40.8	17.73	2.65	8.6
15:07	28.3	46.6	17.76	2.63	6.9
15:08	28.2	15.5	17.75	2.62	5.8
15:09	27.8	8.5	17.79	2.59	7.0
15:10	27.1	7.4	17.81	2.56	8.6
15:11	27.3	35.8	17.82	2.57	7.0
15:12	27.7	39.0	17.84	2.57	8.2
15:13	28.1	25.1	17.81	2.58	6.0
15:14	28.4	8.5	17.76	2.63	7.0
15:15	28.6	10.8	17.73	2.65	8.3

AVERAGE VALUES FOR THE LAST 30 MINUTES

15:15	27.1	24.4	17.84	2.54	7.3
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COMMENTS: PORT CHANGE
ENGINEERING DATA
RUN3
RTOS-1

LOUISIANA-PACIFIC - ROXBORO OSB 08-09-1996

	CHAN 3	CHAN 2	CHAN 4	CHAN 1	CHAN 6
	RTOS-1	RTOS-1	RTOS-1	RTOS-1	RTOS-1
TIME	ppmNOx	ppm CO	% O2	% CO2	ppm C
15:21	30.8	34.5	17.41	3.01	9.0
15:22	31.2	53.5	17.39	3.04	6.0
15:23	31.8	11.3	17.29	3.11	6.8
15:24	31.2	18.5	17.24	3.14	6.1
15:25	30.3	24.5	17.27	3.11	9.0
15:26	30.6	42.3	17.29	3.10	9.0
15:27	30.4	55.9	17.40	3.01	7.2
15:28	30.5	14.9	17.36	3.04	6.2
15:29	30.4	17.8	17.27	3.12	7.9
15:30	30.3	15.3	17.25	3.12	10.1
15:31	29.8	51.2	17.22	3.16	8.0
15:32	30.0	60.0	17.20	3.20	10.0
15:33	27.8	36.1	16.76	3.58	7.0
15:34	28.1	21.6	16.69	3.61	9.0
15:35	28.8	22.1	16.77	3.55	11.3
15:36	28.4	63.6	16.88	3.45	9.2
15:37	28.9	55.0	17.00	3.37	10.1
15:38	29.8	53.5	17.03	3.34	7.8
15:39	30.2	16.2	17.02	3.34	8.8
15:40	30.7	19.2	17.05	3.32	7.4
15:41	30.5	49.4	17.01	3.35	12.1
15:42	30.4	41.2	17.00	3.38	10.7
15:43	30.4	60.8	16.98	3.39	8.1
15:44	30.8	17.3	16.93	3.43	9.0
15:45	31.0	23.1	16.87	3.47	7.7
15:46	30.8	36.4	16.86	3.47	11.0
15:47	31.4	51.6	16.91	3.44	10.8
15:48	31.8	60.4	16.91	3.46	8.3
15:49	32.5	21.3	16.87	3.48	7.6
15:50	32.3	24.4	16.82	3.52	9.0

AVERAGE VALUES FOR THE LAST 30 MINUTES

15:50	30.4	35.8	17.06	3.30	8.7
	<u>26.8</u>	<u>30.4</u>	<u>17.38</u>	<u>2.91</u>	<u>8.1</u>

COMMENTS: END OF RUN
ENGINEERING DATA
RTOS-1
RUN 3

APPENDIX B. FIELD DATA

4. RTO No. 2 Stack

a. Chromium

SAMPLING DATA - METHOD(S) M29

CLIENT LOUISIANA - PACIFIC CORP.

PLANT ROXBORO OIL PLANT

CITY/STATE ROXBORO, NC

RUN NO. 51-M29-1

SAMPLING LOC. RTO #1 STACK

JOB NO. 15575 DATE 8-9-96

BAROMETRIC PRESSURE, IN. HG 29.85 STATIC PRESSURE, IN. H₂O -0.35

TIME START 1140

LEAK J, VACUUM IN. HG 16 M

TIME FINISH 1228

LEAK RATE, CFM 0.000 0.000

TEST PERSONNEL JDK/ADU

POSTTEST POS PRESS LEAK J OK? 0

• CONDUCT POSTTEST POSITIVE PRESSURE LEAK CHECK FOLLOWING THE LAST RUN PER LOCATION. FOR OTHER RUNS, ENTER "N/A".

EQUIPMENT CHECKS		EQUIPMENT I.D. NUMBERS		LEAK CHECKS	
☒ PITOT, PRETEST	REAGENT BOX <u>M111</u>	METER BOX <u>N-20</u>	<u>0.9981</u>	B	B
☒ PITOT, POSTTEST	PITOT <u>APT-84</u>	NOZ'L <u>62305</u>	DIA. <u>0.251</u>	E	E
☒ NOZZLE, PRE/POST	TC READOUT <u>6.93</u>	TC PROBE <u>2-428</u>	UMBILICAL <u>U-8</u>	B	B
☒ TC <u>81</u> °F PRE	SAMPL'G BOX <u>105</u>	ORSAT PUMP <u>8</u>	TEDLAR BAG <u>H346</u>	E	E
☒ TC <u>82</u> °F POST				B	B
☒ ORSAT SYSTEM				E	E
		MONOGRAPH DATA			
FILTER/XAD	TARE WT.	DELTA-HG	<u>1.779</u>		
<u>QUARTZ</u>	<u>UNTARE</u>	METER TEMP.	<u>90</u>		
		EST. XH ₂ O	<u>13</u>		
		"C" FACTOR	<u>0.518</u>		
		STACK TEMP.	<u>275</u>		
		REF DELTA-P	<u>0.657280</u>		
		"K" FACTOR	<u>2.820</u>		
				Fyrites, %	TGS
					<u>1.015</u>
				*% OF CAL'D Y?	
				(Y) (N)	

LINE	SAMPLE POINT	CLOCK TIME, MINUTES	DRY GAS METER READING, CUBIC FEET	PITOT READING, IN. H ₂ O	GAS METER TEMP., °F	STACK TEMP., °F	ORIFICE SETTING, IN. H ₂ O		GAUGE VACUUM, IN. HG	GAS TEMPERATURES, °F			J
							ACTUAL	IDEAL		FILTER	IMPING. EXIT	PROBE OR COND. EXIT	
1	A-1	0/00	149.033	0.54	79	278	1.51	1.353	3	240	66	N/A	
2	2	2 1/2	150.75	0.67	80	267	1.73	1.55	3	242	61		
3	3	5	152.58	0.69	80	271	1.91	1.71	3	251	59		
4	4	7 1/2	154.51	0.65	81	272	1.80	1.61	3	250	58		
5	5	10	156.43	0.62	83	272	1.30	1.30	3	250	57		
6	6	12 1/2	158.09	0.63	83	275	1.32	1.32	3	245	56		
7	7	15	159.75	0.72	84	269	1.81	1.81	3	245	55		
8	8	17 1/2	161.71	0.61	84	277	1.51	1.51	3	245	57		
9	9	20	163.50	0.77	86	281	1.91	1.81	4	245	57		
10	10	22 1/2	165.42	0.79	87	268	1.99	1.99	4	246	57		
11	11	25	167.37	0.96	88	276	2.40	2.40	4	241	57		
12	12	27 1/2	169.58	0.85	88	269	2.14	2.14	4	240	57		
13	B-1	30	171.711	0.92	87	269	1.06	1.06	3	249	62		
14	2	32 1/2	173.23	0.51	88	264	1.30	1.30	3	245	60		
15	3	35	174.95	0.46	89	274	1.16	1.16	3	245	58		
16	4	37 1/2	176.40	0.47	90	268	1.19	1.19	3	245	58		
17	5	40	177.97	0.47	91	276	1.18	1.18	3	247	58		
18	6	42 1/2	179.54	0.44	92	279	1.12	1.12	3	247	58		
19	7	45	181.16	0.96	92	274	2.42	2.42	4	245	57		
20	8	47 1/2	183.22	1.04	94	272	2.64	2.64	4	245	57		
21	9	50	185.53	1.07	95	277	2.70	2.70	4	245	60		
22	10	52 1/2	187.99	1.03	97	271	2.63	2.63	4	250	60		
23	11	55	190.14	1.15	98	275	2.91	2.51	5	250	60		
24	12	57 1/2	192.55	1.12	99	272	2.86	2.86	5	250	60		
25		60/00	197.558										

FINAL

* FILTER EXIT for NJ Method 1. FILTER BOX for all others.

** PROBE EXIT & J (probe & filter heat off) apply to NJ Method 1. COND EXIT applies if sampling train has a condenser.

60 45.925 0.71 88 272 1.85 213
Min. (θ) Vm (√ΔP)² tm ts ΔH

SAMPLING DATA - METHOD(S) M29

CLIENT LOUISIANA PACIFIC CORP
 PLANT ROX 3220 OSEB PLANT
 CITY/STATE ROCKFORD, NC RUN NO. 51-M29-2
 SAMPLING LOC. RTO #1 STAGE JOB NO. 15575 DATE 8-9-78
 BAROMETRIC PRESSURE, IN. H₂O 29.5 STATIC PRESSURE, IN. H₂O -0.32 TIME START 1315
 LEAK J, VACUUM IN. HG 17 15 TIME FINISH 1420
 LEAK RATE, CFM 0.000 0.000 TEST PERSONNEL JDK, PFD
 POSTTEST POS PRESS LEAK / OK? 0

• CONDUCT POSTTEST POSITIVE PRESSURE LEAK CHECK FOLLOWING THE LAST RUN PER LOCATION. FOR OTHER RUNS, ENTER "N/A".

EQUIPMENT CHECKS		EQUIPMENT I.D. NUMBERS		LEAK CHECKS	
☒ PITOT, PRETEST	REAGENT BOX <u>M111</u>	METER BOX <u>N-20</u>	<u>0.9781</u>	B	B
☒ PITOT, POSTTEST	PITOT <u>9-1</u>	CP <u>84</u>	NOZ'L <u>6-67</u>	DIA. <u>0.220</u>	E
☒ NOZZLE, PRE/POST	TC READOUT <u>F.93</u>	TC PROBE <u>R.442</u>	UNIBILICAL <u>U-B</u>	B	B
☒ TC <u>92</u> °F PRE	SAMPL'G BOX <u>81</u>	ORSAT PUMP <u>8</u>	TEDLAR BAG <u>N/A</u>	E	E
☒ TC <u>62</u> °F POST					B
N/A ORSAT SYSTEM					E
		NOMOGRAPH DATA			
DELTA-H ₂		<u>1.779</u>			
FILTER/XAD	TARE WT.	METER TEMP.	<u>90</u>		
<u>QUARTZ</u>	<u>UNFIRE</u>	EST. XH ₂ O	<u>15</u>		
		"C" FACTOR	<u>0.815</u>		
		STACK TEMP.	<u>275</u>		
		REF DELTA-P	<u>0.567</u>		
		"K" FACTOR	<u>3246</u>		
		Evrites, Z	<u>1.011</u>		
		% OF CAL'D Y _T	<u>(Y) (N)</u>		

L I N E	SAMPLE POINT	CLOCK TIME, MINUTES	DRY GAS METER READING, CUBIC FEET	PITOT READING, IN. H ₂ O	GAS METER TEMP., °F	STACK TEMP., °F	ORIFICE SETTING, IN. H ₂ O ACTUAL IDEAL	GAUGE VACUUM, IN. HG	GAS TEMPERATURES, °F FILTER * IMPING. EXIT	PROBE OR COND EXIT**	J
1	B-1	0/00	195.267	0.43	89	272	1.40 1.40	2	255 65	N/A	
2	2	2 1/2	197.06	0.48	89	264	1.57 1.57	2	255 63		
3	3	5	198.85	0.43	89	280	1.38 1.38	2	253 60		
4	4	7 1/2	200.62	0.42	90	267	1.37 1.37	2	253 60		
5	5	10	202.29	0.39	91	279	1.26 1.26	2	250 59		
6	6	12 1/2	203.52	0.41	91	268	1.34 1.34	2	248 57		
7	7	15	205.55	0.98	92	278	3.17 3.17	3	248 57		
8	8	17 1/2	208.03	0.88	93	272	2.86 2.86	3	245 55		
9	9	20	210.43	1.16	95	278	3.76 3.76	3	245 55		
10	10	22 1/2	213.16	1.04	97	272	3.40 3.40	3	245 55		
11	11	25	215.78	1.07	98	279	3.48 3.48	3	245 54		
12	12	27 1/2	218.46	1.05	99	275	3.44 3.44	3	241 54		
13	A-1	30	221.11	0.42	95	268	1.38 1.38	2	240 62		
14	2	32 1/2	222.85	0.57	95	277	1.86 1.86	2	240 61		
15	3	35	224.76	0.48	95	266	1.59 1.59	2	240 61		
16	4	37 1/2	226.63	0.64	95	278	2.08 2.08	2	245 60		
17	5	40	228.66	0.48	96	268	1.58 1.58	2	245 57		
18	6	42 1/2	230.50	0.57	97	281	1.85 1.85	2	245 57		
19	7	45	232.44	0.41	98	269	2.02 2.02	2	245 60		
20	8	47 1/2	234.51	0.74	98	282	2.40 2.40	2	245 60		
21	9	50	236.70	0.71	99	269	2.35 2.35	2	250 58		
22	10	52 1/2	238.85	0.77	100	282	2.51 2.51	2	250 58		
23	11	55	241.13	0.92	100	272	3.04 3.04	2	250 58		
24	12	57 1/2	243.62	0.91	101	280	2.97 2.97	2	250 58		
25		60/00	246.757								✓
FINAL											

* FILTER EXIT for NJ Method 1. FILTER BOX for all others.
 ** PROBE EXIT & / (probe & filter heat off) apply to NJ Method 1. COND EXIT applies if sampling train has a condenser.

60 50.887 0.67 95 274 2.25 214
 Min. (θ) V_h (ΔP)² t_m t_s ΔH

SAMPLING DATA - METHOD(S)

CLIENT LOUISIANA - PACIFIC CORP RUN NO. 51-M27-3
 PLANT ROXBORO OSE PLANT JOB NO. 15525 DATE 8-9-96
 CITY/STATE ROXBORO, NC TIME START 1445
 SAMPLING LOC. ENTER SITE TIME FINISH 1550
 BAROMETRIC PRESSURE, IN. H₂O 29.5 STATIC PRESSURE, IN. H₂O -33
 LEAK / VACUUM IN. HG 13 14 TEST PERSONNEL JDK, PFD
 LEAK RATE, CFM 0.000 0.000 POSTTEST POS PRESS LEAK / OK? 0

• CONDUCT POSTTEST POSITIVE PRESSURE LEAK CHECK FOLLOWING THE LAST RUN PER LOCATION. FOR OTHER RUNS, ENTER "N/A".

EQUIPMENT CHECKS		EQUIPMENT I.D. NUMBERS		LEAK CHECKS	
☒ PITOT, PRETEST	REAGENT BOX <u>M111</u>	METER BOX <u>N-265</u>	<u>0990X</u>	B	B
☒ PITOT, POSTTEST	PITOT <u>PPT-84</u>	NOZ'L <u>612305</u>	DIA. <u>0.251</u>	E	E
☒ NOZZLE, PRE/POST	TC READOUT <u>E-53</u>	TC PROBE <u>A.428</u>	UNBILICAL <u>W8</u>	B	B
☒ TC <u>82</u> °F PRE	SAMPL'G BOX <u>105</u>	ORSAT PUMP <u>83</u>	TEDLAR BAG <u>N/A</u>	E	E
☒ TC <u>83</u> °F POST				B	B
☒ ORSAT SYSTEM				E	E
		NOMOGRAPH DATA			
DELTA-HG <u>1.729</u>					
FILTER/XAD	TARE WT.	METER TEMP.	<u>95</u>		
<u>QUARTZ</u>	<u>UNTARED</u>	EST. %H ₂ O	<u>15</u>		
		"K" FACTOR	<u>0.823</u>		
		STACK TEMP.	<u>215</u>		
		REF DELTA-P	<u>0.752</u>		
		"K" FACTOR	<u>2.447</u>		
				Frictes, %	T _{amb}
					<u>1.012</u>
				% OF CAL'D T _{amb}	(Y) (N)

LINE	SAMPLE POINT	CLOCK TIME, MINUTES	DRY GAS METER READING, CUBIC FEET	PITOT READING, IN. H ₂ O	GAS METER TEMP., °F	STACK TEMP., °F	ORIFICE SETTING, IN. H ₂ O		GALUGE VACUUM, IN. HG	GAS TEMPERATURES, °F			J
							ACTUAL	IDEAL		FILTER	IMPING. EXIT	PROBE OR COND. EXIT	
1	A-1	4:00	246.432	0.63	92	273	1.53	1.53	3	241	67	N/A	
2	2	24	248.17	0.48	90	266	1.17	1.17	3	242	64		
3	3	5	249.76	0.52	90	279	1.25	1.25	3	244	64		
4	4	7 1/2	251.35	0.48	91	267	1.18	1.18	3	245	60		
5	5	10	252.99	0.50	91	275	1.21	1.21	3	245	62		
6	6	12 1/2	254.47	0.50	92	269	1.22	1.22	3	245	62		
7	7	15	256.06	0.65	92	275	1.58	1.58	3	245	62		
8	8	17 1/2	257.88	0.60	92	272	1.46	1.46	3	245	62		
9	9	20	259.67	0.65	94	280	1.57	1.57	3	240	60		
10	10	22 1/2	261.39	0.85	95	267	2.09	2.09	3	240	58		
11	11	25	263.47	0.83	96	278	2.02	2.02	3	240	56		
12	12	27 1/2	265.64	0.83	97	267	2.05	2.05	3	242	52		
13	B-1	30	267.603	0.45	94	268	1.10	1.10	3	242	63		
14	2	32 1/2	269.14	0.39	94	268	0.96	0.96	3	245	59		
15	3	35	270.56	0.41	94	267	1.01	1.01	3	246	58		
16	4	37 1/2	271.99	0.37	94	274	0.90	0.90	3	247	58		
17	5	40	273.37	0.40	94	268	0.98	0.98	3	250	58		
18	6	42 1/2	274.81	0.48	95	275	1.17	1.17	3	251	59		
19	7	45	276.41	0.62	95	270	1.52	1.52	3	252	59		
20	8	47 1/2	278.12	0.96	96	276	2.34	2.34	3	252	59		
21	9	50	280.28	0.85	97	269	2.09	2.09	3	252	56		
22	10	52 1/2	282.27	0.91	98	284	2.20	2.20	3	250	56		
23	11	55	284.43	1.01	98	267	2.50	2.50	3	250	58		
24	12	57 1/2	286.66	0.99	99	280	2.41	2.41	3	243	58		
25		60:00	288.907										
FINAL													

• FILTER EXIT for NJ Method 1. FILTER BOX for all others.
 ** PROBE EXIT & / (probe & filter heat off) apply to NJ Method 1. COND EXIT applies if sampling train has a condenser.

60 42.475 0.62 94 272 1.56 215
 Min. (θ) Vm (ΔP)² TS TS ΔH

MOISTURE ANALYTICAL RESULTS FOR MULTIMETAL SAMPLING TRAINS AND/OR SAMPLING TRAINS USING KMnO_4 REAGENT FOR Hg

Client LA. PACIFIC

Plant Name ROXBORO OGB

Job No. 15575

City/State ROXBORO, N.C.

Sampling Loc. RTO #1 OUTLET

Run Number

SI-M29-1

SI-M29-2

SI-M29-3

Sampling Date

8/9/96

8/9/96

8/9/96

Analysis Date

8/9/96

8/9/96

8/9/96

Analyst

gsk

gsk

gsk

Reagent (5% HNO_3 /10% H_2O_2)			
Final Weight, g	<u>421.0</u>	<u>397.0</u>	<u>422.0</u>
Tared Weight, g	<u>266.2</u>	<u>269.3</u>	<u>272.2</u>
Water Catch, g	<u>154.8</u>	<u>127.7</u>	<u>149.8</u>
Reagent ()			
Final Weight, g			
Tared Weight, g			
Water Catch, g			
Reagent (4% KMnO_4 /10% H_2SO_4)			
Final Weight, g			
Empty Tared Weight, g			
Difference, g			
mL used, KMnO_4 , g *	(<u> </u> mL) - <u> </u>	(<u> </u> mL) - <u> </u>	(<u> </u> mL) - <u> </u>
Water Catch, g			
CONDENSED WATER, g	<u>154.8</u>	<u>127.7</u>	<u>149.8</u>

* Since 4% KMnO_4 /10% H_2SO_4 weighs 1.1 g/mL, multiply mL KMnO_4 used * 1.1 g/mL = total g tare to be subtracted. Enter/deduct actual mL KMnO_4 used.

Silica Gel			
Final Weight, g	<u>226.5</u>	<u>203.0</u>	<u>207.5</u>
Tared Weight, g	<u>207.4</u>	<u>190.8</u>	<u>197.8</u>
ADSORBED WATER, g	<u>19.1</u>	<u>12.2</u>	<u>9.7</u>

TOTAL WATER COLLECTED, g	<u>173.9</u>	<u>139.9</u>	<u>159.5</u>
--------------------------	--------------	--------------	--------------

Balance No. 56 Type (✓) Triple Beam ☒ Electronic ☐

Reagent Box No. M111

Balance located in stable, draft-free area (✓)? Yes ☒ No ☐ (If "No", explain below.)

Comments

216

RECORD OF CUSTODY, CONTAINER No. M111

Client LA. PACIFIC

Job No. 15575

Plant Name ROXBORO OSB

City/State ROXBORO, N.C.

Sampling Method(s) 29

(EPA, NIOSH, etc.)

Container Type (v) Reagent Box ☒ Cooler ☐ Other (specify) ☐

Seal No. or "PC"	Date	Time	*	Full Signature	Reason for Breaking Seal**
1322	7/31	1333	S	<i>[Signature]</i>	
	8/5	1405	B	<i>Jeffrey S. Coffey</i>	LABEL
3673	8/9	1420	S	<i>Jeffrey S. Coffey</i>	
			B		
			S		
			B		
			S		
			B		
			S		
			B		
			S		
			B		
			S		
			B		

PC = Personal Custody

* S = Sealed By; B = Broken By

** Use "REMARKS" Section if more space needed.

Container Received by Entropy Sample Custodian			Seal Intact? **
<i>Sean Oddy</i> Signature	<u>8/12/96</u> Date	<u>1402</u> Time	Yes ☒ No ☐ NA ☐

As Applicable:

All liquid levels at mark (✓) YES ☐ NO ☐ (Estimate loss if not at mark; describe in "REMARKS")

As Applicable:

TUBE SAMPLES put in freezer by _____ Date _____ Time _____

CONDENSATE SAMPLES put in refrige. by _____ Date _____ Time _____

REMARKS _____

217

FIELD SAMPLE RECOVERY QUALITY CONTROL

Box No. M111 Assembly Date 7-31-96 Assembled By jvs
 Client LA. PACIFIC Job No. 15575
 Plant ROXBORO OSB City/State ROXBORO, N.C.
 Sampling Loc. RTO #1 OUTLET Method 29
 Individual Tare Of Reagent 200 (ML) (g) of 5% HNO₃/H₂O₂ lot R
 Individual Tare Of Reagent _____ (ML) (gm) of _____
 Individual Tare Of Reagent _____ (ML) (gm) of _____
 Individual Tare Of Sil. Gel ~200 Gm _____

other (specify) _____

Run Number	Run Date	Filter or XAD		Liquid Tare at Mark? @	Init.	Sample Recov. Date	%Sil. Gel Spent	Liquid Level Marked?	Init.
		Number	Tare, grams						
SI-M29-1	8/9	-	-	✓	gsk	8/9	40	✓	gsk
				Filter Appearance*					
				<u>BEIGE</u>					
				Reagents Appearance*					
				<u>CLEAR</u>					
SI-M29-2	8/9	-	-	✓	gsk	8/9	30	✓	gsk
				Filter Appearance*					
				<u>BEIGE</u>					
				Reagents Appearance*					
				<u>CLEAR</u>					
SI-M29-3	8/9	-	-	✓	gsk	8/9	20	✓	gsk
				Filter Appearance*					
				<u>BEIGE</u>					
				Reagents Appearance*					
				<u>CLEAR</u>					
				Filter Appearance*					
				Reagents Appearance*					

* Use "REMARKS" section if needed.

@ All liquid levels at mark? (check) YES _____ NO _____ (estimate loss if not at mark; use "REMARKS" section).

REMARKS _____

APPENDIX B. FIELD DATA

4. RTO No. 2 Stack

b. Carbon Dioxide and Oxygen

CALIBRATION SUMMARY

SOURCE: Louisiana-Pacific Corp - Roxboro OSB Plant

REASON: direct calibration error check

DATE : 08-09-1996 TIME: 07:21 - 07:41

A/D CHAN	MONITOR DESCRIPTION	UNITS	GAS VALUE	MONITOR RESPONSE
7	RTO-2S	ppmNOx	0.0	0.3
7	RTO-2S	ppmNOx	46.4	46.3
7	RTO-2S	ppmNOx	82.7	84.2
4	RTO-2S	ppm CO	0.0	0.1
4	RTO-2S	ppm CO	60.6	61.1
4	RTO-2S	ppm CO	150.7	150.0
4	RTO-2S	ppm CO	301.4	295.0
4	RTO-2S	ppm CO	448.0	451.1
5	RTO-2S	% O2	0.00	0.10
5	RTO-2S	% O2	12.06	12.09
5	RTO-2S	% O2	20.22	19.85
1	RTO-2S	% CO2	0.00	0.10
1	RTO-2S	% CO2	11.02	11.00
1	RTO-2S	% CO2	16.92	16.73

CALIBRATION SUMMARY

SOURCE: Louisiana-Pacific Corp - Roxboro OSB Plant

REASON: pre run 1 system bias check

DATE : 08-09-1996 TIME: 07:41 - 07:51

A/D CHAN	MONITOR DESCRIPTION	UNITS	GAS VALUE	MONITOR RESPONSE
7	RTO-2S	ppmNOx	0.0	0.1
7	RTO-2S	ppmNOx	46.4	46.6
4	RTO-2S	ppm CO	0.0	1.0
4	RTO-2S	ppm CO	60.6	59.5
4	RTO-2S	ppm CO	150.7	149.5
5	RTO-2S	% O2	0.00	0.11
5	RTO-2S	% O2	12.06	11.93
1	RTO-2S	% CO2	0.00	0.06
1	RTO-2S	% CO2	11.02	10.92
3	RTO-2S	ppm C	0.0	0.3
3	RTO-2S	ppm C	30.0	30.1
3	RTO-2S	ppm C	51.6	51.0
3	RTO-2S	ppm C	82.6	83.9

CALIBRATION SUMMARY

SOURCE: Louisiana-Pacific Corp - Roxboro OSB Plant

REASON: pre run 1 system bias check

DATE : 08-09-1996 TIME: 09:32 - 09:38

A/D CHAN	MONITOR DESCRIPTION	UNITS	GAS VALUE	MONITOR RESPONSE
7	RTO-2S	ppmNOx	0.0	0.5
7	RTO-2S	ppmNOx	46.4	47.6
4	RTO-2S	ppm CO	0.0	1.0
4	RTO-2S	ppm CO	60.6	59.9
5	RTO-2S	% O2	0.00	0.16
5	RTO-2S	% O2	12.06	11.94
1	RTO-2S	% CO2	0.00	0.04
1	RTO-2S	% CO2	11.02	10.98
3	RTO-2S	ppm C	0.0	0.1
3	RTO-2S	ppm C	30.0	30.7
3	RTO-2S	ppm C	51.6	51.4
3	RTO-2S	ppm C	82.7	83.3

Louisiana-Pacific Corp - Roxboro OSB Plant 08-09-1996

	CHAN 7	CHAN 4	CHAN 5	CHAN 1	CHAN 3
	RTO-2S	RTO-2S	RTO-2S	RTO-2S	RTO-2S
TIME	ppmNOx	ppm CO	% O2	% CO2	ppm C
11:42	38.8	34.9	17.39	3.07	15.1
11:42	39.1	94.0	17.43	3.05	10.0
11:43	39.3	23.3	17.43	3.03	8.7
11:44	38.2	9.6	17.45	3.02	10.2
11:45	38.0	14.3	17.48	3.00	10.6
11:46	37.5	16.1	17.48	3.00	10.3
11:47	37.4	50.5	17.42	3.04	14.2
11:48	38.4	45.8	17.39	3.07	8.0
11:49	38.0	4.4	17.38	3.09	8.1
11:50	37.9	18.3	17.36	3.10	8.4
11:51	37.4	16.2	17.31	3.13	9.4
11:52	36.9	28.6	17.29	3.16	16.5
11:53	38.0	71.9	17.26	3.19	9.8
11:54	37.7	6.3	17.27	3.17	10.1
11:55	36.3	15.0	17.33	3.13	11.0
11:56	36.1	10.8	17.35	3.12	9.5
11:57	36.1	23.5	17.35	3.12	10.7
11:58	35.7	70.6	17.39	3.09	12.9
11:59	36.1	16.7	17.44	3.04	7.5
12:00	36.3	9.4	17.52	2.99	9.1
12:01	36.2	11.3	17.58	2.94	9.6
12:02	35.4	13.5	17.67	2.86	9.9
12:03	34.8	43.7	17.80	2.76	14.2
12:04	35.3	32.7	17.82	2.75	9.4
12:05	34.8	3.3	17.83	2.74	9.5
12:06	34.4	13.5	17.87	2.72	8.7
12:07	34.3	9.6	17.85	2.72	7.8
12:08	33.6	19.0	17.87	2.72	12.9
12:09	34.4	55.6	17.92	2.68	8.0
12:10	34.1	4.7	17.93	2.66	9.0

AVERAGE VALUES FOR THE LAST 30 MINUTES

12:10	36.5	26.2	17.53	2.97	10.3
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COMMENTS: end part 1 run 1
rtos-2

Louisiana-Pacific Corp - Roxboro OSB Plant 08-09-1996

	CHAN 7	CHAN 4	CHAN 5	CHAN 1	CHAN 3
	RTO-2S	RTO-2S	RTO-2S	RTO-2S	RTO-2S
TIME	ppmNOx	ppm CO	% O2	% CO2	ppm C
12:19	29.3	33.9	18.24	2.36	12.6
12:20	28.5	24.0	18.34	2.27	7.6
12:21	27.1	1.9	18.45	2.17	7.7
12:22	26.9	6.5	18.48	2.15	8.1
12:23	26.6	6.4	18.48	2.13	8.6
12:24	26.1	13.9	18.50	2.12	12.9
12:25	26.9	41.9	18.47	2.15	7.9
12:26	27.7	3.1	18.41	2.19	8.6
12:27	27.6	6.4	18.38	2.22	8.9
12:28	28.4	5.7	18.32	2.28	8.1
12:29	29.5	13.6	18.24	2.36	10.9
12:30	29.9	54.7	18.20	2.39	9.4
12:31	30.0	9.3	18.20	2.38	6.1
12:32	29.8	6.5	18.21	2.37	7.7
12:33	29.5	6.1	18.19	2.38	8.1
12:34	29.2	8.0	18.20	2.37	9.1
12:35	28.5	38.5	18.26	2.32	13.3
12:36	29.0	21.5	18.24	2.33	8.6
12:37	28.1	2.6	18.33	2.25	9.2
12:38	26.0	7.7	18.48	2.13	9.0
12:39	24.4	5.2	18.58	2.04	8.9
12:40	23.8	14.0	18.60	2.02	11.9
12:41	23.7	35.9	18.64	2.00	6.4
12:42	23.8	2.2	18.63	2.00	7.6
12:43	23.8	6.4	18.62	2.02	7.8
12:44	24.1	3.9	18.57	2.05	7.9
12:45	24.5	9.9	18.54	2.07	12.5
12:46	25.0	41.8	18.50	2.12	10.4
12:47	26.5	6.6	18.40	2.20	8.7
12:48	26.8	6.6	18.37	2.24	9.7

AVERAGE VALUES FOR THE LAST 30 MINUTES

12:48	27.0	14.8	18.40	2.20	9.1
			17.97	2.59	

COMMENTS: end part 2 run 1
rtos-2

CALIBRATION SUMMARY

SOURCE: Louisiana-Pacific Corp - Roxboro OSB Plant

REASON: POST RUN 1 SYSTEM BIAS CHECK - RTOS-2

DATE : 08-09-1996 TIME: 12:48 - 12:50

A/D CHAN	MONITOR DESCRIPTION	UNITS	GAS VALUE	MONITOR RESPONSE
5	RTO-2S	% O2	0.00	0.25
5	RTO-2S	% O2	12.06	11.94
1	RTO-2S	% CO2	0.00	0.09
1	RTO-2S	% CO2	11.02	10.89

Louisiana-Pacific Corp - Roxboro OSB Plant 08-09-1996

	CHAN 7	CHAN 4	CHAN 5	CHAN 1	CHAN 3
	RTOS-2	RTOS-2	RTOS-2	RTOS-2	RTOS-2
TIME	ppmNOx	ppm CO	% O2	% CO2	ppm C
13:16	29.2	17.0	18.13	2.42	13.2
13:17	29.1	49.6	18.16	2.41	10.6
13:18	29.6	11.5	18.13	2.43	8.2
13:19	29.9	10.2	18.13	2.44	10.4
13:20	30.7	11.6	18.04	2.51	9.7
13:21	30.7	15.1	18.03	2.52	10.1
13:22	29.9	49.8	18.09	2.47	15.1
13:23	30.5	27.4	18.09	2.47	9.2
13:24	30.6	5.2	18.09	2.47	10.5
13:25	30.7	15.2	18.06	2.50	9.8
13:26	30.7	12.1	18.04	2.52	9.7
13:27	29.5	25.4	18.09	2.48	13.3
13:28	29.7	49.0	18.14	2.43	8.2
13:29	29.1	7.2	18.19	2.39	8.5
13:30	28.8	12.5	18.18	2.40	8.4
13:31	29.4	8.7	18.14	2.43	8.7
13:32	29.5	16.5	18.11	2.46	14.2
13:33	29.4	53.5	18.15	2.43	10.8
13:34	29.8	14.0	18.12	2.44	9.2
13:35	28.8	10.5	18.19	2.39	10.4
13:36	28.6	8.5	18.19	2.39	9.3
13:37	28.8	15.8	18.16	2.42	8.6
13:38	28.8	49.7	18.18	2.40	14.4
13:39	29.0	27.9	18.18	2.40	8.3
13:40	28.7	5.7	18.20	2.38	9.7
13:41	28.8	13.8	18.18	2.39	9.8
13:42	28.3	13.4	18.20	2.38	10.5
13:43	27.6	27.7	18.22	2.36	15.6
13:44	28.1	48.5	18.24	2.35	9.4
13:45	27.8	5.8	18.26	2.32	9.4

AVERAGE VALUES FOR THE LAST 30 MINUTES

13:45	29.3	21.3	18.14	2.43	10.4
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COMMENTS: END PART 1 RUN 2
RTOS-2

Louisiana-Pacific Corp - Roxboro OSB Plant 08-09-1996

	CHAN 7	CHAN 4	CHAN 5	CHAN 1	CHAN 3
	RTOS-2	RTOS-2	RTOS-2	RTOS-2	RTOS-2
TIME	ppmNOx	ppm CO	% O2	% CO2	ppm C
13:51	27.0	13.0	18.33	2.29	10.7
13:52	27.3	8.4	18.30	2.30	10.1
13:53	27.4	17.8	18.29	2.32	10.6
13:54	27.6	56.8	18.30	2.31	16.4
13:55	28.7	22.0	18.22	2.38	8.5
13:56	29.4	7.6	18.18	2.42	9.1
13:57	29.2	12.7	18.19	2.41	9.5
13:58	28.1	15.9	18.22	2.38	9.7
13:59	27.3	41.1	18.29	2.32	15.2
14:00	28.2	47.8	18.28	2.33	9.7
14:01	27.9	5.7	18.29	2.32	10.6
14:02	28.1	16.7	18.27	2.33	9.7
14:03	27.9	13.4	18.28	2.34	10.0
14:04	27.3	24.8	18.25	2.33	17.1
14:05	28.2	67.0	18.23	2.33	10.2
14:06	28.8	12.8	18.21	2.35	9.0
14:07	28.3	14.3	18.23	2.34	10.1
14:08	28.5	10.6	18.19	2.36	9.1
14:09	28.7	21.5	18.17	2.38	10.2
14:10	28.8	70.2	18.20	2.37	15.7
14:11	29.2	23.4	18.18	2.38	7.9
14:12	29.3	9.4	18.18	2.37	9.4
14:13	29.6	13.4	18.17	2.39	9.5
14:14	29.0	15.9	18.18	2.38	9.0
14:15	29.3	53.1	18.18	2.38	15.1
14:16	30.4	50.3	18.13	2.41	9.2
14:17	30.2	6.9	18.14	2.40	9.5
14:18	29.9	19.8	18.18	2.38	8.5
14:19	29.7	15.7	18.17	2.38	9.0
14:20	29.0	33.7	18.19	2.35	15.8

AVERAGE VALUES FOR THE LAST 30 MINUTES

14:20	28.6	24.7	18.22	2.36	10.8
			18.18	2.40	

COMMENTS: END PART 2 RUN 2
RTOS-2

CALIBRATION SUMMARY

SOURCE: Louisiana-Pacific Corp - Roxboro OSB Plant

REASON: POST RUN 2 PRE RUN 3 SYSTEM BIAS CHECK

DATE : 08-09-1996 TIME: 14:20 - 14:22

A/D CHAN	MONITOR DESCRIPTION	UNITS	GAS VALUE	MONITOR RESPONSE
5	RTOS-2	% O2	0.00	0.23
5	RTOS-2	% O2	12.06	11.95
1	RTOS-2	% CO2	0.00	0.07
1	RTOS-2	% CO2	11.02	10.86

Louisiana-Pacific Corp - Roxboro OSB Plant 08-09-1996

	CHAN 7	CHAN 4	CHAN 5	CHAN 1	CHAN 3
	RTOS-2	RTOS-2	RTOS-2	RTOS-2	RTOS-2
TIME	ppmNOx	ppm CO	% O2	% CO2	ppm C
15:21	21.3	15.9	20.09	0.48	9.8
15:22	24.3	16.2	20.16	0.44	8.5
15:23	23.9	15.5	20.14	0.46	10.2
15:24	20.9	29.3	20.09	0.49	16.8
15:25	20.8	70.1	20.12	0.46	9.4
15:26	20.9	27.0	20.10	0.45	9.6
15:27	20.1	12.9	20.11	0.43	8.7
15:28	19.6	18.0	20.09	0.49	8.3
15:29	19.4	25.1	20.02	0.53	16.6
15:30	31.9	80.2	17.71	2.70	12.7
15:31	35.5	36.8	16.83	3.36	5.9
15:32	34.1	28.3	16.66	3.51	11.1
15:33	34.5	28.5	16.63	3.53	9.7
15:34	33.7	50.1	16.67	3.50	12.3
15:35	34.1	141.3	16.73	3.47	20.4
15:36	35.4	64.7	16.76	3.44	11.2
15:37	35.3	13.4	16.83	3.39	11.8
15:38	36.1	30.2	16.85	3.38	11.9
15:39	36.2	28.5	16.88	3.35	12.7
15:40	36.4	68.9	16.90	3.35	18.5
15:41	38.3	88.6	16.87	3.38	10.7
15:42	38.4	13.9	16.83	3.40	10.2
15:43	37.9	24.5	16.84	3.39	8.8
15:44	38.4	22.1	16.85	3.39	9.1
15:45	38.3	51.0	16.84	3.39	16.3
15:46	38.0	113.0	16.79	3.44	10.7
15:47	38.8	32.3	16.72	3.49	7.0
15:48	38.0	23.7	16.73	3.48	9.1
15:49	38.0	20.2	16.66	3.54	8.1
15:50	36.8	47.2	16.63	3.60	9.5

AVERAGE VALUES FOR THE LAST 30 MINUTES

15:50	31.8	41.2	17.80	2.52	11.2
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COMMENTS: END PART 2 RUN 3
RTOS-2

APPENDIX B. FIELD DATA

5. Sampling Point Determinations and Cyclonic Flow Checks

Sampling and Velocity Traverse Point Determination EPA Method 1

CLIENT <u>LA PACIFIC CORP</u>										
PLANT NAME <u>ROXBORO OSB PLANT</u>										
CITY, STATE <u>ROXBORO, NC</u>										
SAMPLING LOCATION <u>DRYER EXHAUST #1</u>										
NO. OF PORTS AVAILABLE <u>1</u>										
NO. OF PORTS USED <u>1</u>										
PORT INSIDE DIAMETER <u>4"</u>										
DISTANCE FROM FAR WALL TO OUTSIDE OF PORT <u>48"</u>										
NIPPLE LENGTH AND/OR WALL THICKNESS <u>3"</u>										
DEPTH OF STACK OR DUCT <u>45"</u>										
STACK OR DUCT WIDTH (IF RECTANGULAR) <u>N/A</u>										
EQUIVALENT DIAMETER: $D_E = \frac{2 \times \text{DEPTH} \times \text{WIDTH}}{\text{DEPTH} + \text{WIDTH}} = \frac{2() ()}{() + ()} =$										
DISTANCE FROM PORTS TO FLOW DISTURBANCES	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th></th> <th>UPSTREAM</th> <th>DOWNSTREAM</th> </tr> <tr> <td></td> <td><u>~42"</u></td> <td><u>32"</u></td> </tr> <tr> <td>DIAMETERS</td> <td><u><1</u></td> <td><u><1</u></td> </tr> </table>		UPSTREAM	DOWNSTREAM		<u>~42"</u>	<u>32"</u>	DIAMETERS	<u><1</u>	<u><1</u>
	UPSTREAM	DOWNSTREAM								
	<u>~42"</u>	<u>32"</u>								
DIAMETERS	<u><1</u>	<u><1</u>								
STACK/DUCT AREA = $\pi R^2 = 1590.41 \text{ IN}^2$										

DRAW HORIZONTAL LINE THROUGH DIAMETERS

If more than 8 and 2 diameters and if duct dia. is less than 24", use 6 or 9 points.

VELOCITY		PARTICULATE	
		DIAMETERS	
		UP	DOWN
12	8	2.0	12
	7	1.75	
	6	1.5	
	5	1.25	
	4	1.0	
	3	0.75	
2	0.5	24 or 25	

PITOT USED (✓) TYPE "S" ✓ STANDARD _____

LOCATION OF POINTS IN CIRCULAR STACKS OR DUCTS

	4	6	8	10	12	14	16	18	20	22	24
1	6.7	4.4	3.2	2.6	2.1	1.8	1.6	1.4	1.3	1.1	1.1
2	25.0	14.6	10.6	8.2	6.7	5.7	4.9	4.4	3.9	3.6	3.2
3	75.0	29.8	19.4	14.6	11.8	9.9	8.5	7.5	6.7	6.0	5.5
4	93.3	70.4	52.3	42.6	37.7	32.6	28.5	25.0	22.0	19.7	17.9
5		85.4	67.7	54.2	45.0	39.1	34.0	30.0	26.6	23.8	21.6
6		95.6	80.6	65.8	55.6	48.6	42.6	37.5	33.3	30.0	27.2
7			89.5	77.4	64.4	53.6	46.6	40.5	35.4	31.2	28.1
8			96.8	85.4	75.0	63.4	54.0	46.6	40.5	35.4	31.2
9				91.8	82.3	73.1	62.5	54.0	46.6	40.5	35.4
10				97.4	88.2	79.9	71.7	61.8	54.0	46.6	40.5
11					93.3	85.4	78.0	70.4	61.2	53.3	46.6
12					97.9	90.1	83.1	76.4	69.4	60.7	53.8
13						94.3	87.5	81.2	75.0	68.5	60.2
14						98.2	91.6	85.4	79.6	73.8	67.7
15							95.1	89.1	83.5	78.2	72.8
16							98.4	92.6	87.1	82.0	77.0
17								95.6	90.3	85.4	80.6
18								98.6	93.3	88.4	83.9
19									96.1	91.3	86.8
20									98.7	94.0	89.5
21										96.5	92.1
22										98.9	94.5
23											96.8
24											96.9

LOCATION OF POINTS IN RECTANGULAR STACKS OR DUCTS

	2	3	4	5	6	7	8	9	10	11	12
1	25.0	16.7	12.5	10.0	8.3	7.1	6.3	5.6	5.0	4.5	4.2
2	75.0	50.0	37.5	30.0	25.0	21.4	18.8	16.7	15.0	13.6	12.5
3		83.3	62.5	50.0	41.7	35.7	31.3	27.8	25.0	22.7	20.8
4			87.5	70.0	58.3	50.0	43.8	38.9	35.0	31.8	29.2
5				90.0	75.0	64.3	56.3	50.0	45.0	40.9	37.5
6					91.7	78.6	69.8	61.1	55.0	50.0	45.8
7						92.9	81.3	72.2	65.0	59.1	54.2
8							93.8	83.3	75.0	68.2	62.5
9								94.4	86.0	77.3	70.8
10									95.0	86.4	79.2
11										95.5	87.5
12											95.8

Sampling and Velocity Traverse Point Determination EPA Method 1

CLIENT LOUISIANA - PACIFIC COAL
 PLANT NAME ROCKWELL OSE PLANT
 CITY, STATE ROCKWELL, NC
 SAMPLING LOCATION DRYER INLET 2-5

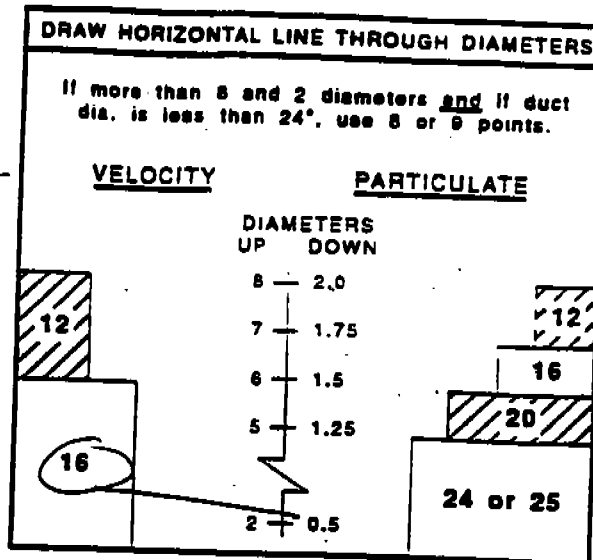
NO. OF PORTS AVAILABLE 1
 NO. OF PORTS USED 1
 PORT INSIDE DIAMETER 4"

DISTANCE FROM FAR WALL TO OUTSIDE OF PORT 48"
 NIPPLE LENGTH AND/OR WALL THICKNESS 3"
 DEPTH OF STACK OR DUCT 45"
 STACK OR DUCT WIDTH (IF RECTANGULAR) -

EQUIVALENT DIAMETER:
 $D_e = \frac{2 \times \text{DEPTH} \times \text{WIDTH}}{\text{DEPTH} + \text{WIDTH}} = \frac{2(45)(4)}{45 + 4} = 34.7$

DISTANCE FROM PORTS TO FLOW DISTURBANCES
 UPSTREAM ~300 DOWNSTREAM ~26
 DIAMETERS 6.667 0.578

STACK/DUCT AREA = $\pi \left(\frac{45}{2}\right)^2 = 1590.4 \text{ IN}^2$



PITOT USED (✓) TYPE "S" / STANDARD

POINT	% OF DUCT DEPTH	DISTANCE FROM INSIDE WALL	DISTANCE FROM OUTSIDE OF PORT
1	1.6	0.720	3 3/4
2	4.9	2.205	5 1/4
3	8.5	3.825	6 7/8
4	12.5	5.625	8 5/8
5	16.9	7.605	10 5/8
6	22.0	9.900	12 7/8
7	28.3	12.735	15 3/4
8	37.5	16.875	19 7/8
9	42.5	22.125	31 1/8
10	71.7	32.265	35 1/4
11	78.0	35.100	38 1/2
12	83.1	37.395	40 7/8
13	87.5	39.375	42 3/8
14	91.5	42.795	44 1/8
15	95.1	42.795	45 3/4
16	98.4	44.280	47 1/4
17			
18			
19			
20			
21			
22			
23			
24			
25			

LOCATION OF POINTS IN CIRCULAR STACKS OR DUCTS

	4	6	8	10	12	14	16	18	20	22	24
1	6.7	4.4	3.2	2.0	2.1	1.8	1.6	1.4	1.3	1.1	1.1
2	25.0	14.6	10.5	8.2	6.7	5.7	4.9	4.4	3.9	3.5	3.2
3	75.0	29.6	19.4	14.6	11.8	9.9	8.6	7.6	6.7	6.0	5.6
4	93.3	70.4	32.3	22.6	17.7	14.6	12.5	10.9	9.7	8.7	7.9
5		85.4	67.7	34.2	25.0	20.1	16.8	14.6	12.9	11.6	10.6
6		95.6	80.6	65.8	35.6	26.9	22.0	18.8	16.5	14.6	13.2
7			89.5	77.4	64.4	36.6	28.3	23.9	20.4	18.0	16.1
8			96.8	85.4	76.0	63.4	37.5	29.6	25.0	21.8	19.4
9				91.8	82.3	73.1	62.6	39.2	30.6	26.2	23.0
10				97.4	88.2	79.9	71.7	61.8	39.6	31.5	27.2
11					93.3	85.4	78.0	70.4	61.2	39.3	32.3
12					97.9	90.1	83.1	76.4	69.4	60.7	39.8
13						94.3	87.5	81.2	75.0	68.6	60.2
14						96.2	91.6	85.4	79.6	73.8	67.7
15							95.1	89.1	83.5	78.2	72.8
16							96.4	92.6	87.1	82.0	77.0
17								95.6	90.3	85.4	80.6
18								96.6	93.3	88.4	83.9
19									96.1	91.3	86.8
20									96.7	94.0	89.5
21										96.6	92.1
22											96.8
23											
24											

LOCATION OF POINTS IN RECTANGULAR STACKS OR DUCTS

	2	3	4	5	6	7	8	9	10	11	12
1	25.0	16.7	12.5	10.0	8.3	7.1	6.3	5.6	5.0	4.6	4.2
2	75.0	50.0	37.5	30.0	25.0	21.4	18.8	16.7	15.0	13.6	12.6
3		83.3	62.5	50.0	41.7	36.7	31.3	27.8	25.0	22.7	20.8
4			87.5	70.0	58.3	50.0	43.8	38.9	35.0	31.8	29.2
5				90.0	75.0	64.3	56.3	50.0	45.0	40.9	37.5
6					91.7	78.8	68.8	61.1	55.0	50.0	45.8
7						82.9	72.2	65.0	59.1	54.2	
8							83.3	75.0	68.2	62.5	
9								84.4	85.0	77.3	70.8
10									86.0	86.4	78.6
11										86.6	87.6
12											88.8

Page 1 of 1

Horizontal Duct Flyash/Dust Buildup > 1" Depth (✓)? Yes ☐ No ☒

Page 1 of 1

Job No. 15575

Date 8-07-96

Personnel DLS, CEN

Barometric Pres. (Pbar) _____ In. Hg Static Pres. (Pg) _____ In. H₂O

Pitot/Orifice ID 30 Pitot Coef. (C_p) .84 Pres. Gauge Set ID MS 33

Thermocouple ID N/A Duct Depth/Diameter 45" Width N/A
 Horizontal Duct Slope (Rise/Run) 0/100 ---Specify inches (") or feet (')---

Horizontal Duct Flyash/Dust Buildup > 1" Depth (✓)? Yes No

0840 - 0850

Avg.	7.4
------	-----

(OMIT IF AVERAGE OF YAW ANGLES $\leq 20^\circ$)

Avg. ΔP_v ***

Avg. ΔP_v ***

Avg. ΔP_v ***

*** Average $\Delta P_V = [(\Sigma \cos \phi \sqrt{\Delta P}) / n]^2$.

238

Page 1 of 1

Client LA. PACIFIC CORP
Plant Name ROXBORO OSB PLANT Job No. 15575
City/State ROXBORO, NC Date 8-07-96
Test Loc. DRYER EXHAUST #5 Personnel DLS, CEN
Barometric Pres. (Pbar) _____ In. Hg Static Pres. (Pg) _____ In. H₂O
Pitot/Orifice ID 30 Pitot Coef. (C_p) .84 Pres. Gauge Set ID MS 33
Thermocouple ID _____ Duct Depth/Diameter 45" Width N/A
Horizontal Duct Flyash/Dust Buildup > 1" Depth (✓)? Yes _____ No _____
-----Specify inches (") or feet (')-----

[illegible]

239

Sampling and Velocity Traverse Point Determination EPA Method 1

CLIENT Louisiana Pacific Corp.
 PLANT NAME Roxboro OSB Plant
 CITY, STATE Roxboro, NC
 SAMPLING LOCATION Pro #3 Inlet

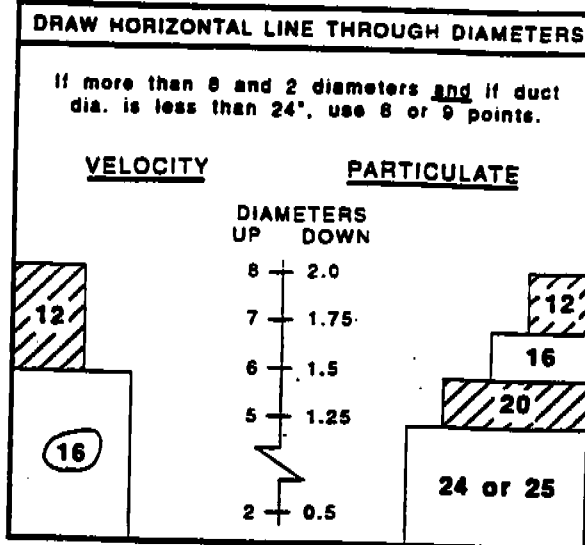
NO. OF PORTS AVAILABLE 1
 NO. OF PORTS USED 1
 PORT INSIDE DIAMETER 4"

DISTANCE FROM FAR WALL TO OUTSIDE OF PORT 84 1/2"
 NIPPLE LENGTH AND/OR WALL THICKNESS 3"
 DEPTH OF STACK OR DUCT 81 1/2"
 STACK OR DUCT WIDTH (IF RECTANGULAR) N/A

EQUIVALENT DIAMETER:
 $D_E = \frac{2 \times \text{DEPTH} \times \text{WIDTH}}{\text{DEPTH} + \text{WIDTH}} = \frac{2 () ()}{() + ()} =$

DISTANCE FROM PORTS TO FLOW DISTURBANCES
 UPSTREAM 62" DOWNSTREAM 46"
 DIAMETERS 21 21

STACK/DUCT AREA = πD^2 = 5,216.8 IN²



PITOT USED (✓) TYPE "S" ✓ STANDARD

POINT	% OF DUCT DEPTH	DISTANCE FROM INSIDE WALL	DISTANCE FROM OUTSIDE OF PORT
1	1.6	1.3	4 1/4
2	4.9	3.99	7
3	8.5	6.93	9 7/8
4	12.5	10.19	13 1/4
5	16.9	13.77	16 3/4
6	22.0	17.93	20 7/8
7	28.3	23.06	26 1/8
8	37.5	30.56	33 5/8
9	62.5	50.94	54
10	71.7	58.43	61 3/8
11	78.0	63.57	66 5/8
12	83.1	67.73	70 3/4
13	87.5	71.31	74 3/8
14	91.5	74.57	77 5/8
15	95.1	77.51	80 1/2
16	98.4	80.19	83 1/4
17			
18			
19			
20			
21			
22			
23			
24			
25			

LOCATION OF POINTS IN CIRCULAR STACKS OR DUCTS

	4	6	8	10	12	14	16	18	20	22	24
1	6.7	4.4	3.2	2.6	2.1	1.8	1.6	1.4	1.3	1.1	1.1
2	25.0	14.8	10.5	8.2	6.7	5.7	4.9	4.4	3.9	3.5	3.2
3	75.0	29.8	19.4	14.8	11.8	9.9	8.5	7.5	6.7	6.0	5.5
4	93.3	70.4	32.3	22.8	17.7	14.8	12.5	10.9	9.7	8.7	7.9
5		85.4	67.7	34.2	25.0	20.1	16.9	14.6	12.9	11.6	10.6
6		95.6	80.6	65.8	35.8	26.9	22.0	18.8	16.5	14.6	13.2
7			89.5	77.4	64.4	36.8	28.3	23.6	20.4	18.0	16.1
8			98.8	85.4	75.0	63.4	37.5	29.8	25.0	21.8	19.4
9				91.8	82.3	73.1	62.5	38.2	30.6	26.2	23.0
10				97.4	89.2	79.9	71.7	61.8	39.8	31.5	27.2
11					93.3	85.4	78.0	70.4	61.2	39.3	32.3
12					97.9	90.1	83.1	76.4	69.4	60.7	39.8
13						94.3	87.5	81.2	75.0	68.5	60.2
14						98.2	91.5	85.4	79.6	73.8	67.7
15							95.1	89.1	83.5	78.2	72.8
16							98.4	92.5	87.1	82.0	77.0
17								95.6	90.3	85.4	80.6
18								98.6	93.3	88.4	83.9
19									96.1	91.3	86.8
20									98.7	94.0	89.5
21										96.5	92.1
22										98.9	94.5
23											96.8
24											98.9

LOCATION OF POINTS IN RECTANGULAR STACKS OR DUCTS

	2	3	4	5	6	7	8	9	10	11	12
1	25.0	16.7	12.5	10.0	8.3	7.1	6.3	5.6	5.0	4.5	4.2
2	75.0	50.0	37.5	30.0	25.0	21.4	18.8	16.7	15.0	13.6	12.5
3		83.3	62.5	50.0	41.7	35.7	31.3	27.8	25.0	22.7	20.8
4			87.5	70.0	58.3	50.0	43.8	38.9	35.0	31.8	29.2
5				90.0	75.0	64.3	56.3	50.0	45.0	40.9	37.5
6					91.7	78.8	68.8	61.1	55.0	50.0	46.8
7						92.9	81.3	72.2	65.0	59.1	54.2
8							93.8	83.3	75.0	68.2	62.5
9								94.4	85.0	77.3	70.8
10									95.0	86.4	79.2
11										95.5	87.5
12											95.8

EPA Method 1

[illegible]F-0016 rev. 8-93

PITOT USED (✓) TYPE "S" ✓ STANDARD

* NPPLE LENGTH = $3\frac{1}{4}"$ w/ L BRACKET = $4"$
241

CYCLONIC FLOW DETERMINATIONS

Page of

client LOUISIANA - PACIFIC CORP

Plant Name Rox3020 058 Plant

City/State Roxboro NC

Test Loc. RTD #1 Stack

Job No. 15575

Date 8-25-6

Personnel JDE, PFD, JED

Barometric Pres. (Pbar) 29.5 In. Hg Static Pres. (Pg) 4/1 In. H₂O

Pitot/Orifice ID DP-120-6 Pitot Coef. (C_p) 87 Pres. Gauge Set ID MS-72

Thermocouple ID H/A Duct Depth/diameter 86 Width
Horizontal Duct Flange/Duct Building ---Specify inches (") or feet (')--

Horizontal Duct Flyash/Dust Buildup > 1" Depth (✓)? Yes No

PRELIMINARY TRAVERSES

Start - Finish Times:

1035 - 1100 ,

Test Pt.	Yaw Ang. ° ϕ	ΔP "H ₂ O	Temp. °F
A-1	-25	N/A	N/A
2	-19		
3	-21		
4	-20		
5	-20		
6	-8		
7	-5		
8	-6		
9	-6		
10	-8		
11	-9		
12	-11		
B-1	+28		
2	+17		
3	+12		
4	+12		
5	+7		
6	+4		
7	+4		
8	+5		
9	+3		
10	+3		
11	+3		
12	+2	↓	↓
Avg.	10-8		

ALIGNMENT APPROACH DATA

(OMIT IF AVERAGE OF YAW ANGLES $\leq 20^\circ$)

[illegible]

Note: Yaw angle average is sum of the absolute values divided by number of measurements, and must be $\leq 20^\circ$.

Δ^P average is square of average square root.

* From isokinetic sampling field data sheet.

**** Minutes/Point = cos ϕ (Base Time).**

*** Average $\Delta P_v = [(\Sigma \cos \phi \sqrt{\Delta P}) / n]^2$.

242

F-1107 rev. 7-93

Page of [illegible]

F-1107 rev. 7-93

APPENDIX C. ANALYTICAL DATA

METALS BLANK CORRECTION CALCULATIONS

Revised: 2/15/94

COMBINED

<u>Run Number, Metal</u>	<u>Filter</u> <u>Diameter</u> <u>(Inches)</u>	<u>p</u> <u>r</u> <u>e</u>	<u>Catch</u> <u>Weight</u> <u>(mt)</u>	<u>p</u> <u>r</u> <u>e</u>	<u>Blank</u> <u>Catch</u> <u>(mtb)</u>	<u>1 +</u> <u>1.4*Area</u> <u>(A)</u>	<u>5% mt</u> <u>(5mt)</u>	<u>Result</u> <u>to Use</u>
S1-M29-1, Cr	3.346		4.67		1.72	13.310	0.2335	2.95
S1-M29-2, Cr	3.346		12.6		1.72	13.310	0.63	10.9
S1-M29-3, Cr	3.346		4.95		1.72	13.310	0.2475	3.23
S2-M29-1, Cr	3.346		5.61		1.72	13.310	0.2805	3.89
S2-M29-2, Cr	3.346		6.34		1.72	13.310	0.317	4.62
S2-M29-3, Cr	3.346		7.64		1.72	13.310	0.382	5.92



Analytical and Consulting Chemists

1316 South Fifth Street

Wilmington, N.C. 28401

(910) 763-9793

Fax (910) 343-9688

DATE RECEIVED 08-13-96

DATE REPORTED 08-28-96

96W9297

PAGE 1 OF 2

ENTROPY ENVIRONMENTALIST INC.

P.O. # 13095-15575-18

P. O. BOX 12291

RESEARCH TRIANGLE PARK, NC 27709-2291

ATTENTION: DAVID BRINTLE

SAMPLE DESCRIPTION: METHOD 29

1. S1-M29-1
2. S1-M29-2
3. S1-M29-3
4. S1-M29-3 MATRIX SPIKE % RECOVERY
5. S2-M29-1
6. S2-M29-2

RESULTS

	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>
Chromium, as Cr, Total ug	4.67	12.6	4.95	106%	5.61	6.32



Analytical and Consulting Chemists

1316 South Fifth Street
Wilmington, N.C. 28401
(910) 763-9793
Fax (910) 343-9688

DATE RECEIVED 08-13-96
DATE REPORTED 08-28-96
96W9297

PAGE 2 OF 2

ENTROPY ENVIRONMENTALIST INC.
P. O. BOX 12291
RESEARCH TRIANGLE PARK, NC 27709-2291

P.O. # 13095-15575-18

ATTENTION: DAVID BRINTLE

SAMPLE DESCRIPTION: METHOD 29

- 7. S2-M29-2 DUPLICATE
- 8. S2-M29-3
- 9. S2-M29-FB
- 10. BLANKS
- 11. METHOD CODE - SW846

RESULTS

	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>	<u>11</u>
Chromium, as Cr, Total ug	6.36	7.64	1.69	1.72	200.8


ROGER C. OXFORD, CHEMIST

SAMPLE TRANSFER RECORD OF CUSTODY

Please include this form with the final (typed) results, and whenever the final results are faxed to Entropy.

The samples referenced in Entropy Environmentalists Inc. RFA or purchase order No. 13095-15575-18 were shipped by Entropy on 8/12/96 (date) via PONY EXPRESS (mode) to OXFORD LABS (laboratory) by Sam Ooley (signature)

The samples were received for analysis on 8-13-96 (date) at OLI (laboratory) by MBC (signature)

As applicable, note any broken seals, leakage, spillage, or damage to samples. If discrepancy, specify seal No., jar No., sample No., etc.

OXFORD LABORATORY INC.

SAMPLE NARRATIVE SUMMARY OLI # 96W9297
REPORT DATE: 08-27-96

CLIENT: ENTROPY
PROJECT # 13095-15575-18
SAMPLE ARRIVAL DATE: 08-13-96 CHAIN OF CUSTODY: YES
SAMPLE ARRIVAL CONDITION/COMMENT: SHIPPED via PONY EXPRESS.
NO PROBLEMS NOTED.
OBSERVED DISCREPANCY/COMMENT: ALL VOLUMES MARKED.
NO SAMPLE LOSS OBSERVED. pH <2
REQUESTED METHOD OF ANALYSIS: EPA METHOD 29

SAMPLE PREPARATION PER: METHOD 29
SAMPLE ANALYSIS PER: 200.8

INSTRUMENTATION USED:
PE 3030 FAA.....NO
PE 5100 FAA.....NO
PE ZEEMAN 5100 GFAA.....NO
PE ICP-MS ELAN 5000.....YES

QC REQUIREMENTS: SPIKE RECOVERY OF 90-110 PERCENT HAS BEEN MET
FOR DUPLICATES: RELATIVE PERCENT DIFFERENCE OF + OR - 10 PERCENT
WAS MET
LABORATORY CONTROL BLANK: LESS THAN
LABORATORY CONTROL SPIKE: 90-110 PERCENT HAS BEEN MET
DETECTION LIMIT: HAS BEEN MET
CALIBRATION VERIFICATION: OUTSIDE QC WAS MET (90% TO 110%)
CALIBRATION COEFFICIENT: ALL ELEMENTS AT LEAST .996
THIS DATA PACKAGE CONTAINS 3 SUMMARY PAGES TO INCLUDE THE
NARRATIVE SUMMARY: ALL PERTINENT DATA ON FILE AT OLI.
FRONT HALF & BACK HALF COMBINED FINAL VOLUMES ARE 100ml * 2

CALCULATION FOR TOTAL ug REPORTED

ICP-MS ug/L * DILUTION FACTOR * FINAL VOLUME / 1000 = TOTAL ug

12:09:03 Aug 27 1996

QUANTITATIVE ANALYSIS: DATA SET SUMMARY $Total_{ug} = \frac{ppb \times DF \times FV}{1000}$

Data Set: 08-27-96-1

Data Set Description:

Intensity	Std Dev	Conc.	Std Dev	Units	Int	Std
-----------	---------	-------	---------	-------	-----	-----

ANALYTE:Cr 52

PPB

X??X .2

 $Total_{ug}$
 ↓

053 DIL BLANK	-0.0563					
055 QC=50PPB	49.8152					
056 D.L.=1PPB	0.9634					
057 9297-BLK X4	0.3777	.30216				
058 9297-BLKX4+12.5	13.0494	101.3736%				
059 9297-1 X4	5.8386	4.67088	4.67			
060 9297-2 X4	15.8107	12.64856	12.6			
061 9297-3 X4	6.1936	4.95488	4.95			
071 9297-3 X4+20	27.3375	105.7195%	106%			
063 9297-5 X4	7.0089	5.60712	5.61			
064 9297-6 X4	7.9003	6.32024	6.32			
065 9297-6 X4DUP	7.9500	6.36	6.36			
066 9297-8 X4	9.5464	7.63712	7.64			
067 9297-9 X4	2.1094	1.68752	1.69			
068 9297-10 X4	2.1459	1.71672	1.72			
069 DIL BLANK	0.0607					
070 QC=50PPB	53.0757					

APPENDIX D. CALIBRATION DATA

1. Manual Test Methods

SAMPLING EQUIPMENT AUDIT

Plant Name LOUISIANA-PACIFIC, ROXBORO OSB PLANT Job No. 15575
 City/State ROXBORO, NC Auditor(s) JDK
 Test Loc. RTO #1 Stack Date 8-6-96

BAROMETER
 Entropy In-House Ref. Barometer _____ "Hg vs Field Barometer _____ "Hg
 Date Compared _____ Dev. _____ "Hg (Max. Allowable Dev.: ± 0.1 "Hg)
 Field Barometric Pressure Corrected for Test Location Elevation? (v) _____
 (Note: deduct 0.1" Hg from local NWS STATION pressure for each 100' of test location elevation; example: $29.6 - (300/100 \times 0.1) = 29.3$ "Hg.)

Ref. Therm. Initial Ambient Temp., °F	Allowable Deviation From Ambient	Ambient Temperature, °F	Audit OK (v)
THERMOMETERS*			
Dry Gas Meter	± 5.4 °F	_____ (Meterbox No. _____)	_____
Impinger Exit	± 2.0 °F	_____	_____
Filter Box	± 5.4 °F	_____	_____

* Adjust thermometer until acceptable. If it cannot be adjusted, use as backup. If no backup, record ambient temperature indicated by unadjusted thermometer and label with correction factor (indicate):

THERMOCOUPLES Allowable Deviation from Ambient: ± 8.0 °F* (± 2.0 °F)**

TC No. / °F	OK	TC No. / °F	OK	TC No. / °F	OK	TC No. / °F	OK	TC No. / °F	OK
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____

* ± 8.0 °F = $\pm 1.5\%$ of ambient absolute temperature.
 ** (± 2.0 °F if used in saturated or water droplet-laden gas stream.)

ISOKINETIC METERBOX I.D. N-20 Gamma (Y) 0.9981 AHE 1.779
 As Applicable (check): Zero Magnehelics? ☒ Zero/Level Manometer? _____
 Barometric Pressure (P_{bar}) 29.8 Auditor JDK Date 8-6-96

Dry Gas Meter Reading (Cubic Ft.)	Meter Temperature (°F)	Lower and Upper Limits for Audit Gamma
Final <u>147.287</u>	Final <u>91</u>	$0.96 \times Y = \underline{0.9582}$
Initial <u>139.678</u>	Initial <u>85</u>	$1.04 \times Y = \underline{1.0380}$

Dry Gas Volume Metered (Cubic Ft.)	Average Meter Temp. (°F)	Run Time (Base = 10)	
		(Minutes)	(Seconds)
V _m = <u>7.609</u>	T _m = <u>88</u>	<u>10</u>	<u>00</u>

0.75 = Ideal Sampling Rate

$$Y_c = \frac{[Min. + (Sec. / 60)]}{V_m} \times \left[\frac{[(29.92) / (460 + T_m) \times (0.75)^2] \times (T_m + 460)}{P_{bar}} \right]^{.5}$$

$$Y_c = \frac{[10 + (00 / 60)]}{7.609} \times \left[\frac{0.0319 ((88) + 460)}{29.8} \right]^{.5} = \underline{1.0066}$$

Audit Gamma

Audit Gamma Acceptable (between lower & upper limits)? (v) ☒ Yes ☐ No

SAMPLING EQUIPMENT AUDIT

Client Louisiana-Pacific
 Plant Louisiana-Pacific Job No. 15575
 City/State Roxboro, NC Team Leader DDH
 Test Location RTD #2

BAROMETER
 Barometer (Van) No. 29.8 Checked OK? (✓) ☒ Shop Auditor DDH
 Entropy In-House Ref. Barometer _____ °Hg VE Van Barometer _____ °Hg
 Date Compared _____ Dev. _____ °Hg (Max. Allowable Dev.: ± 0.1 °Hg)
 Test Loc. Elevation Above Ground (Van) 0 Ft. Date 8-6-76 Field Auditor DDH
 Field Barometric Pressure Reduced for Test Location Elevation by N/A °Hg

Ref. Therm. Initial Ambient Temp., °F _____ Allowable Deviation From Ambient _____ Date 8-6-76 Auditor DDH ✓ OK
 Ambient Temperature, °F _____

THERMOMETERS

	±	°F		°F	
Dry Gas Meter	±	5.4	°F	<u>72</u>	(Meterbox I.D. <u>N-24</u>) ✓
Impinger Exit	±	2.0	°F	<u>72</u>	✓
Filter Box	±	5.4	°F	<u>72</u>	✓

THERMOCOUPLES

TC No. / °F	✓ OK	TC No. / °F	✓ OK	TC No. / °F	✓ OK	TC No. / °F	✓ OK	TC No. / °F	✓ OK
<u>2133 / 72</u>	✓	<u>R474 / 72</u>	✓	<u>R454 / 72</u>	✓				
(Including Temp. Change and Direction)		(Including Temp. Change and Direction)		(Including Temp. Change and Direction)		(Including Temp. Change and Direction)		(Including Temp. Change and Direction)	
Auditor <u>DDH</u>		Auditor <u>DDH</u>		Auditor <u>DDH</u>		Auditor _____		Auditor _____	

* As applicable, ASTM ref. thermometer No. Allowable dev. from ambient = ±2°F

ISOKINETIC METERBOX
 I.D. N-24 Gamma (Y) .9978 ΔH₀ 1.839
 As Applicable (check): Zero Magnehelics? ☒ Zero/Level Manometer? _____
 Barometric Pressure (P_{bar}) 29.80 Auditor DDH Date _____

Dry Gas Meter Reading (Cubic Ft.)	Meter Temperature (°F)	Lower and Upper Limits for Audit Gamma	
Final <u>324.442</u>	Final <u>92</u>	0.96 * Y = <u>0.95788</u>	
Initial <u>316.829</u>	Initial <u>87</u>	1.04 * Y = <u>1.03771</u>	
Dry Gas Volume Metered (Cubic Ft.)	Average Meter Temp. (°F)	Run Time (Base = 10)	
V _m = <u>7.613</u>	T _m = <u>89.5</u>	(Minutes)	(Seconds)
		<u>10</u>	<u>0</u>

$$Y_c = \frac{[10 + (0 / 60)]}{7.613} \cdot \left[\frac{0.0319 (89.5 + 460)}{29.8} \right]^{.5} = \frac{1.00743}{\text{Audit Gamma}}$$

Audit Gamma Acceptable (between lower & upper limits)? (✓) Yes ☒ No _____
 Ideal Sampling Rate = 0.75

256

Positive Pressure Leak Check OK? Yes ☒ No _____

NOZZLE CALIBRATION

NOZZLE NUMBER GL 699

[illegible]

Note: 1. All diameters measured in inches.
2. Maximum 0.004 inches from lowest to highest diameter.

NOZZLE NUMBER

GL-1965

Note: 1. All diameters measured in inches. 258
2. Maximum 0.004 inches from lowest to highest diameter.
R-0013a rev. 3-91

NOZZLE NUMBER[illegible]

259

R-0033a rev. 3-91

NOZZLE NUMBER GL2280

NOZZLE NUMBER

GL2280

Note: 1. All diameters measured in inches.
2. Maximum 0.004 inches from lowest to highest ²⁶⁰diameter.

R-0033, rev. 3-91

NOZZLE NUMBER GL2305

Note: 1. All diameters measured in inches.
2. Maximum 0.004 inches from lowest to highest diameter.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Office of Air Quality Planning and Standards
Research Triangle Park, North Carolina 27711

MAY 24 1994

Mr. Roger T. Shigehara
Director, Research Division
Entropy Environmentalists, Inc.
Post Office Box 12291
Research Triangle Park, NC 27709-2291

Dear Mr. Shigehara:

This letter is written in response to your March 7, 1994 letter to Mr. Peter Westlin concerning an alternative to the post-test calibration procedure for the dry gas meter in section 5.3.2 of Method 5. A review of Entropy's proposed alternative procedure of the field calibration of the metering system in lieu of the post-test calibration, which usually requires the use of a spirometer or wet test meter in the laboratory, has been completed.

The Emission Measurement Branch finds this alternative acceptable and intends to propose the alternative procedure as a part of the proposed methods revision package. An Emission Measurement Technical Information Center (EMTIC) guidance document will be developed for this field calibration and placed on the EMTIC Bulletin Board System (BBS) in early June.

I appreciate this opportunity to be of service and trust this information will be helpful to you.

Sincerely,

Michael K. Ciolek

Michael K. Ciolek
Manufacturing and Combustion
Testing Section
Emission Measurement Branch

EMISSION MEASUREMENT TECHNICAL INFORMATION CENTER
GUIDELINE DOCUMENT

Alternative Method 5 Post-Test Calibration

INTRODUCTION AND BACKGROUND

EPA Method 5 requires the calibration of the metering system after each field use. Because the post-test calibration requires the use of a spirometer or wet test meter, the calibration is often conducted in the laboratory. However, a field calibration procedure is highly desirable for two reasons: (1) it eliminates questions about the possibility of the damage to the metering system occurring during transport and (2) it eliminates travel costs for a retest if the metering system fails the post-test calibration.

The alternative post-test calibration procedure described below is based on the principles of the optional pretest orifice meter coefficient check in Section 4.4.1 of Method 5. Since the orifice meter coefficient check will not detect leakages between the inlet of the metering system and the dry gas meter, the alternative procedure includes two additional steps: (1) a leak check from either the inlet of the sampling train or the inlet of the metering system and (2) a leak check of that portion of the sampling train from the pump to the orifice meter.

PROCEDURE

The alternative to the post-test calibration in Section 5.3.2 of Method 5 is as follows:

After each test run, do the following:

1. Ensure that the metering system has passed the post-test leak-check. If not, conduct a leak-check of the metering system from its inlet.
2. Conduct the leak-check of that portion of the train from the pump to the orifice meter as described in Section 5.6 of Method 5.
3. Calculate Y_m for each test run using the following equation:

$$Y_m = \frac{Q}{V_s} \sqrt{\frac{0.0319 T_s}{\Delta H_s (P_s + \Delta \frac{H_{avg}}{13.6})}} \frac{29}{M_g} (\sqrt{\Delta H})_{avg}$$

where:

- Y_c = dry gas meter calibration check value, dimensionless.
 θ = total run time, min.
 V_s = total sample volume measured by dry gas meter, dcf.
 T_s = absolute average dry gas meter temp., $^{\circ}\text{R}$.
 P_b = barometric pressure, in. Hg.
 $0.0319 = (29.92/528)(0.75)^2$ (in. Hg/ θ /R) cfm^2 .
 ΔH_m = average orifice meter differential, in. H_2O .
 ΔH_c = orifice meter calibration coefficient, in. H_2O .
 M_s = dry molecular weight of stack gas, lb/lb-mole.
29 = dry molecular weight of air, lb/lb-mole.
13.6 = specific gravity of mercury.

After each test run series, do the following:

4. Average the three or more Y_c 's obtained from the test run series and compare this average Y_c with the dry gas meter calibration factor, Y . The average Y_c must be within 5 percent of Y .
5. If the average Y_c does not meet the ± 5 percent criterion, recalibrate the meter over the full range of orifice settings, as detailed in Section 5.3.1 of Method 5. Then follow the procedure in Section 5.3.3 of Method 5.

REFERENCE

Roger T. Shigehara, P.G. Royals, and E.W. Steward,
"Alternative Method 5 Post-Test Calibration", Entropy, Inc,
contained in the EMTIC TSAR Library.

Standardized Critical Orifice Calibrations (K Factors)

Calibrated By P. Judd
Date 4/18/96
Orifice Set # 9046

Meterbox ID N31
Leak Check OK
Meterbox Gamma

	0.9967	0.9967	0.9967	0.9967	0.9967	0.9967	0.9967	0.9967
Orifice #	48		54		62		72	
Crit Vacuum	14	14	14	14	14	14	14	14
Pump Vac.	26.5	26.5	25	25	23	23	21	21
Run No.	1	2	1	2	1	2	1	2
DGM Initial Rdg, V_d	649.1	651.7	642.2	645.8	633.4	637.8	621.6	627.5
DGM Final Rdg, V_d	651.601	654.201	645.501	648.9	637.701	642.102	627.403	633.301
DGM temp Initial, t_d	110	110	111	112	114	112	111	114
DGM temp Final, t_d	111	111	113	114	116	114	114	116
Time, Min, M	5	5	5	5	5	5	5	5
Time, Sec, S	3	2	0	0	4	5	2	1
Delta H, ΔH	0.61	0.63	1.15	1.17	1.98	2	3.79	3.8
Bar Press, P_b	29.65	29.65	29.65	29.65	29.65	29.65	29.65	29.65
Amb Temp, t_{amb}	74	74	74	74	74	74	74	74
K factor, K'	0.3534	0.3546	0.4705	0.4696	0.6031	0.6034	0.8263	0.8252
Avg K'	0.3540		0.4701		0.6032		0.8258	
Deviation, %	0.17%		0.10%		0.02%		0.07%	

Maximum Deviation = 0.5% From Average.

$$K' = \frac{17.65(V_d - V_a)Y\left(P_b + \frac{\Delta H}{13.6}\right)\sqrt{t_{amb} + 460}}{P_b\left(\frac{t_d + t_a}{2} + 460\right)\left(M + \frac{S}{60}\right)}$$

Standardized Critical Orifice Calibrations (K Factors)

Calibrated By P. Judd
Date 10/3/95
Orifice Set # BE47-81

Meterbox ID N18
Leak Check OK
Meterbox Gamma

	0.9837	0.9837	0.9837	0.9837	0.9837	0.9837	0.9837	0.9837
Orifice #	47		55		63		73	
Crit Vacuum	17	17	17	17	17	17	17	17
Pump Vac.	24	24	23	23	21	21	19	19
Run No.	1	2	1	2	1	2	1	2
DGM Initial Rdg, V_d	654.2	656.5	659.2	662.4	665.9	670.1	695.3	700.8
DGM Final Rdg, V_d	656.401	658.7	662.303	665.5	669.904	674.201	700.7	706.201
DGM temp Initial, t_d	82	85	90	95	100	107	95	100
DGM temp Final, t_d	86	89	96	101	108	114	100	105
Time, Min, M	5	5	5	5	5	5	5	5
Time, Sec, S	7	3	7	3	0	4	4	2
Delta H, ΔH	0.51	0.51	1.06	1.06	1.86	1.86	3.2	3.2
Bar Press, P_b	29.44	29.44	29.44	29.44	29.44	29.44	29.44	29.44
Amb Temp, t_{amb}	77	77	77	77	77	77	77	77
K factor, K'	0.3186	0.3208	0.4424	0.4438	0.5739	0.5735	0.7753	0.7737
Avg K'	0.3197		0.4431		0.5737		0.7745	
Deviation, %	0.36%		0.16%		0.04%		0.11%	

Maximum Deviation = 0.5% From Average.

$$K' = \frac{17.65(V_d - V_d)Y\left(P_b + \frac{\Delta H}{13.6}\right)\sqrt{t_{amb} + 460}}{P_b\left(\frac{t_d + t_d}{2} + 460\right)\left(M + \frac{S}{60}\right)}$$

Isokinetic Meterbox Full-Test Calibration

Meterbox ID: N20
Calibrated by: P. Judd
Date: 5/16/96

Range Run No.	Low		Medium		High	
	1A	1B	2A	2B	3A	3B
Stand. Crit. Orifice (SCRIT)						
SCRIT ID#	47		63		73	
SCRIT K Factor	0.3197	0.3197	0.5737	0.5737	0.7745	0.7745
Min. SCRIT Vac., V_{cr} in. Hg	17	17	17	17	17	17
Amb Temp, t_{amb} °F	66	66	66	66	66	66
Bar. Pressure, P_b in. Hg	29.74	29.74	29.74	29.74	29.74	29.74
Meterbox (MB)						
Leak-check OK? (Y or N)	Y	Y	Y	Y	Y	Y
MB Orifice Delta H in. H ₂ O	0.56	0.58	1.91	1.93	3.38	3.4
Initial MB Vol. Reading, V_{di} acf	305.400	310.600	294.300	299.500	283.300	288.600
Final MB Vol. Reading, V_{df} acf	310.566	315.833	299.492	305.149	288.523	293.869
Difference ≥ 5.0 cf?	5.166	5.233	5.192	5.649	5.223	5.269
Initial MB Temp, t_{di} °F	108	111	101	104	90	96
Final MB Temp, t_{df} °F	111	115	104	109	96	103
Pump Vac ($> V_{cr}$ in. HG?)	24	24	22	22	20	20
Time, Minutes (M)	11	11	6	7	5	5
Time, Seconds (S)	30	30	30	0	0	0
Calculations						
M5 DGM Factor, Y_i	0.99986	0.99308	0.99335	0.99016	1.00449	1.00737
Average, $Y_{ab(avg)}$	0.9965		0.9918		1.0059	
Diff = $Y_{i(avg)} - Y_{ab(avg)}$ ($\leq \pm 0.02$)?	0.002	ok	0.006	ok	-0.008	ok
Delta H _{ei}	1.691	1.741	1.820	1.826	1.804	1.793
Average, Delta H _{ei}	1.716		1.823		1.799	
Diff=Delta H _{ei} - Delta H _{ei} ($\leq \pm 0.20$)?	0.063	ok	-0.044	ok	-0.019	ok

$Y_{i(avg)}$	0.9981
Delta H _{ei} (avg)	1.779

$$Y_i = \frac{K'P_b \left(\frac{t_{di} + t_{df}}{2} + 460 \right) \left(M + \frac{S}{60} \right)}{17.65(V_{df} - V_{di}) \left(P_b + \frac{\Delta H}{13.6} \right) \sqrt{t_{amb} + 460}}$$

$$\Delta H_{ei} = \frac{9.926 \Delta H \left(P_b + \frac{\Delta H}{13.6} \right) (t_{amb} + 460)}{(K'P_b)^2 \left(\frac{t_{di} + t_{df}}{2} + 460 \right)}$$

QA/QC Check

Completeness ☒ Legibility ☒ Accuracy ☒ Specifications ☒ Reasonableness ☒

Checked By: Sh. S. K. 5-16-96
 QC Administrator (Signature/Date)

Isokinetic Meterbox Post-Test Calibration

Job Name: LA. PACIFIC CORP.
 Calibrated by: P. Judd
 Date: 8/16/96
 Full-Test Date: 5/16/96

Job Number: 15575
 Meterbox: N20
 Delta H_@: 1.779
 Gamma Y_{mb}: 0.9981

Run No.	1	2	3
Stand, Crit. Orifice (SCRIT)			
SCRIT ID#	63	63	63
SCRIT K Factor	0.5737	0.5737	0.5737
Min. SCRIT Vac., V _{cr} in. Hg	17	17	17
Amb Temp, t _{amb} °F	74	74	74
Bar. Pressure, P _b in. Hg	29.67	29.67	29.67
Meterbox (MB)			
Leak-check OK? (Y or N)	Y	Y	Y
Post-test Orifice Delta H in. H ₂ O	1.85	1.87	1.89
Initial MB Vol. Reading, V _a acf	427.500	432.700	437.900
Final MB Vol. Reading, V _a acf	432.611	437.863	443.114
Difference ≥ 5.0 cft?	5.111	5.163	5.214
Initial MB Temp, t _a °F	88	94	100
Final MB Temp, t _a °F	94	100	106
Pump Vac (> V _{cr} in. HG?)	22	22	22
Time, Minutes (M)	6	6	6
Time, Seconds (S)	30	30	30
DGM Factor, Y _i	0.9812	0.9818	0.9828
Post-Test Average Y _(avg)			0.9819
Deviation From Full-Test: < ± 5.0%?			-1.6%

For Y_i and Delta H_@ equations, see accompanying Full-Test Calibration.

Note: EPA Method 5 does not require a post-test calibration check on Delta H_@.			
Delta H _@	1.831	1.831	1.831
Post-Test Average Delta H _{@(avg)}			1.831
Deviation From Full-Test: < ± 10%?			2.9%

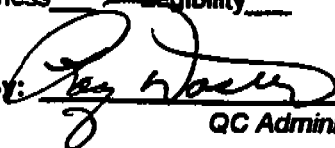
Pressure Gauge Post-Test Calibrations

	Pressure Gauge Used	Readings, in. H ₂ O		Deviation, %* (< ± 5.0%)
		Press. Gauge	Inclined Manometer	
Delta p	0 - 0.5"	0.4	0.4	0.0
	0 - 2"	0.8	0.795	0.5
	0 - 2"	1.2	1.2	0.0
Delta H	0 - 2"	1.9	1.9	0.0

* Dev. % = ((Press. Gauge - Inclined Manometer) / Inclined Manometer) * 100

QC Check

Completeness _____ Legibility _____ Accuracy _____ Specifications _____ Reasonableness _____

Checked By:  8-19-96
 QC Administrator (Signature/Date)

Isokinetic Meterbox Full-Test Calibration

Meterbox ID: **N24**
 Calibrated by: **P. Judd**
 Date: **5/6/96**

Range Run No.	Low		Medium		High	
	1A	1B	2A	2B	3A	3B
Stand. Crit. Orifice (SCRIT)						
SCRIT ID#	4847	5475	6263	5475	7273	5475
SCRIT K' Factor	0.3197	0.3197	0.5737	0.5737	0.7745	0.7745
Min. SCRIT Vac., V_{cr} in. Hg	17	17	17	17	17	17
Amb Temp, t_{amb} °F	74	74	74	74	74	74
Bar. Pressure, P_b in. Hg	29.53	29.53	29.53	29.53	29.53	29.53
Meterbox (MB)						
Leak-check OK? (Y or N)	Y	Y	Y	Y	Y	Y
MB Orifice Delta H in. H ₂ O	0.55	0.55	1.98	2	3.41	3.43
Initial MB Vol. Reading, V_{di} acf	445.400	450.800	468.000	473.300	457.000	462.300
Final MB Vol. Reading, V_{df} acf	450.326	455.744	473.207	478.565	462.246	467.590
Difference ≥ 5.0 cf?	4.926	4.944	5.207	5.265	5.246	5.290
Initial MB Temp, t_{di} °F	84	86	107	111	92	101
Final MB Temp, t_{df} °F	92	89	111	116	101	108
Pump Vac ($> V_{cr}$ in. HG?)	23	23	19	19	17	17
Time, Minutes (M)	11	11	6	6	5	5
Time, Seconds (S)	30	30	30	30	0	0
Calculations						
M5 DGM Factor, Y_i	1.00142	0.99687	0.99420	0.99097	0.99871	1.00459
Average, $Y_{ab(avg)}$	0.9991		0.9926		1.0017	
Diff = $Y_{i(avg)} - Y_{ab(avg)}$ ($\leq \pm 0.02$)?	-0.001	ok	0.005	ok	-0.004	ok
Delta H_{ei}	1.765	1.767	1.907	1.911	1.849	1.834
Average, Delta $H_{ei(ab(avg))}$	1.766		1.909		1.841	
Diff=Delta $H_{ei(ab(avg))} - \Delta H_{ei}$ ($\leq \pm 0.20$)?	0.073	ok	-0.070	ok	-0.003	ok

$Y_{i(avg)}$	0.9978
Delta $H_{ei(ab(avg))}$	1.839

$$Y_i = \frac{K'P_b \left(\frac{t_{di} + t_{df}}{2} + 460 \right) \left(M + \frac{S}{60} \right)}{17.65(V_{df} - V_{di}) \left(P_b + \frac{\Delta H}{13.6} \right) \sqrt{t_{amb} + 460}}$$

$$\Delta H_{ei} = \frac{9.926 \Delta H \left(P_b + \frac{\Delta H}{13.6} \right) (t_{amb} + 460)}{(K'P_b)^2 \left(\frac{t_{di} + t_{df}}{2} + 460 \right)}$$

QA/QC Check

Completeness ☒
 Legibility ☒
 Accuracy ☒
 Specifications ☒
 Reasonableness ☒

Checked By: *P. Judd* 5-6-96
 QC Administrator (Signature/Date)

Isokinetic Meterbox Post-Test Calibration

Job Name: LA. PACIFIC CORP.
 Calibrated by: P. Judd
 Date: 8/16/96
 Full-Test Date: 5/6/96

Job Number: 15575
 Meterbox: N24
 Delta H_{gint}: 1.839
 Gamma Y_{int}: 0.9978

Run No.	1	2	3
Stand. Crit. Orifice (SCRIT)			
SCRIT ID#	63	63	63
SCRIT K' Factor	0.5737	0.5737	0.5737
Min. SCRIT Vac., V _{cr} in. Hg	17	17	17
Amb Temp, t _{amb} °F	74	74	74
Bar. Pressure, Pb in. Hg	29.67	29.67	29.67
Meterbox (MB)			
Leak-check OK? (Y or N)	Y	Y	Y
Post-test Orifice Delta H in. H ₂ O	1.93	1.95	1.97
Initial MB Vol. Reading, V _a acf	680.700	685.800	691.000
Final MB Vol. Reading, V _a acf	685.763	690.900	696.144
Difference ≥ 5.0 ccf?	5.063	5.100	5.144
Initial MB Temp, t _a °F	83	88	94
Final MB Temp, t _a °F	88	94	100
Pump Vac (> V _{cr} in. HG?)	20	20	20
Time, Minutes (M)	6	6	6
Time, Seconds (S)	30	30	30
DGM Factor, Y _i	0.9804	0.9830	0.9852
Post-Test Average Y _(avg)			0.9829
Deviation From Full-Test: < ± 5.0%?			-1.5%

For Y_i and Delta H_g equations, see accompanying Full-Test Calibration.

Note: EPA Method 5 does not require a post-test calibration check on Delta H_g.			
Delta H _g	1.930	1.930	1.929
Post-Test Average Delta H _{g(avg)}			1.930
Deviation From Full-Test: < ± 10%?			4.9%

Pressure Gauge Post-Test Calibrations

	Pressure Gauge Used	Readings, in. H ₂ O		Deviation, %* ($< \pm 5.0\%$)
		Press. Gauge	Inclined Manometer	
Delta p	0 - 0.5"	0.3	0.29	3.4
	0 - 2"	0.6	0.6	0.0
	0 - 2"	0.9	0.91	-1.1
Delta H	0 - 2"	1.8	1.8	0.0

* Dev.% = ((Press. Gauge - Inclined Manometer) / Inclined Manometer) * 100

QC Check
 Completeness _____ Legibility _____ Accuracy _____ Specifications _____ Reasonableness _____

Checked By: Ray Doster 8-19-96
 QC Administrator (Signature/Date)

Isokinetic Meterbox Full-Test Calibration

Meterbox ID: N29
Calibrated by: P. Judd
Date: 5/15/96

Range Run No.	Low		Medium		High	
	1A	1B	2A	2B	3A	3B
Stand. Crit. Orifice (SCRIT)						
SCRIT ID#	47		63		73	
SCRIT K' Factor	0.3197	0.3197	0.5737	0.5737	0.7745	0.7745
Min. SCRIT Vac., V_{cr} in. Hg	17	17	17	17	17	17
Amb Temp, t_{amb} °F	67	67	67	67	67	67
Bar. Pressure, P_b in. Hg	29.95	29.95	29.95	29.95	29.95	29.95
Meterbox (MB)						
Leak-check OK? (Y or N)	Y	Y	Y	Y	Y	Y
MB Orifice Delta H in. H ₂ O	0.63	0.65	1.95	1.97	3.41	3.43
Initial MB Vol. Reading, V_{di} acf	592.600	597.700	582.000	587.200	570.400	576.100
Final MB Vol. Reading, V_{df} acf	597.643	602.769	587.119	592.367	576.066	581.279
Difference ≥ 5.0 cf?	5.043	5.069	5.119	5.167	5.666	5.179
Initial MB Temp, t_{di} °F	103	107	94	99	83	88
Final MB Temp, t_{df} °F	107	114	99	105	89	95
Pump Vac ($> V_{cr}$ in. HG?)	23	23	20	20	18	18
Time, Minutes (M)	11	11	6	6	5	5
Time, Seconds (S)	30	30	30	30	30	0
Calculations						
M5 DGM Factor, Y_i	1.01503	1.01960	0.99576	0.99621	1.00488	1.00925
Average, $Y_{ab(avg)}$	1.0173		0.9950		1.0070	
Diff = $Y_{i(avg)} - Y_{ab(avg)}$ ($\leq \pm 0.02$)?	-0.011	ok	0.011	ok	0.000	ok
Delta H_{di}	1.908	1.950	1.868	1.869	1.834	1.826
Average, Delta $H_{di(ab(avg))}$	1.929		1.869		1.830	
Diff = Delta $H_{di(i(avg))} - \Delta H_{di(ab(avg))}$ ($\leq \pm 0.20$)?	-0.053	ok	0.007	ok	0.046	ok

$Y_{i(avg)}$	1.0068
Delta $H_{di(i(avg))}$	1.876

$$Y_i = \frac{K'P_b \left(\frac{t_{di} + t_{df}}{2} + 460 \right) \left(M + \frac{S}{60} \right)}{17.65(V_{df} - V_{di}) \left(P_b + \frac{\Delta H}{13.6} \right) \sqrt{t_{amb} + 460}}$$

$$\Delta H_{di} = \frac{9.926 \Delta H \left(P_b + \frac{\Delta H}{13.6} \right) (t_{amb} + 460)}{(K'P_b)^2 \left(\frac{t_{di} + t_{df}}{2} + 460 \right)}$$

QA/QC Check

Completeness ☒ Legibility ☒ Accuracy ☒ Specifications ☒ Reasonableness ☒

Checked By: Joe Scholone 5-15-96

QC Administrator (Signature/Date)

Isokinetic Meterbox Post-Test Calibration

Job Name: LA. PACIFIC CORP.
 Calibrated by: P. Judd
 Date: 8/20/96
 Full-Test Date: 5/15/96

Job Number: 15575
 Meterbox: N29
 Delta H_{@int}: 1.876
 Gamma Y_{int}: 1.0068

Run No.	1	2	3
Stand. Crit. Orifice (SCRIT)			
SCRIT ID#	63	63	63
SCRIT K' Factor	0.5737	0.5727	0.5737
Min. SCRIT Vac., V _{cr} in. Hg	17	17	17
Amb Temp, t _{amb} °F	75	75	75
Bar. Pressure, Pb in. Hg	29.83	29.83	29.83
Meterbox (MB)			
Leak-check OK? (Y or N)	Y	Y	Y
Post-test Orifice Delta H in. H ₂ O	1.93	1.95	1.97
Initial MB Vol. Reading, V _d acf	23.200	29.100	34.200
Final MB Vol. Reading, V _d acf	29.020	34.156	39.304
Difference ≥ 5.0 cft?	5.820	5.056	5.104
Initial MB Temp, t _d °F	91	96	102
Final MB Temp, t _d °F	96	102	108
Pump Vac (> V _{cr} in. HG?)	20	20	20
Time, Minutes (M)	7	6	6
Time, Seconds (S)	30	30	30
DGM Factor, Y _i	0.9976	1.0051	1.0083
Post-Test Average Y _(avg)			1.0030
Deviation From Full-Test: < ± 5.0%?			-0.4%

For Y_i and Delta H_@ equations, see accompanying Full-Test Calibration.

Note: EPA Method 5 does not require a post-test calibration check on Delta H_@.			
Delta H _@	1.895	1.896	1.895
Post-Test Average Delta H _{@(avg)}			1.895
Deviation From Full-Test: < ± 10%?			1.0%

Pressure Gauge Post-Test Calibrations

	Pressure Gauge Used	Readings, in. H ₂ O		Deviation, %* (< ± 5.0%?)
		Press. Gauge	Inclined Manometer	
Delta p	#N/A			NA
	#N/A			NA
	#N/A			NA
Delta H	0 - 2"	1.9	1.9	0.0

* Dev. % = ((Press. Gauge - Inclined Manometer) / Inclined Manometer) * 100

QC Check

Completeness___ Legibility___ Accuracy___ Specifications___ Reasonableness___

Checked By: [Signature] 8-22-96
 QC Administrator (Signature/Date)

THERMOCOUPLE CALIBRATION

THERMOCOUPLE No. P-428

Date 10-11-95

Calibrated By Cus

Barometric Pressure, "Hg 29.74

Ambient Temperature, °F 76°

Calibration System Used	Ref. Digital Thermometer & Thermocouple I.D. Nos.	Reference Thermocouple Temperature (T _r °F)	Test Digital Thermometer I.D. No.	Test Thermocouple Temperature (T _t °F)	Temperature Diff., % (Allowable: ≤ 1.5 %)
ICE BATH	T-10289	31.8	F56	32.3	0.1
		31.8		32.4	↓
		31.7		32.2	↓
BOILING WATER		211.8	F56	210.8	0.1
		211.6		210.6	↓
		211.7		210.8	↓
BOILING OIL	✓	399.2	F56	398.4	0.1
		399.4		398.2	0.1
		399.6		398.2	0.2

$$\text{Temperature Difference} = \frac{T_r - T_t}{T_r + 460} \times 100$$

THERMOCOUPLE CALIBRATION

THERMOCOUPLE No. R430

Date 1-12-95

Calibrated By MBC

Barometric Pressure, "Hg 29.80

Ambient Temperature, °F 71.7

Calibration System Used	Ref. Digital Thermometer & Thermocouple I.D. Nos.	Reference Thermocouple Temperature (T _r °F)	Test Digital Thermometer I.D. No.	Test Thermocouple Temperature (T _t °F)	Temperature Diff., % (Allowable: ≤ 1.5 %)
ICE BATH	T-102829	31.7	F68 test TC	32.2	0.1
		31.8		32.2	0.1
		31.7		32.2	0.1
BOILING WATER		211.7	F68 test TC	210.8	0.1
		211.6		210.8	0.1
		211.7		210.6	0.1
BOILING OIL		395.3	F68 test TC	392.6	0.3
		400.8		399.0	0.2
		398.5		396.8	0.2

$$\text{Temperature Difference} = \frac{T_r - T_t}{T_r + 460} \times 100$$

THERMOCOUPLE CALIBRATION

THERMOCOUPLE No. R-438

Date 10-11-95

Calibrated By CMS

Barometric Pressure, "Hg 29.74

Ambient Temperature, °F 76 °

Calibration System Used	Ref. Digital Thermometer & Thermocouple I.D. Nos.	Reference Thermocouple Temperature (T _r °F)	Test Digital Thermometer I.D. No.	Test Thermocouple Temperature (T _t °F)	Temperature Diff., % (Allowable: ≤ 1.5 %)
ICE BATH	T 102524	31.8	F-117	32.8	0.2
		31.8		32.8	↓
		31.8		32.8	↓
BOILING WATER		211.8	F-117	210.8	0.1
		211.8		210.6	↓
		211.9		210.6	↓
BOILING OIL	✓	396.2	F-117	397.8	0.2
		396.2		397.8	
		396.2		397.7	

$$\text{Temperature Difference} = \frac{T_r - T_t}{T_r + 460} \times 100$$

THERMOCOUPLE CALIBRATION

THERMOCOUPLE No. R 447

Date 10-11-95

Calibrated By CAS

Barometric Pressure, "Hg 29.74

Ambient Temperature, °F 76 °

Calibration System Used	Ref. Digital Thermometer & Thermocouple I.D. Nos.	Reference Thermocouple Temperature (T _r °F)	Test Digital Thermometer I.D. No.	Test Thermocouple Temperature (T _t °F)	Temperature Diff., % (Allowable: ≤ 1.5 %)
ICE BATH	T-10289	31.4	F56	32.3	0.1
		31.7		32.2	↓
		31.5		32.1	↓
BOILING WATER		211.6	F56	210.8	0.1
		211.8		210.6	↓
		211.8		210.6	↓
BOILING OIL		398.6	F56	398.7	0
		398.4		398.6	↓
		398.5		398.8	↓

$$\text{Temperature Difference} = \frac{T_r - T_t}{T_r + 460} \times 100$$

THERMOCOUPLE CALIBRATION

THERMOCOUPLE No. R 451

Date 10-11-95

Calibrated By cm

Barometric Pressure, "Hg 29.74

Ambient Temperature, °F 76°

Calibration System Used	Ref. Digital Thermometer & Thermocouple I.D. Nos.	Reference Thermocouple Temperature (T _r °F)	Test Digital Thermometer I.D. No.	Test Thermocouple Temperature (T _t °F)	Temperature Diff., % (Allowable: ≤ 1.5 %)
ICE BATH	T 102 824	31.8	F 117	32.8	0.2
		31.8		32.8	↓
		31.8		32.8	↓
BOILING WATER		211.8	F 117	210.8	0.1
		211.8		210.8	↓
		211.8		210.8	↓
BOILING OIL	✓	346.4	F 117	348.4	0.2
		346.4		348.6	↓
		346.4		348.6	↓

$$\text{Temperature Difference} = \frac{T_r - T_t}{T_r + 460} \times 100$$

THERMOCOUPLE CALIBRATION

THERMOCOUPLE No. R. 454

Date 10-11-95

Calibrated By Cms

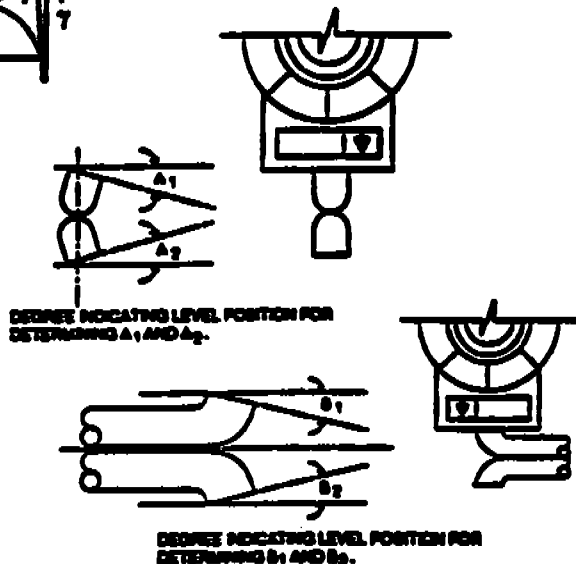
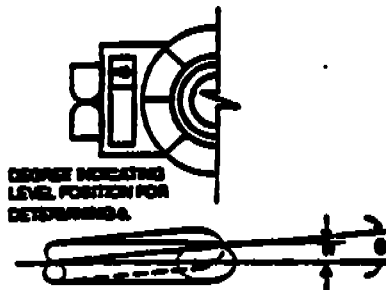
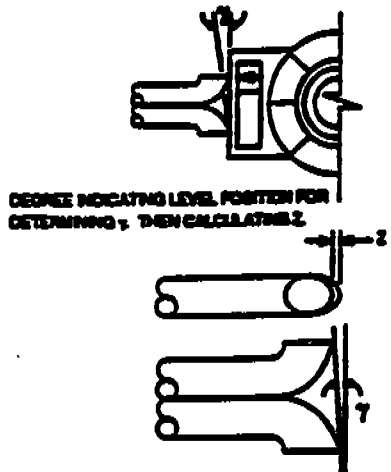
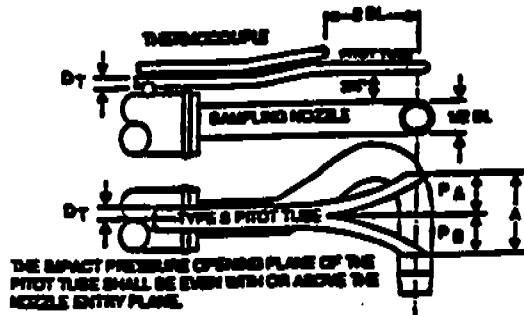
Barometric Pressure, "Hg 29.74

Ambient Temperature, °F 76°

Calibration System Used	Ref. Digital Thermometer & Thermocouple I.D. Nos.	Reference Thermocouple Temperature (T _r °F)	Test Digital Thermometer I.D. No.	Test Thermocouple Temperature (T _t °F)	Temperature Diff., % (Allowable: ≤ 1.5 %)
ICE BATH	T10284	31.7	F117	33.0	0.3
		31.8		33.0	0.2
		31.8		32.9	0.2
BOILING WATER		211.8	F111	210.8	0.1
		211.8		210.8	↓
		211.8		210.6	↓
BOILING OIL	✓	396.8	F117	398.8	0.2
		396.6		398.8	↓
		396.6		398.7	↓

$$\text{Temperature Difference} = \frac{T_r - T_t}{T_r + 460} \times 100$$

PITOT TUBE INSPECTION



level?	Yes
obstructions?	None
damaged?	None
$-10^\circ < \alpha_1 < +10^\circ$	0
$-10^\circ < \alpha_2 < +10^\circ$	0
$-5^\circ < B_1 < +5^\circ$	0
$-5^\circ < B_2 < +5^\circ$	0
γ	0
θ	0
A	.925
$1.05 D_1 < P_1 < 1.5 D_1$	.462
$1.05 D_2 < P_2 < 1.5 D_2$	.463
$3/16^\circ < D_1 < 3/8^\circ$	.375
$A \tan \gamma < 0.125^\circ$	0
$A \tan \theta < 0.03125^\circ$	0
$P_1 = P_2 \pm 0.003^\circ$	Yes .001

See 40 CFR 60, Vol. 42 No. 160 EPA Method 2. Verify the minimum 2-inch setback of the thermocouple and the minimum 3/4-inch separation between the pitot tube and the nozzle as shown at the top of this page.

Comments: _____

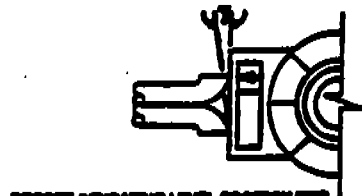
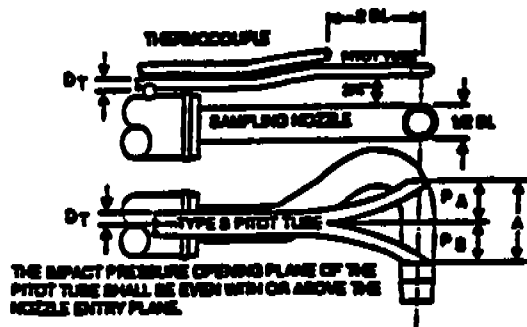
I certify that pitot tube/probe number 9-1 meets or exceeds all specifications, criteria and/or applicable design features and is hereby assigned a pitot tube calibration factor of 0.84.

Signature W. L. Shultz

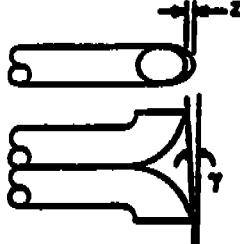
Date 12-26-91

R-0028 rev. 3/80

PITOT TUBE INSPECTION



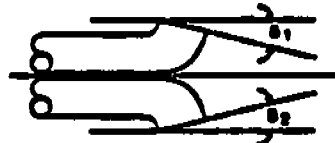
DEGREE INDICATING LEVEL POSITION FOR DETERMINING z , THEN CALCULATING z .



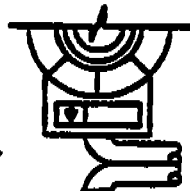
DEGREE INDICATING LEVEL POSITION FOR DETERMINING A .



DEGREE INDICATING LEVEL POSITION FOR DETERMINING A_1 AND A_2 .



DEGREE INDICATING LEVEL POSITION FOR DETERMINING B_1 AND B_2 .



level?	Yes
obstructions?	None
damaged?	None
$-10^\circ < \alpha_1 < +10^\circ$	0
$-10^\circ < \alpha_2 < +10^\circ$	0
$-5^\circ < B_1 < +5^\circ$	0
$-5^\circ < B_2 < +5^\circ$	0
T	0
θ	0
A	.941
$1.05 D_1 < P_1 < 1.5 D_1$	.473
$1.05 D_2 < P_2 < 1.5 D_2$	.468
$3/16^\circ < \theta < 3/8^\circ$	.375
$A \tan \gamma < 0.125^\circ$	0
$A \tan \theta < 0.03125^\circ$	0
$P_1 = P_2 \pm 0.005^\circ$	Yes .005

See 40 CFR 60, Vol. 42 No. 160 EPA Method 2. Verify the minimum 2-inch setback of the thermocouple and the minimum 3/4-inch separation between the pitot tube and the nozzle as shown at the top of this page.

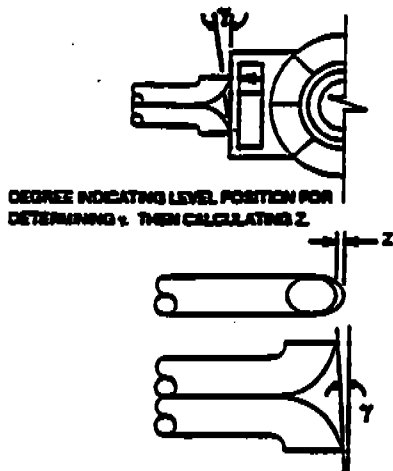
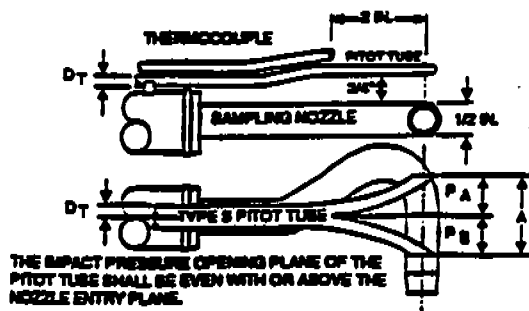
Comments: _____

I certify that pitot tube/probe number 9-23 meets or exceeds all specifications, criteria and/or applicable design features and is hereby assigned a pitot tube calibration factor of 0.84.

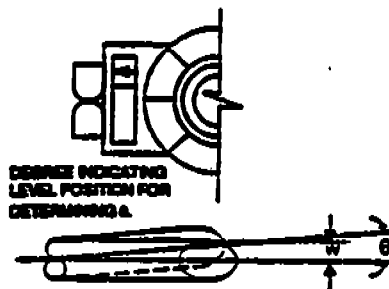
Signature W. L. Shull

Date 12-26-91

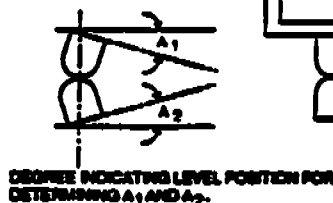
PITOT TUBE INSPECTION



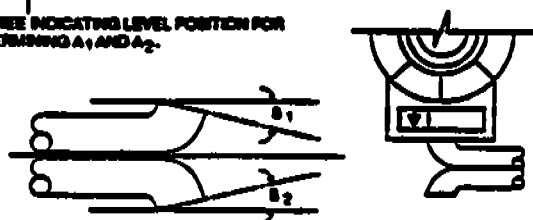
DEGREE INDICATING LEVEL POSITION FOR DETERMINING γ , THEN CALCULATING Z .



DEGREE INDICATING LEVEL POSITION FOR DETERMINING α .



DEGREE INDICATING LEVEL POSITION FOR DETERMINING A_1 AND A_2 .



DEGREE INDICATING LEVEL POSITION FOR DETERMINING B_1 AND B_2 .

level?	yes
obstructions?	none
damaged?	none
$-10^\circ < \alpha_1 < +10^\circ$	1
$-10^\circ < \alpha_2 < +10^\circ$	1
$-5^\circ < B_1 < +5^\circ$	1
$-5^\circ < B_2 < +5^\circ$	0
γ	0
θ	0
A	.949
$1.05 D_1 < P_1 < 1.5 D_1$	.476
$1.05 D_2 < P_2 < 1.5 D_2$	.473
$3/16" < D_1 < 3/8"$	.375
$A \tan \gamma < 0.125"$	.015
$A \tan \theta < 0.03125"$	.015
$P_1 = P_2 \pm 0.063"$	yes .003

See 40 CFR 60, Vol. 42 No. 160 EPA Method 2. Verify the minimum 2-inch setback of the thermocouple and the minimum 3/4-inch separation between the pitot tube and the nozzle as shown at the top of this page.

Comments: NEW fixed (H.B.)

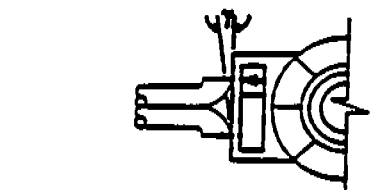
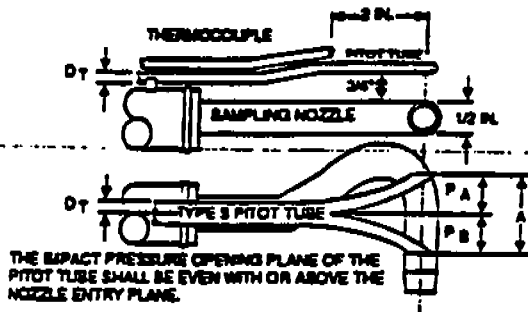
I certify that pitot tube/probe number 9-32 meets or exceeds all specifications, criteria and/or applicable design features and is hereby assigned a pitot tube calibration factor of 0.84.

Signature

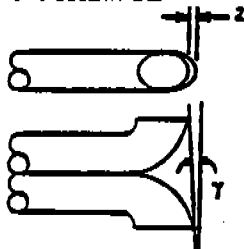
Date

[Signature]
9-9-92

PITOT TUBE INSPECTION



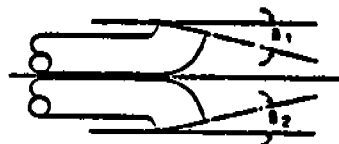
DEGREE INDICATING LEVEL POSITION FOR DETERMINING γ , THEN CALCULATING Z.



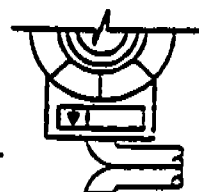
DEGREE INDICATING LEVEL POSITION FOR DETERMINING θ .



DEGREE INDICATING LEVEL POSITION FOR DETERMINING A_1 AND A_2 .



DEGREE INDICATING LEVEL POSITION FOR DETERMINING B_1 AND B_2 .



level?	YES
obstructions?	NONE
damaged?	NONE
$-10^\circ < \alpha_1 < +10^\circ$	0
$-10^\circ < \alpha_2 < +10^\circ$	0
$-5^\circ < B_1 < +5^\circ$	0
$-5^\circ < B_2 < +5^\circ$	0
γ	1.0
θ	0
A	1.055
$1.05 D_1 < P_1 < 1.5 D_1$	.527
$1.05 D_2 < P_2 < 1.5 D_2$	.528
$3/16^\circ < D_1 < 3/8^\circ$	.375
$A \tan \gamma < 0.125^\circ$	.016
$A \tan \theta < 0.03125^\circ$	0
$P_1 = P_2 \pm 0.063^\circ$	YES 0.01

See 40 CFR 60, Vol. 42 No. 160 EPA Method 2. Verify the minimum 2-inch setback of the thermocouple and the minimum 3/4-inch separation between the pitot tube and the nozzle as shown at the top of this page.

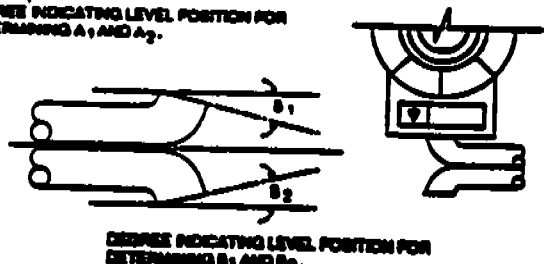
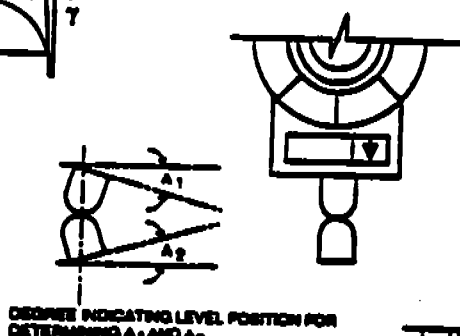
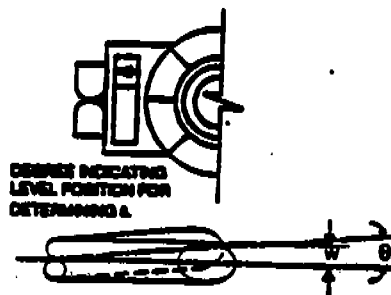
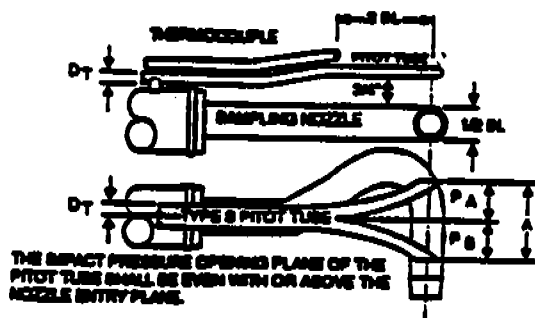
Comments: Shipped to H&B for

I certify that pitot tube/probe number PPT-54 meets or exceeds all specifications, criteria and/or applicable design features and is hereby assigned a pitot tube calibration factor of 0.84.

Signature Chas C. Lander

Date 3-7-91

PITOT TUBE INSPECTION



level?	YES
obstructions?	NONE
damaged?	NO
$-10^\circ < \alpha_1 < +10^\circ$	0
$-10^\circ < \alpha_2 < +10^\circ$	0
$-5^\circ < B1 < +5^\circ$	0
$-5^\circ < B2 < +5^\circ$	0
γ	1°
θ	0
A	1.012
$1.05 D_1 < P_1 < 1.5 D_1$	0.503
$1.05 D_2 < P_2 < 1.5 D_2$	0.509
$3/16" < D_1 < 3/8"$	0.375
$A \tan \gamma < 0.125"$	0
$A \tan \theta < 0.03125"$	0.018
$P_1 = P_2 \pm 0.063"$	YES 0.006

See 40 CFR 60, Vol. 42 No. 160 EPA Method 2. Verify the minimum 2-inch setback of the thermocouple and the minimum 3/4-inch separation between the pitot tube and the nozzle as shown at the top of this page.

Comments: Recal

I certify that pitot tube/probe number DP-108-3 meets or exceeds all specifications, criteria and/or applicable design features and is hereby assigned a pitot tube calibration factor of 0.84.

Signature Patrick T. Daley

Date 6/18/96

APPENDIX D. CALIBRATION DATA

2. Instrumental Test Methods

INTERFERENCE RESPONSE

Analyzer Type.....	FUJI 3300 DUAL RANGE	Span.....	20
Serial number.....	N4A1133T	Date.....	8/5/94
EEl #.....	11		

Gas Type	Concentration	Analyzer response	(a) % of span
=====	=====	=====	=====
CO/NO	601.0 ppm	0.000	0.0000
SO2/N2	455.0 ppm	0.000	0.0000
NO/N2	139.8 ppm	0.000	0.0000
O2/N2	10.0 %	0.000	0.0000
		(b) Totals	0.0000

(a) % of span = ANALYZER RESPONSE/INSTRUMENT SPAN X 100

(b) SPECIFICATION (EPA METHOD 20): SUM OF INTERFERENCE RESPONSES MUST NOT EXCEED 2% OF SPAN.

INTERFERENCE TEST PROCEDURES

ENTROPY followed the manufacturer's recommended set-up procedures contained in the analyzer manual. After the initial set-up procedures were completed, the electronics of the monitor were adjusted according to the manufacturer's guidelines. The monitor was calibrated by flowing CO₂ calibration gases into the instrument. The SO₂, CO, NO_x and O₂ calibration gases listed above were injected into the monitor and the responses were recorded with a data acquisition system, which was analyzed to determine if the gases caused interference (ie. deviations from a zero reading) in the CO₂ monitor.

Note: This is a summary of the data collected, all corresponding data

INTERFERENCE RESPONSE

Analyzer Type.....	FUJI 3300 DUAL RANGE	Span.....	20
Serial number.....	N264243	Date.....	12-20-91
EEl #.....	2		

Gas Type	Concentration	Analyzer response	(a) % of span
CO/N2	437.2 ppm	0.000	0.0000
SO2/N2	240.0 ppm	0.000	0.0000
NO/N2	237.0 ppm	0.000	0.0000
O2/N2	20.9 %	0.000	0.0000
(b) Totals			0.0000

(a) % of span = ANALYZER RESPONSE/INSTRUMENT SPAN X 100

(b) SPECIFICATION (EPA METHOD 20): SUM OF INTERFERENCE RESPONSES MUST NOT EXCEED 2% OF SPAN.

INTERFERENCE TEST PROCEDURES

ENTROPY followed the manufacturer's recommended set-up procedures contained in the analyzer manual. After the initial set-up procedures were completed, the electronics of the monitor were adjusted according to the manufacturer's guidelines. The monitor was calibrated by flowing CO2 calibration gases into the instrument. The SO2, CO, NOx and O2 calibration gases listed above were injected into the monitor and the responses were recorded with a data acquisition system, which was analyzed to determine if the gases caused interference (ie. deviations from a zero reading) in the CO2 monitor.

NOTE: This is a summary of the data collected. All supporting data is available upon request.

INTERFERENCE RESPONSE

Analyzer Type..... FUJI 3300 DUAL RANGE Span..... 20
 Serial number..... N9B1794T Date..... 12-20-91
 EEI #..... 4

Gas Type	Concentration	Analyzer response	(a) % of span
CO/N2	437.2 ppm	0.000	0.0000
SO2/N2	240.0 ppm	0.000	0.0000
NO/N2	237.0 ppm	0.000	0.0000
O2/N2	20.9 %	0.000	0.0000
(b) Totals			0.0000

(a) % of span = ANALYZER RESPONSE/INSTRUMENT SPAN X 100

(b) SPECIFICATION (EPA METHOD 20): SUM OF INTERFERENCE RESPONSES MUST NOT EXCEED 2% OF SPAN.

INTERFERENCE TEST PROCEDURES

ENTROPY followed the manufacturer's recommended set-up procedures contained in the analyzer manual. After the initial set-up procedures were completed, the electronics of the monitor were adjusted according to the manufacturer's guidelines. The monitor was calibrated by flowing CO2 calibration gases into the instrument. The SO2, CO, NOx and O2 calibration gases listed above were injected into the monitor and the responses were recorded with a data acquisition system, which was analyzed to determine if the gases caused interference (ie. deviations from a zero reading) in the CO2 monitor.

NOTE: This is a summary of the data collected. All supporting data will be provided upon request.

INTERFERENCE RESPONSE

Analyzer Type.....	TELEDYNE 320P-4	Span.....	25
Serial number.....	122521	Date.....	10-21-91
EEI #.....	4		

Gas Type	Concentration	Analyzer response	(a) % of span
=====	=====	=====	=====
CO/N2	246.0 ppm	0.000	0.0000
SO2/N2	549.0 ppm	0.000	0.0000
NO/N2	240.0 ppm	0.000	0.0000
CO2/N2	17.5 %	0.000	0.0000
(b) Totals			0.0000

(a) % of span = ANALYZER RESPONSE/INSTRUMENT SPAN X 100

(b) SPECIFICATION (EPA METHOD 20): SUM OF INTERFERENCE RESPONSES MUST NOT EXCEED 2% OF SPAN.

INTERFERENCE TEST PROCEDURES

ENTROPY followed the manufacturer's recommended set-up procedures contained in the analyzer manual. After the initial set-up procedures were completed, the electronics of the monitor were adjusted according to the manufacturer's guidelines. The monitor was calibrated by flowing O2 calibration gases into the instrument. The SO2, CO, NOx and CO2 calibration gases listed above were injected into the monitor and the responses were recorded with a data acquisition system, which was analyzed to determine if the gases caused interference (ie. deviations from a zero reading) in the O2 monitor.

INTERFERENCE RESPONSE

Analyzer Type..... TELEDYNE 320P-4 Span..... 25 %
 Serial number..... 101233 Date..... 3/15/90
 EEI # 8

Gas Type	Concentration	Analyzer response	(a) % of span
CO/N2	246.0 ppm	0.000	0.0000
SO2/N2	449.0 ppm	0.000	0.0000
NO/N2	747.0 ppm	0.000	0.0000
CO2/N2	9.9 %	0.000	0.0000
(b) Totals			0.0000

(a) % of span = ANALYZER RESPONSE/INSTRUMENT SPAN X 100

(b) SPECIFICATION (EPA METHOD 20): SUM OF INTERFERENCE RESPONSES MUST NOT EXCEED 2% OF SPAN.

INTERFERENCE TEST PROCEDURES

ENTROPY followed the manufacturer's recommended set-up procedures contained in the analyzer manual. After the initial set-up procedures were completed, the electronics of the monitor were adjusted according to the manufacturer's guidelines. The monitor was calibrated by flowing O2 calibration gases into the instrument. The SO2, CO, NOx and CO2 calibration gases listed above were injected into the monitor and the responses were recorded with a data acquisition system, which was analyzed to determine if the gases caused interference (ie. deviations from a zero reading) in the O2 monitor.

INTERFERENCE RESPONSE

Analyzer Type.....	TELEDYNE 320P-4	Span.....	25
Serial number.....	126300	Date.....	1-15-92
EEL #.....	13		

Gas Type	Concentration	Analyzer response	(a) % of span
=====	=====	=====	=====
CO/N2	683.9 ppm	0.000	0.0000
SO2/N2	237.0 ppm	0.000	0.0000
NO/N2	240.0 ppm	0.000	0.0000
CO2/N2	11.1 %	0.000	0.0000
		(b) Totals	0.0000

(a) % of span = ANALYZER RESPONSE/INSTRUMENT SPAN X 100

(b) SPECIFICATION (EPA METHOD 20): SUM OF INTERFERENCE RESPONSES MUST NOT EXCEED 2% OF SPAN.

INTERFERENCE TEST PROCEDURES

ENTROPY followed the manufacturer's recommended set-up procedures contained in the analyzer manual. After the initial set-up procedures were completed, the electronics of the monitor were adjusted according to the manufacturer's guidelines. The monitor was calibrated by flowing O2 calibration gases into the instrument. The SO2, CO, NOx and CO2 calibration gases listed above were injected into the monitor and the responses were recorded with a data acquisition system, which was analyzed to determine if the gases caused interference (ie. deviations from a zero reading) in the O2 monitor.

INTERFERENCE RESPONSE

Analyzer Type.....	TELEDYNE 320P-4	Span.....	25%
Serial number.....	144344	Date.....	10/19/94
EEI #.....	20		

Gas Type	Concentration	Analyzer response	(a) % of span
=====	=====	=====	=====
CO/N2	301.0 ppm	0.000	ERR
SO2/N2	206.0 ppm	0.000	ERR
NO/N2	238.0 ppm	0.000	ERR
CO2/N2	5.02 %	0.000	ERR
(b) Totals			ERR

(a) % of span = ANALYZER RESPONSE/INSTRUMENT SPAN X 100

(b) SPECIFICATION (EPA METHOD 20): SUM OF INTERFERENCE RESPONSES MUST NOT EXCEED 2% OF SPAN.

INTERFERENCE TEST PROCEDURES

ENTROPY followed the manufacturer's recommended set-up procedures contained in the analyzer manual. After the initial set-up procedures were completed, the electronics of the monitor were adjusted according to the manufacturer's guidelines. The monitor was calibrated by flowing O2 calibration gases into the instrument. The SO2, CO, NOx and CO2 calibration gases listed above were injected into the monitor and the responses were recorded with a data acquisition system, which was analyzed to determine if the gases caused interference (ie. deviations from a zero reading) in the O2 monitor.

INTERFERENCE RESPONSE

Analyzer Type.....	TECO 48 CO	Span.....	50
Serial number.....	48-32225-241	Date.....	5-9-91
EEl#.....	3		

Gas Type	Concentration	Analyzer response	(a)	% of span
=====	=====	=====	=====	=====
CO2/N2	11.0 %	0.000		0.0000
NO/N2	25.7 ppm	0.100		0.2000
SO2/N2	89.90 ppm	0.200		0.4000
O2/N2	12.5 %	0.200		0.4000
		(b) Totals		1.0000

(a) % of span = ANALYZER RESPONSE/INSTRUMENT SPAN X 100

(b) SPECIFICATION (EPA METHOD 20): SUM OF INTERFERENCE RESPONSES MUST NOT EXCEED 2% OF SPAN.

INTERFERENCE TEST PROCEDURES

ENTROPY followed the manufacturer's recommended set-up procedures contained in the analyzer manual. After the initial set-up procedures were completed, the electronics of the monitor were adjusted according to the manufacturer's guidelines. The monitor was calibrated by flowing CO calibration gases into the instrument. The SO2, NOx, CO2 and O2 calibration gases listed above were injected into the monitor and the responses were recorded with a data acquisition system, which was analyzed to determine if the gases caused interference (ie. deviations from a zero reading) in the CO monitor.

INTERFERENCE RESPONSE

Analyzer Type.....	TECO 48 CO	Span.....	500
Serial number.....	48-32404-241	Date.....	5/9/91
EEI#	4		

Gas Type	Concentration	Analyzer response	(a)	% of span
CO2/N2	11.04 %	0.000		0.0000
NO/N2	470.0 ppm	0.000		0.0000
SO2/N2	454.0 ppm	3.100		0.6200
O2/N2	20.6 %	0.100		0.0200
		(b) Totals		0.6400

(a) % of span = ANALYZER RESPONSE/INSTRUMENT SPAN X 100

(b) SPECIFICATION (EPA METHOD 20): SUM OF INTERFERENCE RESPONSES MUST NOT EXCEED 2% OF SPAN.

INTERFERENCE TEST PROCEDURES

ENTROPY followed the manufacturer's recommended set-up procedures contained in the analyzer manual. After the initial set-up procedures were completed, the electronics of the monitor were adjusted according to the manufacturer's guidelines. The monitor was calibrated by flowing CO calibration gases into the instrument. The SO₂, NO_x, CO₂ and O₂ calibration gases listed above were injected into the monitor and the responses were recorded with a data acquisition system, which was analyzed to determine if the gases caused interference (i.e. deviations from a zero reading) in the CO monitor.

INTERFERENCE RESPONSE

Analyzer Type.....	TECO 48 CO	Span.....	1000
Serial number.....	48-32500-242	Date.....	07/02/92
EEI#.....	6		

Gas Type	Concentration	Analyzer response	(a)	% of span
CO2/N2	11.04 %	2.100		0.2100
NO/N2	236.0 ppm	0.000		0.0000
SO2/N2	240.0 ppm	0.000		0.0000
O2/N2	20.5 %	0.000		0.0000
		(b) Totals		0.2100

(a) % of span = ANALYZER RESPONSE/INSTRUMENT SPAN X 100

(b) SPECIFICATION (EPA METHOD 20): SUM OF INTERFERENCE RESPONSES MUST NOT EXCEED 2% OF SPAN.

(c) SPECIFICATION (BIF METHODS MANUAL): INTERFERENCE RESPONSE TO EACH GAS MUST BE LESS THAN 1% OF SPAN.

INTERFERENCE TEST PROCEDURES

ENTROPY followed the manufacturer's recommended set-up procedures contained in the analyzer manual. After the initial set-up procedures were completed, the electronics of the monitor were adjusted according to the manufacturer's guidelines. The monitor was calibrated by flowing CO calibration gases into the instrument. The SO₂, NO_x, CO₂ and O₂ calibration gases listed above were injected into the monitor and the responses were recorded with a data acquisition system, which was analyzed to determine if the gases caused interference (i.e. deviations from a zero reading) in the CO monitor.

NOTE: This is a summary of the data collected. All supporting data will be provided upon request.

INTERFERENCE RESPONSE

Analyzer Type.....	TECO 48 CO	Span.....	500
Serial number.....	48-36790-255	Date.....	3-30-92
EEl#.....	7		

Gas Type	Concentration	Analyzer response	(a) % of span
CO2/N2	11.06 %	2.564	0.5128
NO/N2	238.0 ppm	0.004	0.0008
SO2/N2	241.0 ppm	2.556	0.5112
O2/N2	20.09 %	0.007	0.0014
(b) Totals			1.0262

(a) % of span = ANALYZER RESPONSE/INSTRUMENT SPAN X 100

(b) SPECIFICATION (EPA METHOD 20): SUM OF INTERFERENCE RESPONSES MUST NOT EXCEED 2% OF SPAN.

(c) SPECIFICATION (BIF METHODS MANUAL): INTERFERENCE RESPONSE TO EACH GAS MUST BE LESS THAN 1% OF SPAN.

INTERFERENCE TEST PROCEDURES

ENTROPY followed the manufacturer's recommended set-up procedures contained in the analyzer manual. After the initial set-up procedures were completed, the electronics of the monitor were adjusted according to the manufacturer's guidelines. The monitor was calibrated by flowing CO calibration gases into the instrument. The SO₂, NO_x, CO₂ and O₂ calibration gases listed above were injected into the monitor and the responses were recorded with a data acquisition system, which was analyzed to determine if the gases caused interference (ie. deviations from a zero reading) in the CO monitor.

NOTE: This is a summary of the data collected. All supporting data will be provided upon request.

INTERFERENCE RESPONSE

Analyzer Type.....	TECO MODEL 48 CO	Span.....	1000
Serial number.....	48	Date.....	10-5-94
EEI#	9		

Gas Type	Concentration	Analyzer response	(a) % of span
=====	=====	=====	=====
NOx/N2	138.7 ppm	0.500	0.0500
SO2/N2	141.3 ppm	0.500	0.0500
CO2/N2	5.02 %	0.300	0.0300
O2/N2	9.1 %	0.500	0.0500
		(b) Totals	0.1800

(a) % of span = ANALYZER RESPONSE/INSTRUMENT SPAN X 100

(b) SPECIFICATION (EPA METHODS MANUAL FOR COMPLIANCE WITH BIF REGULATION 2.1.6.4.2.2). CO ANALYZER RESPONSE MUST BE LESS THAN 1% OF THE APPLICABLE MEASUREMENT RANGE.

INTERFERENCE TEST PROCEDURES

ENTROPY followed the manufacturer's recommended set-up procedures contained in the analyzer manual. After the initial set-up procedures were completed, the electronics of the monitor were adjusted according to the manufacturer's guidelines. The monitor was calibrated by flowing CO calibration gases into the instrument. The SO2, NOx, CO2 and O2 calibration gases listed above were injected into the monitor and the responses were recorded with a data acquisition system, which was analyzed to determine if the gases caused interference (ie. deviations from a zero reading) in the NOx monitor.

INTERFERENCE RESPONSE

Analyzer Type..... TECO 10 NOX EEI#5 Span..... 250
 Serial number..... 10AR-32543-242 Date..... 2/20/91

Gas Type	Concentration	Analyzer response	(a) % of span
CO/N2	457.5 ppm	0.016	0.0064
SO2/N2	243.0 ppm	0.220	0.0880
CO2/N2	11.01 %	0.000	0.0000
O2/N2	20.6 %	0.100	0.0400
(b) Totals			0.1344

(a) % of span = ANALYZER RESPONSE/INSTRUMENT SPAN X 100

(b) SPECIFICATION (EPA METHOD 20): SUM OF INTERFERENCE RESPONSES MUST NOT EXCEED 2% OF SPAN.

INTERFERENCE TEST PROCEDURES

ENTROPY followed the manufacturer's recommended set-up procedures contained in the analyzer manual. After the initial set-up procedures were completed, the electronics of the monitor were adjusted according to the manufacturer's guidelines. The monitor was calibrated by flowing NO calibration gases into the instrument. The SO2, CO, CO2 and O2 calibration gases listed above were injected into the monitor and the responses were recorded with a data acquisition system, which was analyzed to determine if the gases caused interference (ie. deviations from a zero reading) in the NOx monitor.

Note: This is a summary of the data collected, all corresponding data will be provided upon request.

INTERFERENCE RESPONSE

Analyzer Type.....	TECO 10 NOX EEI#6	Span.....	1000
Serial number.....	10S-32788-242	Date.....	9/27/94

Gas Type	Concentration	Analyzer response	(a) % of span
=====	=====	=====	=====
CO/N2	159.4 ppm	0.020	0.0020
SO2/N2	141.3 ppm	0.020	0.0020
CO2/N2	5.02 %	0.000	0.0000
O2/N2	5.1 %	0.000	0.0000
(b) Totals			0.0040

(a) % of span = ANALYZER RESPONSE/INSTRUMENT SPAN X 100

(b) SPECIFICATION (EPA METHOD 20): SUM OF INTERFERENCE RESPONSES MUST NOT EXCEED 2% OF SPAN.

INTERFERENCE TEST PROCEDURES

ENTROPY followed the manufacturer's recommended set-up procedures contained in the analyzer manual. After the initial set-up procedures were completed, the electronics of the monitor were adjusted according to the manufacturer's guidelines. The monitor was calibrated by flowing NO calibration gases into the instrument. The SO₂, CO, CO₂ and O₂ calibration gases listed above were injected into the monitor and the responses were recorded with a data acquisition system, which was analyzed to determine if the gases caused interference (ie. deviations from a zero reading) in the NO_x monitor.

INTERFERENCE RESPONSE

Analyzer Type.....	TECO 10 NOX EEI#7	Span.....	1000
Serial number.....	10S-32784-243	Date.....	4/30/91

Gas Type	Concentration	Analyzer response	(a) % of span
=====	=====	=====	=====
CO/N2	457.3 ppm	0.020	0.0020
SO2/N2	243.0 ppm	0.020	0.0020
CO2/N2	11.04 %	0.000	0.0000
O2/N2	20.6 %	0.000	0.0000
(b) Totals			0.0040

(a) % of span = ANALYZER RESPONSE/INSTRUMENT SPAN X 100

(b) SPECIFICATION (EPA METHOD 20): SUM OF INTERFERENCE RESPONSES MUST NOT EXCEED 2% OF SPAN.

INTERFERENCE TEST PROCEDURES

ENTROPY followed the manufacturer's recommended set-up procedures contained in the analyzer manual. After the initial set-up procedures were completed, the electronics of the monitor were adjusted according to the manufacturer's guidelines. The monitor was calibrated by flowing NO calibration gases into the instrument. The SO2, CO, CO2 and O2 calibration gases listed above were injected into the monitor and the responses were recorded with a data acquisition system, which was analyzed to determine if the gases caused interference (ie. deviations from a zero reading) in the NOx monitor.

INTERFERENCE RESPONSE

Analyzer Type..... TECO 10 NOX EEI#11 Span..... 250
 Serial number..... 10S-50496-285 Date..... 10-4-94

Gas Type	Concentration	Analyzer response	(a) % of span
CO/N2	801.1 ppm	0.100	0.0400
SO2/N2	141.3 ppm	0.000	0.0000
CO2/N2	5.02 %	0.000	0.0000
O2/N2	9.1 %	0.000	0.0000
(b) Totals			0.0400

(a) % of span = ANALYZER RESPONSE/INSTRUMENT SPAN X 100

(b) SPECIFICATION (EPA METHOD 20): SUM OF INTERFERENCE RESPONSES MUST NOT EXCEED 2% OF SPAN.

INTERFERENCE TEST PROCEDURES

ENTROPY followed the manufacturer's recommended set-up procedures contained in the analyzer manual. After the initial set-up procedures were completed, the electronics of the monitor were adjusted according to the manufacturer's guidelines. The monitor was calibrated by flowing NO calibration gases into the instrument. The SO2, CO, CO2 and O2 calibration gases listed above were injected into the monitor and the responses were recorded with a data acquisition system, which was analyzed to determine if the gases caused interference (ie. deviations from a zero reading) in the NOx monitor.

Note: This is a summary of the data collected, all corresponding data will be provided upon request.

INTERFERENCE RESPONSE

Analyzer Type..... TECO 10 NOX EEI#12 Span..... 100
 Serial number..... 10AR-49431-282 Date..... 11-14-94

Gas Type	Concentration	Analyzer response	(a) % of span
CO/N2	801.1 ppm	0.000	0.0000
SO2/N2	238.0 ppm	0.000	0.0000
CO2/N2	5.02 %	0.000	0.0000
O2/N2	9.1 %	0.000	0.0000
(b) Totals			0.0000

(a) % of span = ANALYZER RESPONSE/INSTRUMENT SPAN X 100

(b) SPECIFICATION (EPA METHOD 20): SUM OF INTERFERENCE RESPONSES MUST NOT EXCEED 2% OF SPAN.

INTERFERENCE TEST PROCEDURES

ENTROPY followed the manufacturer's recommended set-up procedures contained in the analyzer manual. After the initial set-up procedures were completed, the electronics of the monitor were adjusted according to the manufacturer's guidelines. The monitor was calibrated by flowing NO calibration gases into the instrument. The SO2, CO, CO2 and O2 calibration gases listed above were injected into the monitor and the responses were recorded with a data acquisition system, which was analyzed to determine if the gases caused interference (ie. deviations from a zero reading) in the NOx monitor.

Note: This is a summary of the data collected. All supporting data will be provided upon request.

NO2-NO CONVERSION EFFICIENCY

Analyzer Type.....	TECO 10 NOX EEI#5	Span.....	250
Serial number.....	10AR-32543-242	Date.....	1/19/96

PEAK RESPONSE RECORDED DURING CONVERTER EFFICIENCY TEST..	118.98	ppm
RESPONSE RECORDED AT THE END OF THE 30-MINUTE TEST.....	117.88	ppm
PERCENT DECREASE FROM PEAK RESPONSE.....	0.92	%
CONVERTER EFFICIENCY.....	99.1	%

SPECIFICATIONS (EPA METHOD 20): RESPONSE AT 30 MINUTES MUST NOT DECREASE BY MORE THAN 2% OF THE PEAK RESPONSE VALUE.

NO2-NO CONVERTER EFFICIENCY TEST PROCEDURES

ENTROPY followed the manufacturer's recommended set-up procedures contained in the analyzer manual. After the initial set-up procedures were completed, the electronics of the monitor were adjusted according to the manufacturer's guidelines. The monitor was then calibrated by flowing NO calibration gases into the instrument. A calibration gas was then diluted (1:1) with purified compressed air. The gas mixture was routed through a manifold into a Tedlar bag, which was previously leak tested and evacuated. This arrangement afforded sufficient volume to allow the sampling system to operate for the required 30 minutes. Immediately after the bag was filled, the manifold was connected to the sampling system. The system was turned on and the analyzer response was recorded on a data acquisition system. The one minute averages from the data acquisition system was analyzed for the peak response and the response at the end of the 30-minute sampling period.

Note: This is a summary of the data collected. Entropy will supply all supporting data upon request.

NO2-NO CONVERSION EFFICIENCY

Analyzer Type.....	TECO 10 NOX EEI#6	Span.....	100
Serial number.....	10S-32788-242	Date.....	12/2/94

PEAK RESPONSE RECORDED DURING CONVERTER EFFICIENCY TEST..	81.3	pp
RESPONSE RECORDED AT THE END OF THE 30-MINUTE TEST.....	80.8	pp
PERCENT DECREASE FROM PEAK RESPONSE.....	0.62	%
CONVERTER EFFICIENCY.....	99.4	%

SPECIFICATIONS (EPA METHOD 20): RESPONSE AT 30 MINUTES MUST NOT DECREASE BY MORE THAN 2% OF THE PEAK RESPONSE VALUE.

NO2-NO CONVERTER EFFICIENCY TEST PROCEDURES

ENTROPY followed the manufacturer's recommended set-up procedures contained in the analyzer manual. After the initial set-up procedures were completed, the electronics of the monitor were adjusted according to the manufacturer's guidelines. The monitor was then calibrated by flowing NO calibration gases into the instrument. A calibration gas was then diluted (1:1) with purified compressed air. The gas mixture was routed through a manifold into a Tedlar bag, which was previously leak tested and evacuated. This arrangement afforded sufficient volume to allow the sampling system to operate for the required 30 minutes. Immediately after the bag was filled, the manifold was connected to the sampling system. The system was turned on and the analyzer response was recorded on a data acquisition system. The one minute averages from the data acquisition system was analyzed for the peak response and the response at the end of the 30-minute sampling period.

NO2-NO CONVERSION EFFICIENCY

Analyzer Type.....	TECO 10 NOX EEI#7	Span.....	1000
Serial number.....	10S-32784-243	Date.....	5/3/96

PEAK RESPONSE RECORDED DURING CONVERTER EFFICIENCY TEST..	130.72 ppm
RESPONSE RECORDED AT THE END OF THE 30-MINUTE TEST.....	128.47 ppm
PERCENT DECREASE FROM PEAK RESPONSE.....	1.72 %
CONVERTER EFFICIENCY.....	98.3 %

SPECIFICATIONS (EPA METHOD 20): RESPONSE AT 30 MINUTES MUST NOT DECREASE BY MORE THAN 2% OF THE PEAK RESPONSE VALUE.

NO2-NO CONVERTER EFFICIENCY TEST PROCEDURES

ENTROPY followed the manufacturer's recommended set-up procedures contained in the analyzer manual. After the initial set-up procedures were completed, the electronics of the monitor were adjusted according to the manufacturer's guidelines. The monitor was then calibrated by flowing NO calibration gases into the instrument. A calibration gas was then diluted (1:1) with purified compressed air. The gas mixture was routed through a manifold into a Tedlar bag, which was previously leak tested and evacuated. This arrangement afforded sufficient volume to allow the sampling system to operate for the required 30 minutes. Immediately after the bag was filled, the manifold was connected to the sampling system. The system was turned on and the analyzer response was recorded on a data acquisition system. The one minute averages from the data acquisition system was analyzed for the peak response and the response at the end of the 30-minute sampling period.

NO2-NO CONVERSION EFFICIENCY

Analyzer Type.....	TECO 10 NOX EEI#11	Span.....	250
Serial number.....	10S-50496-285	Date.....	10-25-95

PEAK RESPONSE RECORDED DURING CONVERTER EFFICIENCY TEST..	250.33	pp
RESPONSE RECORDED AT THE END OF THE 30-MINUTE TEST.....	247.29	pp
PERCENT DECREASE FROM PEAK RESPONSE.....	1.21	%
CONVERTER EFFICIENCY.....	98.8	%

SPECIFICATIONS (EPA METHOD 20): RESPONSE AT 30 MINUTES MUST NOT DECREASE BY MORE THAN 2% OF THE PEAK RESPONSE VALUE.

NO2-NO CONVERTER EFFICIENCY TEST PROCEDURES

ENTROPY followed the manufacturer's recommended set-up procedures contained in the analyzer manual. After the initial set-up procedures were completed, the electronics of the monitor were adjusted according to the manufacturer's guidelines. The monitor was then calibrated by flowing NO calibration gases into the instrument. A calibration gas was then diluted (1:1) with purified compressed air. The gas mixture was routed through a manifold into a Tedlar bag, which was previously leak tested and evacuated. This arrangement afforded sufficient volume to allow the sampling system to operate for the required 30 minutes. Immediately after the bag was filled, the manifold was connected to the sampling system. The system was turned on and the analyzer response was recorded on a data acquisition system. The one minute averages from the data acquisition system was analyzed for the peak response and the response at the end of the 30-minute sampling period.

NO2-NO CONVERSION EFFICIENCY

Analyzer Type.....	TECO 10 NOX EEI#12	Span.....	100
Serial number.....	10AR-49431-282	Date.....	11-14-94

PEAK RESPONSE RECORDED DURING CONVERTER EFFICIENCY TEST..	54.3	pp
RESPONSE RECORDED AT THE END OF THE 30-MINUTE TEST.....	53.8	pp
PERCENT DECREASE FROM PEAK RESPONSE.....	0.92	%
CONVERTER EFFICIENCY.....	99.1	%

SPECIFICATIONS (EPA METHOD 20): RESPONSE AT 30 MINUTES MUST NOT DECREASE BY MORE THAN 2% OF THE PEAK RESPONSE VALUE.

NO2-NO CONVERTER EFFICIENCY TEST PROCEDURES

ENTROPY followed the manufacturer's recommended set-up procedures contained in the analyzer manual. After the initial set-up procedures were completed, the electronics of the monitor were adjusted according to the manufacturer's guidelines. The monitor was then calibrated by flowing NO calibration gases into the instrument. A calibration gas was then diluted (1:1) with purified compressed air. The gas mixture was routed through a manifold into a Tedlar bag, which was previously leak tested and evacuated. This arrangement afforded sufficient volume to allow the sampling system to operate for the required 30 minutes. Immediately after the bag was filled, the manifold was connected to the sampling system. The system was turned on and the analyzer response was recorded on a data acquisition system. The one minute averages from the data acquisition system was analyzed for the peak response and the response at the end of the 30-minute sampling period.



Scott Specialty Gases

1750 EAST CLUB BOULEVARD, DURHAM, NC 27704

(919) 220-0803 FAX: (919) 220-0808

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

Customer
Entropy
Attn: John Maxwell
CEM Division
8724 Glenwood Avenue
Raleigh, NC 27612

Assay Laboratory
Scott Specialty Gases, Inc.
1750 East Club Boulevard
Durham, NC 27704

Purchase Order 5159-MAXWELLJ
Scott Project # 12-17291

ANALYTICAL INFORMATION

Certified to exceed the minimum specifications of EPA Protocol Procedure #G1, issued September, 1993.

Cylinder Number	ALM-028320	Certification Date	05-07-96	Expiration Date	05-07-99
Cylinder Pressure	2000 psig	Previous Certification	None		

ANALYZED CYLINDER

Components

Propane
Air

Certified Concentration
10.03 ppm

Analytical Uncertainty*

+/- 1% NIST Directly Traceable
Balance

Do not use when cylinder pressure is less than 150 PSIG.

*Analytical uncertainty is inclusive of usual known error sources which at least includes reference standard error & precision of the measurement process.

REFERENCE STANDARD

Type	Expiration Date	Cylinder Number	Concentration
NTRM # 1666	09-97	AAL-8237	9.62 ppm C3H8 Balance in Air

INSTRUMENTATION

Instrument/Model/Serial #
Varian /3400/0160

Last Date Calibrated
05-07-96

Analytical Principle
Gas Chromatography

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components	First Triad Analysis	Second Triad Analysis	Calibration Curve																	
Propane	<table><tr><td>Date: 05-07-96</td><td>Response Units: Area</td></tr><tr><td>STD=52485</td><td>SPL=54721</td></tr><tr><td>SPL=54720</td><td>STD=52566</td></tr><tr><td>STD=52576</td><td>SPL=54876</td></tr></table>	Date: 05-07-96	Response Units: Area	STD=52485	SPL=54721	SPL=54720	STD=52566	STD=52576	SPL=54876	<table><tr><td>Date:</td><td>Response Units:</td></tr><tr><td>STD=</td><td>SPL=</td></tr><tr><td>SPL=</td><td>STD=</td></tr><tr><td>STD=</td><td>SPL=</td></tr></table>	Date:	Response Units:	STD=	SPL=	SPL=	STD=	STD=	SPL=	<table><tr><td>Date: 05-07-96</td></tr></table>	Date: 05-07-96
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B. Becton
Analyst B. Becton



Scott Specialty Gases

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CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

Customer
Entropy Environmentalists
Attn: John Maxwell
Accounts Payable
P.O. Box 12291
Research Triangle Park, NC 27612

Assay Laboratory
Scott Specialty Gases, Inc.
1750 East Club Boulevard
Durham, NC 27704

Purchase Order MAXWELL
Scott Project # 12-16095

ANALYTICAL INFORMATION

Certified to exceed the minimum specifications of EPA Protocol Procedure #G1, issued September, 1993.

Cylinder Number ALM-039869
Cylinder Pressure 2000 PSIG

Certification Date 03-05-96
Previous Certification None

Expiration Date 03-05-99

ANALYZED CYLINDER

Components

Propane
Air

Certified Concentration
17.20 PPM

Analytical Uncertainty*

± 1% NIST Directly Traceable
Balance

Do not use when cylinder pressure is less than 150 PSIG.

*Analytical uncertainty is inclusive of usual known error sources which at least includes reference standard error & precision of the measurement process.

REFERENCE STANDARD

Type Expiration Date
NTRM # 1666 09-97

Cylinder Number
AAL-8237

Concentration
9.62 PPM C3H8 Balance in Air

INSTRUMENTATION

Instrument/Model/Serial #
Verion /3400/0160

Last Date Calibrated
03-05-96

Analytical Principle
Gas Chromatography

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components

Propane

First Triad Analysis

Date: 03-05-96 Response Units: Area
STD-50738 SPL-90865
SPL-90765 STD-50471
STD-50957 SPL-90465

Second Triad Analysis

Date: Response Units:
STD- SPL-
SPL- STD-
STD- SPL-

Calibration Curve

Date: 03-05-96

Date: Response Units:
STD- SPL-
SPL- STD-
STD- SPL-

Date: Response Units:
STD- SPL-
SPL- STD-
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Analyst S. Vaughan



Scott Specialty Gases

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CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

Customer
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Attn: John Maxwell
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Research Triangle Park, NC 27612

Assay Laboratory
Scott Specialty Gases, Inc.
1750 East Club Boulevard
Durham, NC 27704

Purchase Order MAXWELL
Scott Project # 12-16095

ANALYTICAL INFORMATION

Certified to exceed the minimum specifications of EPA Protocol Procedure #G1, issued September, 1993.

Cylinder Number ALM-046161
Cylinder Pressure 2000 PSIG

Certification Date 03-05-96
Previous Certification None

Expiration Date 03-05-99

ANALYZED CYLINDER

Components

Propane
Air

Certified Concentration

27.54 PPM

Analytical Uncertainty*

+/- 1% NIST Directly Traceable
Balance

Do not use when cylinder pressure is less than 150 PSIG.

*Analytical uncertainty is inclusive of usual known error sources which at least includes reference standard error & precision of the measurement processes.

REFERENCE STANDARD

Type Expiration Date
NTRM # 1668 06-96

Cylinder Number
ALM-032005

Concentration
95.5 PPM C3H8 Balance in Air

INSTRUMENTATION

Instrument/Model/Serial #
Varian /3400/16804

Last Date Calibrated
03-05-96

Analytical Principle
Gas Chromatography

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components

Propane

First Triad Analysis

Date: 03-05-96 Response Units: Area
STD=521891 SPL=150699
SPL=150434 STD=522215
STD=521892 SPL=150512

Second Triad Analysis

Date: Response Units:
STD= SPL=
SPL= STD=
STD= SPL=

Calibration Curve

Date: 03-05-96

Date: Response Units:
STD= SPL=
SPL= STD=
STD= SPL=

Date: Response Units:
STD= SPL=
SPL= STD=
STD= SPL=

Date:

Date: Response Units:
STD= SPL=
SPL= STD=
STD= SPL=

Date: Response Units:
STD= SPL=
SPL= STD=
STD= SPL=

Date:

S. Vaughan
Analyst S. Vaughan



Scott Specialty Gases

1750 EAST CLUB BOULEVARD, DURHAM, NC 27704

(919) 220-0803 FAX: (919) 220-0808

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

Customer
Entropy Environmentalists
Attn: John Maxwell
Accounts Payable
P.O. Box 12291
Research Triangle Park, NC 27612

Assay Laboratory
Scott Specialty Gases, Inc.
1750 East Club Boulevard
Durham, NC 27704

Purchase Order MAXWELL
Scott Project # 12-16095

ANALYTICAL INFORMATION

Certified to exceed the minimum specifications of EPA Protocol Procedure #G1, issued September, 1993.

Cylinder Number ALM-019353
Cylinder Pressure 2000 PSIG

Certification Date 03-06-96
Previous Certification None

Expiration Date 03-06-99

ANALYZED CYLINDER

Components

Propane

Air

Certified Concentration
98.65 PPM

Analytical Uncertainty*
+/- 1% NIST Directly Traceable
Balance

Do not use when cylinder pressure is less than 150 PSIG.

*Analytical uncertainty is inclusive of usual known error sources which at least includes reference standard error & precision of the measurement processes.

REFERENCE STANDARD

Type Expiration Date
NTRM # 1668 06-96

Cylinder Number
ALM-032005

Concentration
95.5 PPM C3H8 Balance in Air

INSTRUMENTATION

Instrument/Model/Serial #
Varian /3400/16804

Last Date Calibrated
03-06-96

Analytical Principle
Gas Chromatography

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components

Propane

First Triad Analysis

Date: 03-06-96 Response Units: Area
STD-1088319 SPL-1124194
SPL-1122777 STD-1090240
STD-1089452 SPL-1128851

Second Triad Analysis

Date: Response Units:
STD- SPL-
SPL- STD-
STD- SPL-

Calibration Curve

Date: 03-06-96

Date: Response Units:
STD- SPL-
SPL- STD-
STD- SPL-

Date: Response Units:
STD- SPL-
SPL- STD-
STD- SPL-

Date:

Date: Response Units:
STD- SPL-
SPL- STD-
STD- SPL-

Date: Response Units:
STD- SPL-
SPL- STD-
STD- SPL-

Date:

S. Vaughan
Analyst S. Vaughan



Scott Specialty Gases

1750 EAST CLUB BOULEVARD, DURHAM, NC 27704

(919) 220-0803 FAX: (919) 220-0808

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

Customer
Entropy Environmentalists
Attn: Mr. John Maxwell
Accounts Payable
P.O. Box 12291
Research Triangle Park, NC 27709

Assay Laboratory
Scott Specialty Gases, Inc.
1750 East Club Boulevard
Durham, NC 27704

Purchase Order 5011-MAXWELLJ
Scott Project # 12-13047

ANALYTICAL INFORMATION

Certified to exceed the minimum specifications of EPA Protocol Procedure #G1, issued September, 1993.

Cylinder Number ALM-009442
Cylinder Pressure 2000 PSIG

Certification Date 08-21-95
Previous Certification None

Expiration Date 08-21-98

ANALYZED CYLINDER

Components

Propane
Air

Certified Concentration
100.9 PPM

Analytical Uncertainty*

+/- 1% NIST Directly Traceable
Balance

Do not use when cylinder pressure is less than 150 PSIG.

*Analytical uncertainty is inclusive of usual known error sources which at least includes reference standard error & precision of the measurement processes.

REFERENCE STANDARD

Type NTRM # 1668
Expiration Date 06-96

Cylinder Number
ALM-032005

Concentration
95.5 PPM C3H8 Balance in Air

INSTRUMENTATION

Instrument/Model/Serial #
Varian /3400/16804

Last Date Calibrated
08-16-95

Analytical Principle
Gas Chromatography

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components

Propane

First Triad Analysis

Date: 08-21-95 Response Units: Area
STD-1229415 SPL-1296062
SPL-1295810 STD-1226338
STD-1224770 SPL-1295065

Second Triad Analysis

Date: Response Units:
STD- SPL-
SPL- STD-
STD- SPL-

Calibration Curve

Date: 08-16-95

Date: Response Units:
STD- SPL-
SPL- STD-
STD- SPL-

Date: Response Units:
STD- SPL-
SPL- STD-
STD- SPL-

Date:

Date: Response Units:
STD- SPL-
SPL- STD-
STD- SPL-

Date: Response Units:
STD- SPL-
SPL- STD-
STD- SPL-

S. Vaughan
Analyst S. Vaughan



Scott Specialty Gases

1750 EAST CLUB BOULEVARD, DURHAM, NC 27704

(919) 220-0803 FAX: (919) 220-0808

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

Customer
Entropy Environmentalists
Attn: John Maxwell
Accounts Payable
P.O. Box 12291
Research Triangle Park, NC 27612

Assay Laboratory
Scott Specialty Gases, Inc.
1750 East Club Boulevard
Durham, NC 27704

Purchase Order MAXWELL
Scott Project # 12-16095

ANALYTICAL INFORMATION

Certified to exceed the minimum specifications of EPA Protocol Procedure #G1, issued September, 1993.

Cylinder Number AAL-8457
Cylinder Pressure 2000 PSIG

Certification Date 03-06-96
Previous Certification None

Expiration Date 03-06-99

ANALYZED CYLINDER

Components

Propane
Air

Certified Concentration
172.7 PPM

Analytical Uncertainty*

+/- 1% NIST Directly Traceable
Balance

Do not use when cylinder pressure is less than 150 PSIG.

*Analytical uncertainty is inclusive of usual known error sources which at least includes reference standard error & precision of the measurement processes.

REFERENCE STANDARD

Type Expiration Date
NTRM # 1668 06-96

Cylinder Number
ALM-032005

Concentration
95.5 PPM C3H8 Balance in Air

INSTRUMENTATION

Instrument/Model/Serial #
Varian /3400/16804

Last Date Calibrated
03-06-96

Analytical Principle
Gas Chromatography

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components

Propane

First Triad Analysis

Date: 03-06-96 Response Units: Area
STD=1088319 SPL=1970235
SPL=1970989 STD=1090240
STD=1089452 SPL=1970192

Second Triad Analysis

Date: Response Units:
STD= SPL=
SPL= STD=
STD= SPL=

Calibration Curve

Date: 03-06-96

Date: Response Units:
STD= SPL=
SPL= STD=
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STD= SPL=
SPL= STD=
STD= SPL=

Date: Response Units:
STD= SPL=
SPL= STD=
STD= SPL=

Date:

B. Becton
Analyst B. Becton



Scott Specialty Gases

1750 EAST CLUB BOULEVARD, DURHAM, NC 27704

(919) 220-0803 FAX: (919) 220-0808

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

Customer
Entropy Environmentalists
Attn: John Maxwell
Accounts Payable
P.O. Box 12291
Research Triangle Park, NC 27612

Assay Laboratory
Scott Specialty Gases, Inc.
1750 East Club Boulevard
Durham, NC 27704

Purchase Order MAXWELL
Scott Project # 12-16095

ANALYTICAL INFORMATION

Certified to exceed the minimum specifications of EPA Protocol Procedure #G1, issued September, 1993.

Cylinder Number	ALM-023832	Certification Date	03-06-96	Expiration Date	03-06-99
Cylinder Pressure	2000 PSIG	Previous Certification	None		

ANALYZED CYLINDER

Components

Propane
Air

Certified Concentration

172.8 PPM

Analytical Uncertainty*

+/- 1% NIST Directly Traceable
Balance

Do not use when cylinder pressure is less than 150 PSIG.

*Analytical uncertainty is inclusive of usual known error sources which at least includes reference standard error & precision of the measurement processes.

REFERENCE STANDARD

Type	Expiration Date	Cylinder Number	Concentration
NTRM # 1668	06-96	ALM-032005	95.5 PPM C3H8 Balance in Air

INSTRUMENTATION

Instrument/Model/Serial #	Last Date Calibrated	Analytical Principle
Varian /3400/16804	03-06-96	Gas Chromatography

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components	First Triad Analysis	Second Triad Analysis	Calibration Curve																	
Propane	<table><tr><td>Date: 03-06-96</td><td>Response Units: Area</td></tr><tr><td>STD=1088319</td><td>SPL=1971014</td></tr><tr><td>SPL=1970453</td><td>STD=1090240</td></tr><tr><td>STD=1089452</td><td>SPL=1971934</td></tr></table>	Date: 03-06-96	Response Units: Area	STD=1088319	SPL=1971014	SPL=1970453	STD=1090240	STD=1089452	SPL=1971934	<table><tr><td>Date:</td><td>Response Units:</td></tr><tr><td>STD=</td><td>SPL=</td></tr><tr><td>SPL=</td><td>STD=</td></tr><tr><td>STD=</td><td>SPL=</td></tr></table>	Date:	Response Units:	STD=	SPL=	SPL=	STD=	STD=	SPL=	<table><tr><td>Date: 03-06-96</td></tr></table>	Date: 03-06-96
Date: 03-06-96	Response Units: Area																			
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SPL=1970453	STD=1090240																			
STD=1089452	SPL=1971934																			
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B. Becton
Analyst B. Becton



Scott Specialty Gases

6141 EASTON ROAD, P.O. BOX 310, PLUMSTEADVILLE, PA 18949-0310

(215) 766-8881 FAX: (215) 766-0320

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

Customer
Entropy
8724 Glenwood Ave
Raleigh, NC 27612

Assay Laboratory
Scott Specialty Gases, Inc.
6141 Easton Road
P.O. Box 310
Plumsteadville, PA 18949-0310

Purchase Order 4783-MAXWELJ
Scott Project # 01-63890-009

ANALYTICAL INFORMATION

Certified to exceed the minimum specifications of EPA Protocol 1 Procedure #G1, Section Number 3.0.4

Cylinder Number ALM000303
Cylinder Pressure 2000 psig+

Certification Date 01-11-95
Previous Certification Dates None

Expiration Date 01-11-98

ANALYZED CYLINDER

Components

Propane
Balance Gas: Air

Certified Concentration
279 ppm

Analytical Uncertainty*
±1% NIST Traceable

+Do not use when cylinder is less than 150 psig.

*Analytical uncertainty is inclusive of usual known error sources which at least includes reference standard error & precision of the measurement processes.

REFERENCE STANDARD

Type SRM2646A
Expiration Date 09-01-95

Cylinder Number
FF26918

Concentration
1001 ppm C₃H₈ in N₂

INSTRUMENTATION

Instrument/Model/Serial #
C3H8: Varian/VA3300/7945

Last Date Calibrated
12-15-94

Analytical Principle
FID

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components	First Triad Analysis	Second Triad Analysis	Calibration Curve
Propane	Date: 01-11-95 Response Units: Area Z1=000000 R1=244099 T1=068226 R2=243695 Z2=000000 T2=067994 Z3=000000 T3=068157 R3=244235 Avg. Conc. of Cust. Cyl. 279 ppm		Concentration=A+Bx+Cx ² +Dx ³ +Ex ⁴ r=1.00000 SRM2646 Constants: A=1.4623E-01 B=3.9493E-03 C=0.0000E+00 D=0.0000E+00
E=0.0000E+00			

Special Notes:

☐ Check this box if certified concentration has been corrected for analytical interferences.

316

Analyst



Scott Specialty Gases

1750 EAST CLUB BOULEVARD, DURHAM, NC 27704

(919) 220-0803 FAX: (919) 220-0808

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

Customer
Entropy Environmentalists
Attn: John Maxwell
Accounts Payable
P.O. Box 12291
Research Triangle Park, NC 27612

Assay Laboratory
Scott Specialty Gases, Inc.
1750 East Club Boulevard
Durham, NC 27704

Purchase Order MAXWELL
Scott Project # 12-16095

ANALYTICAL INFORMATION

Certified to exceed the minimum specifications of EPA Protocol Procedure #G1, issued September, 1993.

Cylinder Number AAL-18353
Cylinder Pressure 2000 PSIG

Certification Date 03-06-96
Previous Certification None

Expiration Date 03-06-99

ANALYZED CYLINDER

Components

Propane
Air

Certified Concentration

280.6 PPM

Analytical Uncertainty*

+/- 1% NIST Directly Traceable
Balance

Do not use when cylinder pressure is less than 150 PSIG.

*Analytical uncertainty is inclusive of usual known error sources which at least includes reference standard error & precision of the measurement processes.

REFERENCE STANDARD

Type Expiration Date
NTRM # 1668 06-96

Cylinder Number
ALM-032005

Concentration
95.5 PPM C3H8 Balance in Air

INSTRUMENTATION

Instrument/Model/Serial #
Varian /3400/16804

Last Date Calibrated
03-06-96

Analytical Principle
Gas Chromatography

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components

Propane

First Triad Analysis

Date: 03-06-96 Response Units: Area
STD=1088319 SPL=3201690
SPL=3199875 STD=1090240
STD=1089452 SPL=3202240

Second Triad Analysis

Date: Response Units:
STD= SPL=
SPL= STD=
STD= SPL=

Calibration Curve

Date: 03-06-96

Date: Response Units:
STD= SPL=
SPL= STD=
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Date: Response Units:
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STD= SPL=

B. Becton
Analyst B. Becton

P8



Scott Specialty Gases

1750 E. CLUB BLVD., DURHAM, NC 27704

(919) 220-0803 FAX: (919) 220-0808

CERTIFICATE OF ANALYSIS: Interference Free™ Multi-Component EPA Protocol Gas

Customer
Entropy
Attn: John Maxwell
CEM Division
8724 Glenwood Avenue
Raleigh, NC 27612

Assay Laboratory
Scott Specialty Gases, Inc.
1750 E. Club Blvd.
Durham, NC 27704

Purchase Order 5159-MAXWELLJ
Scott Project # 12-17291

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay and Certification of Gaseous Calibration Standards; Procedure G1; September, 1993.

Cylinder Number ALM-001094
Cylinder Pressure+ 1957 psig

Previous Certification Dates

Certification Date 05-06-96
Exp. Date 05-06-99

ANALYZED CYLINDER

Components
Carbon Monoxide
Nitrogen

Certified Concentration
60.51 ppm
Balance Gas

Analytical Accuracy*
±1% NIST Traceable

+ Do not use when cylinder pressure is below 150 psig.

* Analytical accuracy is inclusive of usual known error sources which at least includes precision of the measurement processes.

REFERENCE STANDARD

Type/Sample No. Expiration Date
NTRM 1679 08-11-96

Cylinder Number
ALM-041546

Concentration
97.1 ppm CO Balance N2

INSTRUMENTATION

Instrument/Model/Serial #
Nicolet FTIR/8220/AAB9400252

Last Date Calibrated
05-02-96

Analytical Method
Scott Enhanced FTIR™

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components

First Triad Analysis

Second Triad Analysis

Calibration Curve

CO

Date: 04-29-96 Response Unit: ppm
Z1= -0.020 R1= 97.91 T1= 60.49
R2= 97.23 Z2= -0.009 T2= 60.44
Z3= -0.003 T3= 60.41 R3= 97.16
Avg. Concentration = 60.43 ppm

Date: 05-06-96 Response Unit: ppm
Z1= -0.094 R1= 96.90 T1= 60.49
R2= 97.19 Z2= -0.077 T2= 60.56
Z3= -0.074 T3= 60.65 R3= 97.21
Avg. Concentration = 60.51 ppm

Concentration = $A + Bx + Cx^2 + Dx^3 + Ex^4 + Fx^5$
 $r = 0.99999$
Constants: A= -3.23459E-1
B= 2.69481E-1 C= 3.28372E-4
D= 4.54493E-6 E= -3.89233E-9
F= 1.80390E-12

Special Notes:

B. Becton
Analyst B. Becton



Scott Specialty Gases

1750 E. CLUB BLVD., DURHAM, NC 27704

(919) 220-0803 FAX: (919) 220-0808

CERTIFICATE OF ANALYSIS: Interference Free™ Multi-Component EPA Protocol Gas

Customer
Entropy
Attn: John Maxwell
CEM Division
8724 Glenwood Avenue
Raleigh, NC 27612

Assay Laboratory
Scott Specialty Gases, Inc.
1750 E. Club Blvd.
Durham, NC 27704

Purchase Order 5159-MAXWELLJ
Scott Project # 12-17291

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay and Certification of Gaseous Calibration Standards, Procedure G1; September, 1993.

Cylinder Number AAL-17348
Cylinder Pressure+ 1957 psig

Previous Certification Dates

Certification Date 05-06-96
Exp. Date 05-06-99

ANALYZED CYLINDER

Components

Carbon Monoxide
Nitrogen

Certified Concentration

68.59 ppm
Balance Gas

Analytical Accuracy*

±1% NIST Traceable

* Do not use when cylinder pressure is below 150 psig.

Analytical accuracy is inclusive of usual known error sources which at least includes precision of the measurement process.

REFERENCE STANDARD

Type/Sample No. Expiration Date
NIRM 1679 08-11-96

Cylinder Number
ALM-041546

Concentration
97.1 ppm CO Balance N2

INSTRUMENTATION

Instrument/Model/Serial #
Spectra FTIR/8220/AAB9400252

Last Date Calibrated
05-02-96

Analytical Method
Scott Enhanced FTIR™

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components

First Triad Analysis

Second Triad Analysis

Calibration Curve

Date: 04-29-96 Response Unit: ppm
Z1=-0.020 R1=97.91 T1=68.52
R2=97.23 Z2=-0.009 T2=68.44
Z3=-0.003 T3=68.60 R3=97.16
Avg. Concentration = 68.52 ppm

Date: 05-06-96 Response Unit: ppm
Z1=-0.094 R1=96.90 T1=68.56
R2=97.19 Z2=-0.077 T2=68.66
Z3=-0.074 T3=68.75 R3=97.21
Avg. Concentration = 68.66 ppm

Concentration = $A + Bx + Cx^2 + Dx^3 + Ex^4 + Fx^5$
 $r = 0.99999$
Constants: $A = -3.23435E-1$
 $B = 2.69481E-1$ $C = 3.28372E-4$
 $D = 4.54493E-6$ $E = -3.89233E-9$
 $F = 1.80290E-12$

Special Notes:

B. Bector
Analyst B. Bector

Air Products and Chemicals, Inc.
P.O. BOX 35
R.D. #1
TAMAQUA, PA 18252

Certificate of Analysis - EPA Protocol Gas Standard

Page 1 of 1

PERFORMED ACCORDING TO EPA TRACEABILITY PROTOCOL FOR ASSAY AND CERTIFICATION OF GASEOUS CALIBRATION STANDARDS (PROCEDURE #G1)

Customer:

AIR PRODUCTS AND CHEMICALS, INC.
HOMETOWN FACILITY
R.R. #1, P.O. BOX 351
TAMAQUA " PA 18252-

Notes:

Order No: 255-055424-02
Batch No: 255-73389

PO: Rel:

*** Certified Concentration *** ***** Reference Standards ***** Analytical Instrumentation *****

Component	Certified Concentration	Cylinder #	Standard Number	Concentration	Instrument Make/Model	Serial Number	Last Calibration	Measurement
CARBON MONOXIDE	90.1 ±0.23 PPM	SG887934	GMIS	91.7000 PPM	Hewlett Packar	2518A052	08/12/95 GC-FID	Principal

Cylinder No: SG861591NB
Cylinder Pressure*: 2000 psig
Certification Date: 08/24/95
Expiration Date: 08/24/98

Balance Gas: Nitrogen

* Standard should not be used below 150 psig

320

Analyst:

Mike Pascolini
M Pascolini

Approved By:

K. Roubik
Ken Roubik



Scott Specialty Gases, Inc.

1750 EAST CLUB BOULEVARD, DURHAM, NC 27704

(919) 220-0803 FAX: (919) 220-0808

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

Customer
Entropy
Attn: Mr. John Maxwell
CEM Division
8724 Glenwood Avenue
Raleigh, NC 27612

Assay Laboratory
Scott Specialty Gases, Inc.
1750 East Club Boulevard
Durham, NC 27704

Purchase Order 4514MULLINT
Scott Project # 12-07707

ANALYTICAL INFORMATION

Certified to exceed the minimum specifications of EPA Protocol Procedure #G1, issued September, 1993.

Cylinder Number AAL-20788
Cylinder Pressure 1915 PSIG

Certification Date 07-06-94
Previous Certification None

Expiration Date 07-06-97

ANALYZED CYLINDER

Components

Carbon Monoxide
Nitrogen

Certified Concentration
149.2 PPM

Analytical Uncertainty*

+/- 1% NIST Directly Traceable
Balance

Do not use when cylinder pressure is less than 150 PSIG.

*Analytical uncertainty is inclusive of usual known error sources which at least includes reference standard error & precision of the measurement processes.

REFERENCE STANDARD

Type Expiration Date
NTRM # 2636 12/94

Cylinder Number
ALM-024902

Concentration
243.2 PPM Balance in Nitrogen

INSTRUMENTATION

Instrument/Model/Serial #
Varian /3400/16804

Last Date Calibrated
06-17-94

Analytical Principle
Gas Chromatography

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components	First Triad Analysis	Second Triad Analysis	Calibration Curve																	
Carbon Monoxide	<table><tr><td>Date: 06-30-94</td><td>Response Units: Area</td></tr><tr><td>STD-12050</td><td>SPL-7405</td></tr><tr><td>SPL-7404</td><td>SPL-7435</td></tr><tr><td>STD-12195</td><td>STD-12103</td></tr></table>	Date: 06-30-94	Response Units: Area	STD-12050	SPL-7405	SPL-7404	SPL-7435	STD-12195	STD-12103	<table><tr><td>Date: 07-06-94</td><td>Response Units:</td></tr><tr><td>STD-13347</td><td>SPL-8155</td></tr><tr><td>SPL-8178</td><td>SPL-8160</td></tr><tr><td>STD-13312</td><td>STD-13317</td></tr></table>	Date: 07-06-94	Response Units:	STD-13347	SPL-8155	SPL-8178	SPL-8160	STD-13312	STD-13317	<table><tr><td>Date: 06-17-94</td></tr></table>	Date: 06-17-94
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A. Barber
Analyst A. Barber



Scott Specialty Gases, Inc.

1750 EAST CLUB BOULEVARD, DURHAM, NC 27704

(919) 220-0803 FAX: (919) 220-0808

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

Customer
Entropy
Attn: Mr. John Maxwell
CEM Division
8724 Glenwood Avenue
Raleigh, NC 27612

Assay Laboratory
Scott Specialty Gases, Inc.
1750 East Club Boulevard
Durham, NC 27704

Purchase Order 4514MULLINT
Scott Project # 12-07707

ANALYTICAL INFORMATION

Certified to exceed the minimum specifications of EPA Protocol Procedure #G1, issued September, 1993.

Cylinder Number	ALM-011700	Certification Date	07-06-94	Expiration Date	07-06-97
Cylinder Pressure	1915 PSIG	Previous Certification	None		

ANALYZED CYLINDER

Components

Carbon Monoxide
Nitrogen

Certified Concentration

150.6 PPM

Analytical Uncertainty*

+/- 1% NIST Directly Traceable
Balance

Do not use when cylinder pressure is less than 150 PSIG.

*Analytical uncertainty is inclusive of usual known error sources which at least includes reference standard error & precision of the measurement processes.

REFERENCE STANDARD

Type
NTRM # 2636

Expiration Date
12/94

Cylinder Number
ALM-024902

Concentration
243.2 PPM Balance in Nitrogen

INSTRUMENTATION

Instrument/Model/Serial #
Varian /3400/16804

Last Date Calibrated
06-17-94

Analytical Principle
Gas Chromatography

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components

Carbon Monoxide

First Triad Analysis

Date: 06-30-94	Response Units: Area
STD-12143	SPL-7560
SPL-7544	SPL-7502
STD-12229	STD-12136

Second Triad Analysis

Date: 07-06-94	Response Units: Area
STD-13294	SPL-8255
SPL-8231	SPL-8240
STD-13309	STD-13323

Calibration Curve

Date: 06-17-94

Date:	Response Units:
STD-	SPL-
SPL-	SPL-
STD-	STD-

Date:	Response Units:
STD-	SPL-
SPL-	SPL-
STD-	STD-

Date:

Date:	Response Units:
STD-	SPL-
SPL-	SPL-
STD-	STD-

Date:	Response Units:
STD-	SPL-
SPL-	SPL-
STD-	STD-

Date:

A. Barber
Analyst A. Barber



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CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

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Plumsteadville, PA 18949-0310

Purchase Order 4397HARRISB
Scott Project # 01-55881-003

ANALYTICAL INFORMATION

Certified to exceed the minimum specifications of EPA Protocol 1 Procedure #G1, Section Number 3.0.4

Cylinder Number ALM024154
Cylinder Pressure 2000 psig

Certification Date 04-13-94
Previous Certification Dates None

Expiration Date 04-13-97

ANALYZED CYLINDER

Components
Carbon monoxide
Balance Gas Nitrogen

Certified Concentration
150.7 ppm

Analytical Uncertainty*
±1% NIST Directly Traceable

*Analytical uncertainty is inclusive of usual known error sources which at least includes reference standard error & precision of the measurement process.

REFERENCE STANDARD

Type
NIRM2636

Expiration Date
09-18-94

Cylinder Number
ALM019690

Concentration
243 ppm CO in N₂

INSTRUMENTATION

Instrument/Model/Serial #
CO: Horiba/CFA310A/474091

Last Date Calibrated
04-13-94

Analytical Principle
NDIR

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components

Carbon monoxide

First Triad Analysis

Date: 04-05-94 Response Units: Volts
Z1=0.0022 R1=0.9478 T1=0.5926
R2=0.9487 Z2=0.0029 T2=0.5928
Z3=0.0019 T3=0.5933 R3=0.9503
Avg. Conc. of Cust. Cyl. 150.5 ppm

Second Triad Analysis

Date: 04-13-94 Response Units: Volts
Z1=0.0017 R1=0.9446 T1=0.5916
R2=0.9461 Z2=0.0028 T2=0.5916
Z3=0.0019 T3=0.5913 R3=0.9463
Avg. Conc. of Cust. Cyl. 150.9 ppm

Calibration Curve

Concentration = $A + Bx + Cx^2 + Dx^3 + Ex^4$
 $r = 0.99999$ NIRM2636
Constants: $A = 8.2454E-02$
 $B = 2.5193E+02$ $C = 5.5813E+00$
 $D = 0.0000E+00$ $E = 0.0000E+00$

Special Notes

Analyst Al Rojas



Scott Specialty Gases, Inc.

1750 EAST CLUB BOULEVARD, DURHAM, NC 27704

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Durham, NC 27704

Purchase Order 4739-MAXWELLJ
Scott Project # 12-09458

ANALYTICAL INFORMATION

Certified to exceed the minimum specifications of EPA Protocol Procedure #G1, issued September, 1993.

Cylinder Number ALM-045645
Cylinder Pressure 2000 PSIG

Certification Date 12-19-94
Previous Certification None

Expiration Date 12-19-97

ANALYZED CYLINDER

Components

Carbon Monoxide
Nitrogen

Certified Concentration
301 PPM

Analytical Uncertainty*

+/- 1% NIST Directly Traceable
Balance

Do not use when cylinder pressure is less than 150 PSIG.

*Analytical uncertainty is inclusive of usual known error sources which at least includes reference standard error & precision of the measurement process.

REFERENCE STANDARD

Type NTRM# 2636
Expiration Date 08-96

Cylinder Number
ALM-034195

Concentration
244.2 PPM Balance in Nitrogen

INSTRUMENTATION

Instrument/Model/Serial #
LOW CO: Horiba/AlA23AS/850658012

Last Date Calibrated
12-19-94

Analytical Principle
NDIR

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components
Carbon Monoxide

First Triad Analysis

Date: 12-12-94 Response Units: PPM
Z1=0.2 R2=244.3 Z3=0.3
R1=244.3 Z2=0.4 T3=300.6
T1=300.9 T2=300.7 R3=244.2

Second Triad Analysis

Date: 12-19-94 Response Units: PPM
Z1=0.1 R2=244.5 Z3=0.1
R1=244.5 Z2=0.1 T3=301.4
T1=301.3 T2=301.5 R3=244.5

Calibration Curve

Date: 12-19-94

Date: Response Units:
Z1= R2= Z3=
R1= Z2= T3=
T1= T2= R3=

Date: Response Units:
Z1= R2= Z3=
R1= Z2= T3=
T1= T2= R3=

Date:

Date: Response Units:
Z1= R2= Z3=
R1= Z2= T3=
T1= T2= R3=

Date: Response Units:
Z1= R2= Z3=
R1= Z2= T3=
T1= T2= R3=

Date:

Analyst K. Cooke



Scott Specialty Gases, Inc.

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Assay Laboratory
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1750 East Club Boulevard
Durham, NC 27704

Purchase Order 4640
Scott Project # 12-08598

ANALYTICAL INFORMATION

Certified to exceed the minimum specifications of EPA Protocol Procedure #G1, issued September, 1993.

Cylinder Number AAL-15037
Cylinder Pressure 2000 PSIG

Certification Date 09-29-94
Previous Certification None

Expiration Date 09-29-97

ANALYZED CYLINDER

Components

Carbon Monoxide
Nitrogen

Certified Concentration
301 PPM

Analytical Uncertainty*

+/- 1% NIST Directly Traceable
Balance

Do not use when cylinder pressure is less than 150 PSIG.

*Analytical uncertainty is inclusive of usual known error sources which at least includes reference standard error & precision of the measurement process.

REFERENCE STANDARD

Type **Expiration Date**
NTRM# 2636 12-94
NTRM# 1680 12-94

Cylinder Number
ALM-024902
ALM-024728

Concentration
243.2 PPM Balance in Nitrogen
474.4 PPM Balance in Nitrogen

INSTRUMENTATION

Instrument/Model/Serial #
LOW CO: Horiba/ALA23AS/850658012

Last Date Calibrated
09-20-94

Analytical Principle
NDIR

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components
Carbon Monoxide

First Triad Analysis

Date: 09-21-94 Response Units: PPM
Z1=0.2 R2=244.4 Z3=0.3
R1=244.0 Z2=0.3 T3=302.7
T1=302.6 T2=302.4 R3=244.4

Second Triad Analysis

Date: 09-29-94 Response Units: PPM
Z1=0.1 R2=474.3 Z3=0.1
R1=474.3 Z2=0.2 T3=301.8
T1=301.6 T2=301.6 R3=474.6

Calibration Curve

Date: 09-20-94

Date: Response Units:
Z1= R2= Z3= R1= Z2= T3= T1= T2= R3=

Date: Response Units:
Z1= R2= Z3= R1= Z2= T3= T1= T2= R3=

Date:

Date: Response Units:
Z1= R2= Z3= R1= Z2= T3= T1= T2= R3=

Date: Response Units:
Z1= R2= Z3= R1= Z2= T3= T1= T2= R3=

Date:

Analyst K. Cooke



Scott Specialty Gases

1750 EAST CLUB BOULEVARD, DURHAM, NC 27704

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CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

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Entropy Environmentalist
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Attn: Accts Payable
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Research Triangle Park, NC 27709

Assay Laboratory
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1750 East Club Boulevard
Durham, N.C. 27704

Purchase Order 5011-MAXWELLJ
Scott Project # 12-13047

ANALYTICAL INFORMATION

Certified to exceed the minimum specifications of EPA Protocol Procedure #G1, issued September, 1993.

Cylinder Number ALM-021947
Cylinder Pressure 1919 PSIG

Certification Date 08-21-95
Previous Certification None
Expiration Date 08-21-98

ANALYZED CYLINDER

Components

Carbon Monoxide
Nitrogen

Certified Concentration
301.4 PPM

Analytical Uncertainty*
+/- 1% NIST Directly Traceable
Balance

Do not use when cylinder pressure is less than 150 PSIG.

*Analytical uncertainty is inclusive of total known error sources which at least includes reference standard error & precision of the measurement process.

REFERENCE STANDARD

Type NTRM# 2636
Expiration Date 08-96

Cylinder Number
ALM-034275

Concentration
244.2 PPM CO Balance in N2

INSTRUMENTATION

Instrument/Model/Serial #
NICOLET / 8220 / AAB9400252

Last Date Calibrated
08-01-95

Analytical Principle
FTIR

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components

Carbon Monoxide

First Triad Analysis

Date: 08-11-95 Response Units: PPM
Z1=0.058 R2=243.8 Z3=0.133
R1=244.2 Z2=0.068 T3=301.6
T1=301.7 T2=301.1 R3=243.8

Second Triad Analysis

Date: 08-21-95 Response Units: PPM
Z1=0.028 R2=243.8 Z3=0.200
R1=244.2 Z2=0.017 T3=301.0
T1=301.1 T2=301.5 R3=243.5

Calibration Curve

Date: 08-01-95

Date: Response Units:
Z1= R2= Z3=
R1= Z2= T3=
T1= T2= R3=

Date: Response Units:
Z1= R2= Z3=
R1= Z2= T3=
T1= T2= R3=

Date:

Date: Response Units:
Z1= R2= Z3=
R1= Z2= T3=
T1= T2= R3=

Date: Response Units:
Z1= R2= Z3=
R1= Z2= T3=
T1= T2= R3=

Date:

B. Berton
Analyst B. Berton



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CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

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1750 East Club Boulevard
Durham, NC 27704

Purchase Order 4514MULLINT
Scott Project # 12-07707

ANALYTICAL INFORMATION

Certified to exceed the minimum specifications of EPA Protocol Procedure #G1, issued September, 1993.

Cylinder Number	AAL-1005	Certification Date	07-14-94	Expiration Date	07-14-97
Cylinder Pressure	1915 PSIG	Previous Certification	None		

ANALYZED CYLINDER

Components

Carbon Monoxide
Nitrogen

Certified Concentration

447 PPM

Analytical Uncertainty*

+/- 1% NIST Directly Traceable
Balance

Do not use when cylinder pressure is less than 150 PSIG.

*Analytical uncertainty is inclusive of usual known error sources which at least includes reference standard error & precision of the measurement procedure.

REFERENCE STANDARD

Type **Expiration Date**
NTRM # 1681 07/94

Cylinder Number
ALM-024751

Concentration
966.1 PPM Balance in Nitrogen

INSTRUMENTATION

Instrument/Model/Serial #
Varian /3400/16804

Last Date Calibrated
06-17-94

Analytical Principle
Gas Chromatography

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components

Carbon Monoxide

First Triad Analysis

Date: 07-07-94	Response Units: Area
STD-53115	SPL-24665
SPL-24780	SPL-24395
STD-53280	STD-33170

Second Triad Analysis

Date: 07-14-94	Response Units:
STD-50340	SPL-23342
SPL-23163	SPL-23281
STD-50287	STD-50219

Calibration Curve

Date: 06-17-94

Date:	Response Units:
STD-	SPL-
SPL-	SPL-
STD-	STD-

Date:	Response Units:
STD-	SPL-
SPL-	SPL-
STD-	STD-

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STD-	SPL-
SPL-	SPL-
STD-	STD-

Date:	Response Units:
STD-	SPL-
SPL-	SPL-
STD-	STD-

A. Barber
Analyst A. Barber



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Plumsteadville, PA 18949-0310

Purchase Order 3938 HARRISB
Scott Project # 01-50352-004

ANALYTICAL INFORMATION

Certified to exceed the minimum specifications of EPA Protocol 1 Procedure #G1, Section Number 3.0.4

Cylinder Number AAL20314
Cylinder Pressure 2000 psig

Certification Date 09-22-93
Previous Certification Dates None

Expiration Date 09-22-96

ANALYZED CYLINDER

Components
Carbon monoxide
Balance Gas: Nitrogen

Certified Concentration
448 ppm

Analytical Uncertainty*
±1% NIST Directly Traceable

*Analytical uncertainty is inclusive of usual known error sources which at least includes reference standard error & precision of the measurement processes.

REFERENCE STANDARD

Type NTRM1680
Expiration Date 09-24-94

Cylinder Number ALM024877

Concentration
474 ppm CO in N₂

INSTRUMENTATION

Instrument/Model/Serial #
CO: Horiba/CFA310A/474091

Last Date Calibrated
08-28-93

Analytical Principle
NDIR

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components
Carbon monoxide

First Triad Analysis

Date: 09-15-93 Response Units: Volts
Z1=0.0015 R1=1.0020 T1=0.4795
R2=1.0019 Z2=0.0033 T2=0.4786
Z3=0.0039 T3=0.4787 R3=1.0039
Avg. Conc. of Cust. Cyl. 447 ppm

Second Triad Analysis

Date: 09-22-93 Response Units: Volts
Z1=0.0055 R1=0.4964 T1=0.4702
R2=0.4972 Z2=0.0056 T2=0.4695
Z3=0.0052 T3=0.4702 R3=0.4965
Avg. Conc. of Cust. Cyl. 448 ppm

Calibration Curve

Concentration=A+Br+Cx²+Dx³+Ex⁴
r=1.00000 NTRM1681
Constants: A=0.5192E-01
B=9.2703E+02 C=5.9936E+01
D=0.0000E+00 E=0.0000E+00

Special Notes

Analyst Michael A. Kuhns



Scott Specialty Gases, Inc.

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Assay Laboratory
Scott Specialty Gases, Inc.
1750 East Club Boulevard
Durham, NC 27704

Purchase Order 4514MULLINT
Scott Project # 12-07707

ANALYTICAL INFORMATION

Certified to exceed the minimum specifications of EPA Protocol Procedure #G1, issued September, 1993.

Cylinder Number	ALM-038593	Certification Date	07-14-94	Expiration Date	07-14-97
Cylinder Pressure	1915 PSIG	Previous Certification	None		

ANALYZED CYLINDER

Components

Carbon Monoxide
Nitrogen

Certified Concentration
450 PPM

Analytical Uncertainty*

+/- 1% NIST Directly Traceable
Balance

Do not use when cylinder pressure is less than 150 PSIG.

*Analytical uncertainty is inclusive of usual known error sources which at least includes reference standard error & precision of the measurement processes.

REFERENCE STANDARD

Type **Expiration Date**
NTRM # 1681 07/94

Cylinder Number
ALM-024751

Concentration
966.1 PPM Balance in Nitrogen

INSTRUMENTATION

Instrument/Model/Serial #
Varian /3400/16804

Last Date Calibrated
06-17-94

Analytical Principle
Gas Chromatography

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components	First Triad Analysis	Second Triad Analysis	Calibration Curve																	
Carbon Monoxide	<table><tr><td>Date: 07-07-94</td><td>Response Units: Area</td></tr><tr><td>STD-33200</td><td>SPL-24649</td></tr><tr><td>SPL-24839</td><td>SPL-24605</td></tr><tr><td>STD-33159</td><td>STD-33208</td></tr></table>	Date: 07-07-94	Response Units: Area	STD-33200	SPL-24649	SPL-24839	SPL-24605	STD-33159	STD-33208	<table><tr><td>Date: 07-14-94</td><td>Response Units:</td></tr><tr><td>STD-30443</td><td>SPL-23277</td></tr><tr><td>SPL-23447</td><td>SPL-23473</td></tr><tr><td>STD-30306</td><td>STD-30235</td></tr></table>	Date: 07-14-94	Response Units:	STD-30443	SPL-23277	SPL-23447	SPL-23473	STD-30306	STD-30235	<table><tr><td>Date: 06-17-94</td></tr></table>	Date: 06-17-94
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	<table><tr><td>Date:</td><td>Response Units:</td></tr><tr><td>STD-</td><td>SPL-</td></tr><tr><td>SPL-</td><td>SPL-</td></tr><tr><td>STD-</td><td>STD-</td></tr></table>	Date:	Response Units:	STD-	SPL-	SPL-	SPL-	STD-	STD-	<table><tr><td>Date:</td><td>Response Units:</td></tr><tr><td>STD-</td><td>SPL-</td></tr><tr><td>SPL-</td><td>SPL-</td></tr><tr><td>STD-</td><td>STD-</td></tr></table>	Date:	Response Units:	STD-	SPL-	SPL-	SPL-	STD-	STD-	<table><tr><td></td></tr></table>	
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Date:	Response Units:																			
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A. Barber
Analyst A. Barber



Scott Specialty Gases

6141 EASTON ROAD, P.O. BOX 310, PLUMSTEADVILLE, PA 18949-0310

(215) 766-8881

FAX: (215) 766-0320

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

Customer
Entropy
Chem Division
8724 Glenwood Avenue
Raleigh, NC 27612

Assay Laboratory
Scott Specialty Gases, Inc.
6141 Easton Road
P.O. Box 310
Plumsteadville, PA 18949-0310

Purchase Order 5011-MAXWELL
Scott Project # 01-70629-001

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gasous Calibration Standards; 1 Procedure #GL Section Number 3.0.4; September, 1993.

Cylinder Number A1.MIB5396
Cylinder Pressure 2000 psig+

Certification Date 08-14-95
Previous Certification Dates None

Expiration Date 08-14-97

ANALYZED CYLINDER

Components
Nitric Oxide
Total Oxides of Nitrogen
Balance Gas Nitrogen

Certified Concentration
25.9 ppm
26.0 ppm

Analytical Uncertainty*
±1% NIST Traceable
Reference Value Only

*Do not use when cylinder is less than 150 psig.

*Analytical uncertainty is a measure of total known error sources which at least includes reference standard error & precision of the measurement process.

REFERENCE STANDARD

Type
NITROGEN
Expiration Date 11-21-96

Cylinder Number
KLM001188

Concentration
19.87 ppm NO in N₂

INSTRUMENTATION

Instrument/Model/Serial #
NCS Inc/10/97411115

Last Date Calibrated
08-14-95

Analytical Principle
Chemiluminescent

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components

Nitric Oxide

First Triad Analysis

Date: 08-07-95 Response Under Voils
Z1=0.0622 R1=1.9962 T1=2.5996
R2=2.0054 Z2=0.0626 T2=2.6220
Z3=0.0261 T3=2.5980 R3=1.9936
Avg. Conc. of Cust. Cyl. 25.9 ppm

Second Triad Analysis

Date: 08-14-95 Response Under Voils
Z1=0.0184 R1=1.5135 T1=1.9753
R2=1.9850 Z2=0.0135 T2=1.9690
Z3=0.0041 T3=1.9529 R3=1.5135
Avg. Conc. of Cust. Cyl. 25.9 ppm

Calibration Curve

Concentration = $A + B \cdot C + D \cdot C^2 + E \cdot C^3$
 $r = 1.0000$ NITROGEN
Constants: A = 1.8834E-01
B = 1.5871E+01 C = 0.0000E+00
D = 0.0000E+00 E = 0.0000E+00

Special Notes:

Analyst Wesley Elmer



Scott Specialty Gases

1750 EAST CLUB BOULEVARD, DURHAM, NC 27704

(919) 220-0803 FAX: (919) 220-0808

CERTIFICATE OF ANALYSIS: Interference-Free™ Multi-Component EPA Protocol Gas

Customer
Entropy Environmentalists
Attn: John Maxwell
Accounts Payable
P.O. Box 12291
Research Triangle Park, NC 27709

Assay Laboratory
Scott Specialty Gases, Inc.
1750 East Club Boulevard
Durham, NC 27704

Purchase Order MAXWELL
Scott Project # 12- 16095

ANALYTICAL INFORMATION

Certified to exceed the minimum specifications of EPA Protocol Procedure #G1, issued September, 1993.

Cylinder Number ALM-044018
Cylinder Pressure 1939 PSIG

Certification Date 03-06-95
Previous Certification None

Expiration Date 03-06-98

ANALYZED CYLINDER

Components

Nitric Oxide

NO_x

Nitrogen

Certified Concentration

43.52 PPM

44.05 PPM

Analytical Uncertainty*

± 1% NIST Directly Traceable
Reference Value Only
Balance

Do not use when cylinder pressure is less than 150 PSIG.

*Analytical uncertainty is inclusive of usual known error sources which at least includes precision of the measurement process.

REFERENCE STANDARD

Type NTRM# 1684
Expiration Date 06-97

Cylinder Number
ALM-049051

Concentration
94.4 PPM NO Balance in N₂

INSTRUMENTATION

Instrument/Model/Serial #
NICOLET / 8220 / AAB9400252

Last Date Calibrated
02-06-96

Analytical Principle
Scott Enhanced FTIR

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components

Nitric Oxide

First Triad Analysis

Date: 02-22-96 Response Unit: PPM
Z1= -0.155 R2= 94.48 Z3= -0.045
R1= 94.28 Z2= 0.048 T3= 43.56
T1= 43.61 T2= 43.69 R3= 94.42
Average Concentration : 43.62 PPM

Second Triad Analysis

Date: 03-06-96 Response Unit: PPM
Z1= -0.184 R2= 94.37 Z3= -0.018
R1= 94.50 Z2= -0.155 T3= 43.26
T1= 43.36 T2= 43.45 R3= 94.33
Average Concentration : 43.42 PPM

Calibration Curve

Date: 02-06-96
Concentration = A+Rx+Cx2+Dx3+Ex4+Fx5
R=0.99999 A= -2.04523E-1
B=7.55972E-1 C=2.59896E-4
D=5.37748E-7 E=1.13202E-1
F=1.91805E-13

Date: Response Unit:
Z1= R2= Z3=
R1= Z2= T3=
T1= T2= R3=

Date: Response Unit:
Z1= R2= Z3=
R1= Z2= T3=
T1= T2= R3=

Date:

Date: Response Unit:
Z1= R2= Z3=
R1= Z2= T3=
T1= T2= R3=

Date: Response Unit:
Z1= R2= Z3=
R1= Z2= T3=
T1= T2= R3=

Date:

B. Becton
Analyst B. Becton



Scott Specialty Gases

6141 EASTON ROAD, P.O. BOX 310, PLUMSTEADVILLE, PA 18949-0310

(215) 766-8861 FAX (215) 766-0320

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

Customer

Entropy
Attn: John Maxwell
Cem Division
Raleigh, NC 27612

Assay Laboratory

Scott Specialty Gases, Inc.
6141 Easton Road
P.O. Box 310
Plumsteadville, PA 18949-0310

Purchase Order 5159-MAXWELLJ
Scott Project # 01-78849-009

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; 1 Procedure #G1, Section Number 3.0.4; September, 1993.

Cylinder Number ALM054563
Cylinder Pressure 2000 psig+

Certification Date 05-07-96
Previous Certification Dates None

Expiration Date 05-07-98

ANALYZED CYLINDER

Components
Nitric Oxide
Total Oxides of Nitrogen
Balance Gas: Nitrogen

Certified Concentration
46.3 ppm
46.4 ppm

Analytical Uncertainty*
±1% NIST Traceable
Reference Value Only

*Do not use when cylinder is less than 150 psig.

*Analytical uncertainty is inclusive of usual known error sources which at least includes precision of the measurement process.

REFERENCE STANDARD

Type NRM1684
Expiration Date 06-07-97

Cylinder Number
ALM047456

Concentration
94.4 ppm NO in N₂

INSTRUMENTATION

Instrument/Model/Serial #
NO Horiba/CLA220/5708850810

Last Date Calibrated
04-17-96

Analytical Principle
Chemiluminescent

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components

Nitric Oxide

First Triad Analysis

Date: 04-30-96 Response Units: Volts
Z1=0.0009 R1=0.9549 T1=0.4690
R2=0.9526 Z2=0.0009 T2=0.4697
Z3=0.0009 T3=0.4703 R3=0.9518
Avg. Conc. of Cust. Cyl. 46.5 ppm

Second Triad Analysis

Date: 05-07-96 Response Units: Volts
Z1=0.0003 R1=0.9715 T1=0.4728
R2=0.9680 Z2=0.0003 T2=0.4737
Z3=0.0004 T3=0.4723 R3=0.9666
Avg. Conc. of Cust. Cyl. 46.1 ppm

Calibration Curve

Concentration = $A + Bx + Cx^2 + Dx^3 + Ex^4$
r=1.0000 NRM1684
Constants: A=7.1805E-03
B=9.9259E+01 C=0.0000E+00
D=0.0000E+00 E=0.0000E+00

Special Notes:



Scott Specialty Gases

6141 EASTON ROAD, P.O. BOX 310, PLUMSTEADVILLE, PA 18949-0310

(215) 766-8861 FAX (215) 766-0320

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

Customer
Entropy
Attn: John Maxwell
Cem Division
Raleigh, NC 27612

Assay Laboratory
Scott Specialty Gases, Inc.
6141 Easton Road
P.O. Box 310
Plumsteadville, PA 18949-0310

Purchase Order 5159-MAXWELLJ
Scott Project # 01-78849-009

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; 1 Procedure #G1, Section Number 3.0.4; September, 1993.

Cylinder Number -ALM034263
Cylinder Pressure 2000 psig+

Certification Date 05-07-96
Previous Certification Dates None

Expiration Date 05-07-98

ANALYZED CYLINDER

Components
Nitric Oxide
Total Oxides of Nitrogen
Balance Gas: Nitrogen

Certified Concentration
46.4 ppm
46.6 ppm

Analytical Uncertainty*
±1% NIST Traceable
Reference Value Only

+Do not use when cylinder is less than 150 psig.

*Analytical uncertainty is inclusive of usual known error sources which at least includes precision of the measurement processes.

REFERENCE STANDARD

Type NTRM1684
Expiration Date 06-07-97

Cylinder Number
ALM047456

Concentration
94.4 ppm NO in N₂

INSTRUMENTATION

Instrument/Model/Serial #
NO: Horiba/CLA220/5708850810

Last Date Calibrated
04-17-96

Analytical Principle
Chemiluminescent

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components	First Triad Analysis	Second Triad Analysis	Calibration Curve
Nitric Oxide	Date: 04-30-96 Response Units: Volts Z1=0.0009 R1=0.9549 T1=0.4695 R2=0.9526 Z2=0.0009 T2=0.4709 Z3=0.0009 T3=0.4719 R3=0.9518 Avg. Conc. of Cust. Cyl. 46.6 ppm	Date: 05-07-96 Response Units: Volts Z1=0.0004 R1=0.9723 T1=0.4752 R2=0.9717 Z2=0.0004 T2=0.4752 Z3=0.0002 T3=0.4752 R3=0.9693 Avg. Conc. of Cust. Cyl. 46.2 ppm	Concentration=A+Br+Cx²+Dx³+Ex⁴ r=1.00000 NTRM1684 Constants: A=-7.1805E-03 B=9.9259E+01 C=0.0000E+00 D=0.0000E+00 E=0.0000E+00

Special Notes:

Wesley B. Brier
Analyst Wesley B. Brier



Scott Specialty Gases

6141 EASTON ROAD, P.O. BOX 310, PLUMSTEADVILLE, PA 18949-0310

(215) 766-8861 FAX: (215) 766-0320

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

Customer
Entropy
8724 Glenwood Ave
Raleigh, NC 27612

Assay Laboratory
Scott Specialty Gases, Inc.
6141 Easton Road
P.O. Box 310
Plumsteadville, PA 18949-0310

Purchase Order 5071-MAXWEJ
Scott Project # 01-73802-005

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; 1 Procedure #G1, Section Number 3.0.4; September, 1993.

Cylinder Number ALM050120
Cylinder Pressure 2000 psig+

Certification Date 11-28-95
Previous Certification Dates None
Expiration Date 11-28-97

ANALYZED CYLINDER

Components

Nitric Oxide
Total Oxides of Nitrogen
Balance Gas: Nitrogen

Certified Concentration

46.4 ppm
47.1 ppm

Analytical Uncertainty*

±1% NIST Traceable
Reference Value Only

*Do not use when cylinder is less than 150 psig.

*Analytical uncertainty is inclusive of usual known error sources which at least includes reference standard error & precision of the measurement processes.

REFERENCE STANDARD

Type NTRM1684
Expiration Date 06-07-97

Cylinder Number
ALM049155

Concentration
94.4 ppm NO in N₂

INSTRUMENTATION

Instrument/Model/Serial #
NO: Horiba/CLA220/5708850610

Last Date Calibrated
11-10-95

Analytical Principle
Chemiluminescent

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components	First Triad Analysis	Second Triad Analysis	Calibration Curve
Nitric Oxide	Date: 11-21-95 Response Units: Volts Z1=0.0001 R1=0.9443 T1=0.4568 R2=0.9414 Z2=0.0003 T2=0.4602 Z3=0.0003 T3=0.4595 R3=0.9447 Avg. Conc. of Cust. Cyl. 46.5 ppm	Date: 11-28-95 Response Units: Volts Z1=0.0002 R1=0.9490 T1=0.4650 R2=0.9486 Z2=0.0000 T2=0.4679 Z3=0.0003 T3=0.4683 R3=0.9490 Avg. Conc. of Cust. Cyl. 46.3 ppm	Concentration = $A + Bx + Cx^2 + Dx^3 + Ex^4$ $r = 0.99992$ NTRM1684 Constants: A = 2.4890E-01 B = 9.8680E+01 C = 0.0000E+00 D = 0.0000E+00 E = 0.0000E+00

Special Notes:

Wesley Bleeker
Analyst Wesley Bleeker



Scott Specialty Gases

1750 EAST CLUB BOULEVARD, DURHAM, NC 27704

(919) 220-0803 FAX: (919) 220-0808

CERTIFICATE OF ANALYSIS: Interference-Free™ EPA Protocol Gas

Customer
Entropy
CEM Division
8724 Glenwood Avenue
Raleigh, NC 27612

Assay Laboratory
Scott Specialty Gases, Inc.
1750 East Club Boulevard
Durham, NC 27704

Purchase Order 12387Z1TOV
Scott Project # 12-15771

ANALYTICAL INFORMATION

Certified to exceed the minimum specifications of EPA Protocol Procedure #G1, issued September, 1993.

Cylinder Number AAL-830
Cylinder Pressure 647 PSIG

Certification Date 01-31-96
Previous Certification 08-05-93

Expiration Date 01-31-98

ANALYZED CYLINDER

Components

Nitric Oxide
N.O.X
Nitrogen

Certified Concentration

80.22 PPM
80.22 PPM

Analytical Uncertainty*

+/- 1% NIST Directly Traceable
Reference Value Only
Balance

Do not use when cylinder pressure is less than 150 PSIG.

*Analytical uncertainty is inclusive of usual known error sources which at least include reference standard error & precision of the measurement process.

REFERENCE STANDARD

Type NIRM# 1684
Expiration Date 06-97

Cylinder Number ALM-049051

Concentration 94.4 PPM NO Balance in N2

INSTRUMENTATION

Instrument/Model/Serial #
NICOLET / 8220 / AAB9400252

Last Date Calibrated
01-05-96

Analytical Principle
Scott Enhanced FTIR

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components

Nitric Oxide

First Triad Analysis

Date: 01-31-96 Response Unit: PPM
Z1= -0.137 R2= 94.57 Z3= -0.091
R1= 94.23 Z2= 0.097 T3= 80.22
T1= 80.16 T2= 80.27 R3= 94.40
Average Concentration: 80.22 PPM

Second Triad Analysis

Date: Response Unit:
Z1= R2= Z3=
R1= Z2= T3=
T1= T2= R3=

Calibration Curve

Date: 01-05-96
Concentration = A+Bx+Cx2+Dx3+Ex4+Fx5
R= 0.99999 A= 4.63378E-2
B= 6.33838E-1 C= 4.83089E-4
D= 6.29995E-7 E= -1.70069E-10
F= 1.93346E-13

Date: Response Unit:
Z1= R2= Z3=
R1= Z2= T3=
T1= T2= R3=

Date: Response Unit:
Z1= R2= Z3=
R1= Z2= T3=
T1= T2= R3=

Date:

Date: Response Unit:
Z1= R2= Z3=
R1= Z2= T3=
T1= T2= R3=

Date: Response Unit:
Z1= R2= Z3=
R1= Z2= T3=
T1= T2= R3=

Date:

B. Becton
Analyst B. Becton

Scott Specialty Gases

6141 EASTON ROAD, P.O. BOX 310, PLUMSTEADVILLE, PA 19949-0310 (215) 788-0801 FAX: (215) 788-0320

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

Customer Kitchy Environmental 4805 Green Rd. Suite 104 Raleigh, NC 27604	Army Laboratory Scott Specialty Gases, Inc. 6141 Easton Road P.O. Box 310 Plumsteadville, PA 19949-0310	Purchase Order KBA-0890-330 Scott Project # 01-6328-002
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ANALYTICAL INFORMATION

Certified to exceed the maximum specifications of EPA Protocol 1 Procedure 601, Section Number 3.0.4

Cylinder Number AL105545	Certification Date 01-05-95	Expiration Date 01-05-97
Cylinder Pressure 2000 psig*	Previous Certification Date None	

ANALYZED CYLINDER

Component Nitric Oxide Total Oxides of Nitrogen Balance Gas: Nitrogen	Certified Concentration 52.7 ppm 52.2 ppm	Analytical Uncertainty ±1% NIST Traceable Reference Value Only
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*Do not use when cylinder is less than 100 psig.
 *Analytical uncertainty is inclusive of usual known uncertainties which at least includes reference standard error & precision of the measurement process.

REFERENCE STANDARD

Type SM16032	Expiration Date 11-18-98	Cylinder Number CL400135	Concentration 47.9 ppm NO in N ₂
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INSTRUMENTATION

Instrument/Model/Serial # NO: Teco/10/9941175	Last Date Calibrated 01-03-95	Analytical Principle Chemiluminescence
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ANALYZER READINGS (Z-Zero Gas B-Balance Gas T-Test Gas C-Correlation Coefficient)

Components	First Trial Analysis	Second Trial Analysis	Calibration Curve
Nitric Oxide	Date: 12-28-94 Response Units/Vol Z=0.0100 B=0.0072 T=0.0021 B=0.0042 Z=0.0086 T=0.0037 B=0.0036 T=0.0094 C=0.0075 Avg Conc. of Cal. Cyl. 52.4 ppm	Date: 01-05-95 Response Units/Vol Z=0.0120 B=0.7000 T=0.4200 B=0.2071 Z=0.6042 T=0.0248 Z=0.0448 T=0.6378 B=0.7000 Avg. Conc. of Cal. Cyl. 52.0 ppm	Concentration (ppm) vs. Response Units Y=1.0000 X=0.0000 Correlation: 0.99999999 B=0.0000+00 C=0.0000+00 D=0.0000+00 E=0.0000+00

Special Notes:
☐ Check gas bar if certified concentrations have been corrected for analytical interference.

Handwritten Signature
 Analyst: [Signature]
 Date: 01/05/95



Scott Specialty Gases

1750 E. CLUB BLVD., DURHAM, NC 27704

(919) 220-0803 FAX: (919) 220-0808

CERTIFICATE OF ANALYSIS: Interference Free™ Multi-Component EPA Protocol Gas

Customer
Entropy
Attn: John Maxwell
CEM Division
8724 Glenwood Avenue
Raleigh, NC 27612

Assay Laboratory
Scott Specialty Gases, Inc.
1750 E. Club Blvd.
Durham, NC 27704

Purchase Order 5159-Maxwell
Scott Project # 12-17291

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay and Certification of Gaseous Calibration Standards, Procedure G1; September, 1993.

Cylinder Number ALM-003737
Cylinder Pressure+ 1917 psig

Previous Certification Dates

Certification Date 05-09-96
Exp. Date 05-09-98

ANALYZED CYLINDER

Components

Nitric Oxide
Total Oxides of Nitrogen
Nitrogen

Certified Concentration

82.62 ppm
82.74 ppm
Balance Gas

Analytical Accuracy*

±1% NIST Traceable
Reference Value Only

+ Do not use when cylinder pressure is below 150 psig.

* Analytical accuracy is inclusive of usual known error sources which at least includes precision of the measurement process.

REFERENCE STANDARD

Type/Sample No. Expiration Date
NIRM 1684 06-97

Cylinder Number
ALM-047432

Concentration
94.4 ppm NO in N2

INSTRUMENTATION

Instrument/Model/Serial #
Nicolet FTIR/8220/AAB9400252

Last Date Calibrated
05-02-96

Analytical Method
Scott Enhanced FTIR™

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components	First Triad Analysis	Second Triad Analysis	Calibration Curve																		
NO	Date: 05-01-96 Response Units: ppm <table><tr><td>Z1= -0.279</td><td>R1= 93.8</td><td>T1= 82.4</td></tr><tr><td>R2= 94.6</td><td>Z2= 0.176</td><td>T2= 82.1</td></tr><tr><td>Z3= 0.377</td><td>T3= 82.2</td><td>R3= 94.8</td></tr></table> Avg. Concentration = 82.2 ppm	Z1= -0.279	R1= 93.8	T1= 82.4	R2= 94.6	Z2= 0.176	T2= 82.1	Z3= 0.377	T3= 82.2	R3= 94.8	Date: 05-09-96 Response Units: ppm <table><tr><td>Z1= 0.574</td><td>R1= 94.20</td><td>T1= 81.90</td></tr><tr><td>R2= 94.65</td><td>Z2= 1.093</td><td>T2= 81.85</td></tr><tr><td>Z3= 1.713</td><td>T3= 81.78</td><td>R3= 94.57</td></tr></table> Avg. Concentration = 81.84 ppm	Z1= 0.574	R1= 94.20	T1= 81.90	R2= 94.65	Z2= 1.093	T2= 81.85	Z3= 1.713	T3= 81.78	R3= 94.57	Concentration = $A + Bx + Cx^2 + Dx^3 + Ex^4 + Fx^5$ $r = 0.99999$ Constants: $A = -2.04523E-1$ $B = 7.35977E-1$ $C = 1.59896E-4$ $D = -3.37748E-7$ $E = -1.13202E-1$ $F = 1.91805E-13$
Z1= -0.279	R1= 93.8	T1= 82.4																			
R2= 94.6	Z2= 0.176	T2= 82.1																			
Z3= 0.377	T3= 82.2	R3= 94.8																			
Z1= 0.574	R1= 94.20	T1= 81.90																			
R2= 94.65	Z2= 1.093	T2= 81.85																			
Z3= 1.713	T3= 81.78	R3= 94.57																			

Special Notes:

B. Becton
Analyst B. Becton



Scott Specialty Gases

1750 EAST CLUB BOULEVARD, DURHAM, NC 27704

(919) 220-0803 FAX: (919) 220-0808

CERTIFICATE OF ANALYSIS: Interference-Free™ Multi-Component EPA Protocol Gas

Customer
Entropy Environmentalists
Attn: John Maxwell
Accounts Payable
P.O. Box 12291
Research Triangle Park, NC 27709

Assay Laboratory
Scott Specialty Gases, Inc.
1750 East Club Boulevard
Durham, NC 27704

Purchase Order MAXWELL
Scott Project # 12-16095

ANALYTICAL INFORMATION

Certified to exceed the minimum specifications of EPA Protocol Procedure #G1, issued September, 1993.

Cylinder Number AAL-18591
Cylinder Pressure 1921 PSIG

Certification Date 03-06-95
Previous Certification None

Expiration Date 03-06-98

ANALYZED CYLINDER

Components

Nitric Oxide
NO_x
Nitrogen

Certified Concentration

86.97 PPM
88.60 PPM

Analytical Uncertainty*

+/- 1% NIST Directly Traceable
Reference Value Only
Balance

Do not use when cylinder pressure is less than 150 PSIG.

*Analytical uncertainty is inclusive of usual known error sources which at least includes precision of the measurement processes.

REFERENCE STANDARD

Type NTRM# 1684
Expiration Date 06-97

Cylinder Number ALM-049051

Concentration
94.4 PPM NO Balance in N₂

INSTRUMENTATION

Instrument/Model/Serial #
NICOLET / 8220 / AAB9400252

Last Date Calibrated
02-06-96

Analytical Principle
Scott Enhanced FTIR

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components

Nitric Oxide

First Triad Analysis

Date: 02-28-96 Response Units: PPM
Z1=-0.155 R2=94.48 Z3=-0.045
R1=94.28 Z2=0.048 T3=87.06
T1=87.09 T2=87.29 R3=94.42
Average Concentration: 87.15 PPM

Second Triad Analysis

Date: 03-06-96 Response Units: PPM
Z1=-0.184 R2=94.37 Z3=-0.018
R1=94.50 Z2=-0.155 T3=86.90
T1=86.83 T2=86.61 R3=94.33
Average Concentration: 86.97 PPM

Calibration Curve

Date: 02-06-96
Concentration = A+Bx+Cx²+Dx³+Ex⁴+Fx⁵
R=0.99999 A=-2.04523E-1
B=7.55972E-1 C=2.59896E-4
D=3.37748E-7 E=1.13202E-1
F=1.91805E-13

Date: Response Units:
Z1- R2- Z3-
R1- Z2- T3-
T1- T2- R3-

Date: Response Units:
Z1- R2- Z3-
R1- Z2- T3-
T1- T2- R3-

Date:

Date: Response Units:
Z1- R2- Z3-
R1- Z2- T3-
T1- T2- R3-

Date: Response Units:
Z1- R2- Z3-
R1- Z2- T3-
T1- T2- R3-

Date:

B. Becton
Analyst B. Becton



Scott Specialty Gases

1750 E. CLUB BLVD., DURHAM, NC 27704

(919) 220-0803 FAX: (919) 220-0808

CERTIFICATE OF ANALYSIS: Interference Free™ Multi-Component EPA Protocol Gas

Customer
Entropy
Attn: John Maxwell
CEM Division
8724 Glenwood Avenue
Raleigh, NC 27612

Assay Laboratory
Scott Specialty Gases, Inc.
1750 E. Club Blvd.
Durham, NC 27704

Purchase Order 5159-MAXWELLJ
Scott Project # 12-17291

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay and Certification of Gaseous Calibration Standards; Procedure G1; September, 1993.

Cylinder Number AAL-4107
Cylinder Pressure+ 1993 psig

Previous Certification Dates

Certification Date 05-06-96
Exp. Date 05-06-99

ANALYZED CYLINDER

Components
Carbon Dioxide
Nitrogen

Certified Concentration
11.02 %
Balance Gas

Analytical Accuracy*
±1% NIST Traceable

+ Do not use when cylinder pressure is below 150 psig.

* Analytical accuracy is inclusive of usual known error sources which at least includes precision of the measurement procedure.

REFERENCE STANDARD

Type/Sample No. Expiration Date
NTRM 18000 12-21-96

Cylinder Number
ALM-047732

Concentration
17.95% CO2 in N2

INSTRUMENTATION

Instrument/Model/Serial #
Nicolet FTIR/8220/AAB9400252

Last Date Calibrated
05-02-96

Analytical Method
Scott Enhanced FTIR™

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components

First Triad Analysis

Second Triad Analysis

Calibration Curve

CO2

Date: 05-06-96 Response Units: %
Z1= -0.006 R1= 17.95 T1= 11.03
R2= 17.96 Z2= 0.007 T2= 11.02
Z3= 0.004 T3= 11.02 R3= 17.95
Avg. Concentration = 11.02 %

Date: Response Units:
Z1= R1= T1=
R2= Z2= T2=
Z3= T3= R3=
Avg. Concentration =

Concentration = $A + Bx + Cx^2 + Dx^3$
 $r = 0.99999$
Constants: A = -4.03725E-3
B = 6.78095E-5 C = 1.57142E-10
D = 1.02225E-16

Special Notes:

B. Bector
Analyst B. Bector



Scott Specialty Gases

1750 E. CLUB BLVD., DURHAM, NC 27704

(919) 220-0803 FAX: (919) 220-0808

CERTIFICATE OF ANALYSIS: Interference Free™ Multi-Component EPA Protocol Gas

Customer
Entropy
Attn: John Maxwell
CEM Division
8724 Glenwood Avenue
Raleigh, NC 27612

Assay Laboratory
Scott Specialty Gases, Inc.
1750 E. Club Blvd.
Durham, NC 27704

Purchase Order 5159-MAXWELL
Scott Project # 12-17291

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay and Certification of Gaseous Calibration Standards; Procedure G1; September, 1993.

Cylinder Number AAL-6899
Cylinder Pressure† 1993 psig

Previous Certification Dates

Certification Date 05-06-96
Exp. Date 05-06-99

ANALYZED CYLINDER

Components
Carbon Dioxide
Nitrogen

Certified Concentration
11.02 %
Balance Gas

Analytical Accuracy*
±1% NIST Traceable

† Do not use when cylinder pressure is below 150 psig.

* Analytical accuracy is inclusive of usual known error sources which at least includes precision of the measurement process.

REFERENCE STANDARD

Type/Sample No. NIRM 18000
Expiration Date 12-21-96

Cylinder Number
ALM-047732

Concentration
17.95% CO2 in N2

INSTRUMENTATION

Instrument/Model/Serial #
Nicolet FTIR/8220/AAB9400252

Last Date Calibrated
05-02-96

Analytical Method
Scott Enhanced FTIR™

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components

CO2

First Triad Analysis

Date: 05-06-96 Response Units: %
Z1= -0.006 R1= 17.95 T1= 11.02
R2= 17.96 Z2= 0.007 T2= 11.02
Z3= 0.004 T3= 11.02 R3= 17.95
Avg. Concentration = 11.02 %

Second Triad Analysis

Date: Response Units:
Z1= R1= T1=
R2= Z2= T2=
Z3= T3= R3=
Avg. Concentration =

Calibration Curve

Concentration = $A + Bx + Cx^2 + Dx^3$
 $r = 0.99999$
Constants: $A = -4.83729E-3$
 $B = 6.78095E-5$ $C = 1.57142E-10$
 $D = 1.02225E-16$

Special Notes:

B. Becton
Analyst B. Becton



Scott Specialty Gases

1750 EAST CLUB BOULEVARD, DURHAM, NC 27704

(919) 220-0803 FAX: (919) 220-0808

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

Customer
Entropy Environmentalists
Attn: John Maxwell
Accounts Payable
P.O. Box 12291
Research Triangle Park, NC 27709

Assay Laboratory
Scott Specialty Gases, Inc.
1750 East Club Boulevard
Durham, NC 27704

Purchase Order MAXWELL
Scott Project # 12-16095

ANALYTICAL INFORMATION

Certified to exceed the minimum specifications of EPA Protocol Procedure #G1, issued September, 1993.

Cylinder Number ALM-046363
Cylinder Pressure 2000 PSIG

Certification Date 03-05-96
Previous Certification None

Expiration Date 03-05-99

ANALYZED CYLINDER

Components

Oxygen
Nitrogen

Certified Concentration
12.05 %

Analytical Uncertainty*

+/- 1% NIST Directly Traceable
Balance

Do not use when cylinder pressure is less than 150 PSIG.

*Analytical uncertainty is inclusive of usual known error sources which at least includes reference standard error & precision of the measurement process.

REFERENCE STANDARD

Type
NIRM # 2659
Expiration Date 11-96

Cylinder Number
ALM-017564

Concentration
20.63% O2 Balance in N2

INSTRUMENTATION

Instrument/Model/Serial #
Varian /3400/16804

Last Date Calibrated
02-08-96

Analytical Principle
Gas Chromatography

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components

Oxygen

First Triad Analysis

Date: 03-05-96 Response Unit: Area
Area
STD-525149 SPL-306735
SPL-306969 STD-525479
STD-525406 SPL-306747

Second Triad Analysis

Date: Response Unit:
STD- SPL-
SPL- STD-
STD- SPL-

Calibration Curve

Date: 02-06-96

Date: Response Unit:
STD- SPL-
SPL- STD-
STD- SPL-

Date: Response Unit:
STD- SPL-
SPL- STD-
STD- SPL-

Date:

Date: Response Unit:
STD- SPL-
SPL- STD-
STD- SPL-

Date: Response Unit:
STD- SPL-
SPL- STD-
STD- SPL-

Analyst S. Vaughan



Scott Specialty Gases

1750 EAST CLUB BOULEVARD, DURHAM, NC 27704

(919) 220-0803 FAX: (919) 220-0803

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

Customer
Entropy Environmentalists
Attn: John Maxwell
Accounts Payable
P.O. Box 12291
Research Triangle Park, NC 27709

Assay Laboratory
Scott Specialty Gases, Inc.
1750 East Club Boulevard
Durham, NC 27704

Purchase Order MAXWELL
Scott Project # 12-16095

ANALYTICAL INFORMATION

Certified to exceed the minimum specifications of EPA Protocol Procedure #G1, issued September, 1993.

Cylinder Number AAL-5695
Cylinder Pressure 2000 PSIG

Certification Date 03-05-96
Previous Certification None

Expiration Date 03-05-99

ANALYZED CYLINDER

Components

Oxygen
Nitrogen

Certified Concentration
12.86 %

Analytical Uncertainty*

+/- 1% NIST Directly Tracable
Balance

Do not use when cylinder pressure is less than 150 PSIG.

*Analytical uncertainty is inclusive of usual known error sources which at least includes reference standard error & precision of the measurement process.

REFERENCE STANDARD

Type NIRM # 2659
Expiration Date 11-96

Cylinder Number
ALM-017564

Concentration
20.63% O2 Balance in N2

INSTRUMENTATION

Instrument/Model/Serial #
Varian /3400/16804

Last Date Calibrated
02-08-96

Analytical Principle
Gas Chromatography

ANALYZER READINGS

(Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components

Oxygen

First Triad Analysis

Date:	Response Unit:
STD-325149	SPL-307235
SPL-307036	STD-325479
STD-325406	SPL-307321

Second Triad Analysis

Date:	Response Unit:
STD-	SPL-
SPL-	STD-
STD-	SPL-

Calibration Curve

Date: 02-06-96

Date:	Response Unit:
STD-	SPL-
SPL-	STD-
STD-	SPL-

Date:	Response Unit:
STD-	SPL-
SPL-	STD-
STD-	SPL-

Date:

Date:	Response Unit:
STD-	SPL-
SPL-	STD-
STD-	SPL-

Date:	Response Unit:
STD-	SPL-
SPL-	STD-
STD-	SPL-

Analyst S. Vaughan



Scott Specialty Gases

1750 EAST CLUB BOULEVARD, DURHAM, NC 27704

(919) 220-0803 FAX: (919) 220-0808

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

Customer
Entropy
Attn: John Maxwell
CEM Division
8724 Glenwood Avenue
Raleigh, NC 27612

Assay Laboratory
Scott Specialty Gases, Inc.
1750 East Club Boulevard
Durham, NC 27704

Purchase Order 5159-MAXWELLJ
Scott Project # 12-17291

ANALYTICAL INFORMATION

Certified to exceed the minimum specifications of EPA Protocol Procedure #G1, issued September, 1993.

Cylinder Number ALM-044661 Certification Date 05-06-96 Expiration Date 05-06-99
Cylinder Pressure 2000 psig Previous Certification None

ANALYZED CYLINDER

Components

Oxygen
Nitrogen

Certified Concentration

12.26 %

Analytical Uncertainty*

+/- 1% NIST Directly Traceable
Balance

Do not use when cylinder pressure is less than 150 PSIG.

*Analytical uncertainty is inclusive of usual known error sources which at least includes reference standard error & precision of the measurement processes.

REFERENCE STANDARD

Type NIRM # 2658 Expiration Date 11-96

Cylinder Number
ALM-031884

Concentration
9.68 % O2 Balance in N2

INSTRUMENTATION

Instrument/Model/Serial #
Varian /3400/16804

Last Date Calibrated
04-23-96

Analytical Principle
Gas Chromatography

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components

Oxygen

First Triad Analysis

Date: 05-06-96 Response Unit: Area
STD-247107 SPL-313313
SPL-312878 STD-247520
STD-247300 SPL-313260

Second Triad Analysis

Date: Response Unit:
STD- SPL-
SPL- STD-
STD- SPL-

Calibration Curve

Date: 04-23-96

Date: Response Unit:
STD- SPL-
SPL- STD-
STD- SPL-

Date: Response Unit:
STD- SPL-
SPL- STD-
STD- SPL-

Date:

Date: Response Unit:
STD- SPL-
SPL- STD-
STD- SPL-

Date: Response Unit:
STD- SPL-
SPL- STD-
STD- SPL-

S. Vaughan
Analyst S. Vaughan



Scott Specialty Gases

1750 EAST CLUB BOULEVARD, DURHAM, NC 27704

(919) 220-0803 FAX: (919) 220-0808

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

Customer
Entropy Environmentalists
Attn: K. Spears
P.O. Box 12291
Research Triangle Park, NC 27709

Assay Laboratory
Scott Specialty Gases, Inc.
1750 East Club Boulevard
Durham, NC 27704

Purchase Order 4922
Scott Project # 12-11576

ANALYTICAL INFORMATION

Certified to exceed the minimum specifications of EPA Protocol Procedure #G1, issued September, 1993.

Cylinder Number ALM-001351
Cylinder Pressure 2000 PSIG

Certification Date 05-15-95
Previous Certification None

Expiration Date 05-15-98

ANALYZED CYLINDER

Components

Oxygen
Carbon Dioxide
Nitrogen

Certified Concentration
20.22 %
16.92 %

Analytical Uncertainty*

+/- 1% NIST Directly Traceable
+/- 1% NIST Directly Traceable
Balance

Do not use when cylinder pressure is less than 150 PSIG.

*Analytical uncertainty is inclusive of usual known error sources which at least includes reference standard error & precision of the measurement process.

REFERENCE STANDARD

Type **Expiration Date**
NTRM # 2659 11-96
NTRM# 1675 09-95

Cylinder Number
ALM-031720
ALM-032766

Concentration
20.72% O2 Balance in N2
14.01% CO2 Balance in N2

INSTRUMENTATION

Instrument/Model/Serial #
Varian /3400/16804

Last Date Calibrated
04-17-95

Analytical Principle
Gas Chromatography

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components	First Triad Analysis	Second Triad Analysis	Calibration Curve
Oxygen	Date: 05-15-95 Response Units: Area STD-543753 SPL-530989 SPL-531718 STD-543709 STD-543680 SPL-529444	Date: Response Units: STD- SPL- SPL- STD- STD- SPL-	Date: 04-17-95
Carbon Dioxide	Date: 05-15-95 Response Units: Area STD-264952 SPL-319387 SPL-319436 STD-264618 STD-265012 SPL-320673	Date: Response Units: STD- SPL- SPL- STD- STD- SPL-	Date: 04-17-95
	Date: Response Units: STD- SPL- SPL- STD- STD- SPL-	Date: Response Units: STD- SPL- SPL- STD- STD- SPL-	

B. Becton
Analyst B. Becton



Scott Specialty Gases

1750 EAST CLUB BOULEVARD, DURHAM, NC 27704

(919) 220-0803 FAX: (919) 220-0808

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

Customer
Entropy
Attn: John Maxwell
Research Division
8724 Glenwood Avenue
Raleigh, NC 27612

Assay Laboratory
Scott Specialty Gases, Inc.
1750 East Club Boulevard
Durham, NC 27704

Purchase Order 5051-MXWELJ
Scott Project # 12-14198

ANALYTICAL INFORMATION

Certified to exceed the minimum specifications of EPA Protocol Procedure #G1, issued September, 1993.

Cylinder Number	AAL-21309	Certification Date	10-16-95	Expiration Date	10-16-98
Cylinder Pressure	2000 PSIG	Previous Certification	None		

ANALYZED CYLINDER

Components

Carbon Dioxide
Oxygen
Nitrogen

Certified Concentration

17.20 %
20.34 %

Analytical Uncertainty*

± 1% NIST Directly Traceable
± 1% NIST Directly Traceable
Balance

Do not use when cylinder pressure is less than 150 PSIG.

*Analytical uncertainty is inclusive of usual known error sources which at least includes reference standard error & precision of the measurement processes.

REFERENCE STANDARD

Type	Expiration Date
NIRM # 18000	12-96
NIRM # 2659	11-96

Cylinder Number
ALM-047691
ALM-031720

Concentration
17.95% CO2 Balance in N2
20.72% O2 Balance in N2

INSTRUMENTATION

Instrument/Model/Serial #
Varian /3400/0160
Varian /3400/16804

Last Date Calibrated
09-19-95
10-06-95

Analytical Principle
Gas Chromatography
Gas Chromatography

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components

First Triad Analysis

Date: 10-16-95	Response Units: Area
STD-316772	SPL-303981
SPL-302958	STD-316629
STD-316806	SPL-303472

Second Triad Analysis

Date:	Response Unit:
STD-	SPL-
SPL-	STD-
STD-	SPL-

Calibration Curve

Date: 09-19-95

Carbon Dioxide

Date: 10-16-95	Response Unit: Area
STD-348378	SPL-339275
SPL-339161	STD-348978
STD-349013	SPL-338032

Date:	Response Unit:
STD-	SPL-
SPL-	STD-
STD-	SPL-

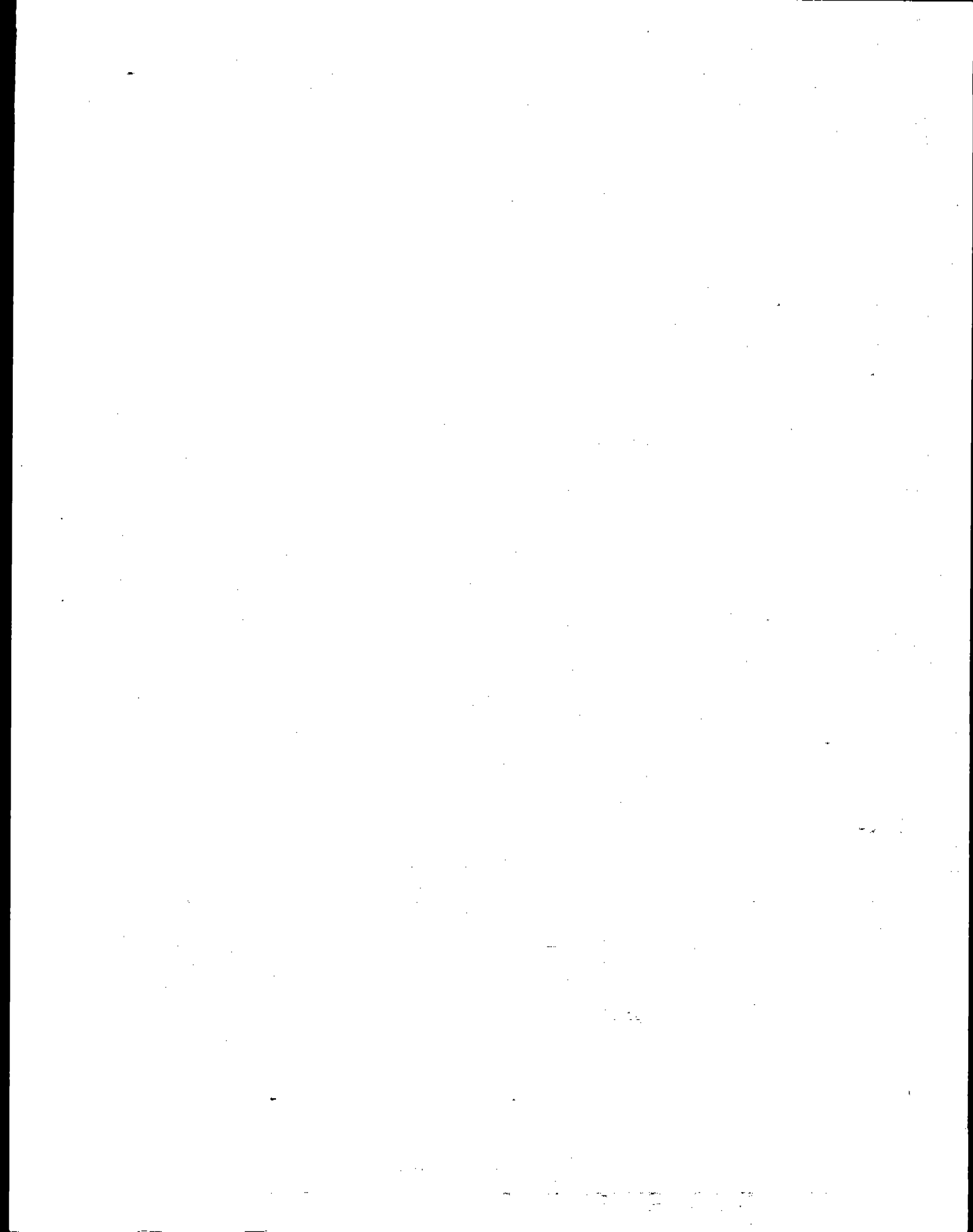
Date: 10-06-95

Oxygen

Date:	Response Unit:
STD-	SPL-
SPL-	STD-
STD-	SPL-

Date:	Response Unit:
STD-	SPL-
SPL-	STD-
STD-	SPL-

B. Becton
Analyst B. Becton



ENTROPY, INC.

Specialists in Air Emissions Technology

*P.O. Box 12291 • Research Triangle Park, North Carolina 27709-2291
(919) 781-3550 • (800) 486-3550 • Fax (919) 787-8442*

STATIONARY SOURCE SAMPLING REPORT

REFERENCE NO. 15575A

**ROXBORO OSB PLANT
ROXBORO, NORTH CAROLINA**

**EMISSIONS TESTING FOR:
CONDENSIBLE PARTICULATE
CARBON MONOXIDE
FILTERABLE PARTICULATE
NITROGEN OXIDES
TOTAL HYDROCARBONS**

RTO NOS. 1, 2, AND 3

PERFORMED FOR: LOUISIANA-PACIFIC CORPORATION

AUGUST 1996

Table of Contents

	<u>Page</u>	
Process Information.....	1	
Process Data Summary.....	2	
 Press RTO(#3) Test, August 6, 1996		
Production Summary.....	3	
Press Production Chart.....	4	
Press RTO Chart.....	5	
Press RTO Data Sheets.....	6-8	
Dryer Process Sheets.....	9	
 Dryer RTO(#1 & #2) Test, August 9, 1996		
Production Summary.....	10-11	
Press Production Chart.....	12-13	
Dryer RTO Chart.....	14-15	
Dryer RTO Data Sheets.....	16-19	
Dryer Process Sheets.....	20-23	
 RTO Gas Usage.....		24
Raw Material & Resin Usage.....		25
Quality Control Round Sheets.....		26-28
Press Enclosure Verification.....		29
Press Enclosure Air Velocity Readings.....		30-31

Roxboro OSB Stack Testing
August 6 & 9, 1996

Process Summary

Production rates, process control settings and raw material usage were recorded during both tests. Official plant startup was February 19, 1996.

RTO #1 & #2 setpoint was 1570° F and RTO #3 setpoint was 1520°F. RTO temperature recording charts as well as press production charts have also been included in this report.

ROXBORO TESTING AUGUST 6 & 8, 1996

Process data summary

PRESS AUGUST 6, 1996 - PM,NOX,CO,VOC

30.70 =Plant Production rate in Tons per hour
760.81 =MDI resin usage in pounds per hour (100% solids)
1.24% =MDI resin usage as % of finished product
1,353.50 =Liquid phenolic resin usage in pounds per hour (100% solids)
2.20% =Liquid phenolic resin usage as % of finished product
280.20 =Wax usage in pounds per hour (100% solids)
0.46% =Wax usage as % of finished product

DRYER AUGUST 9, 1996 - PM,NOX,CO,VOC

31.03 =PressProduction rate in Tons per hour
76,495 = Production rate of five dryers in pounds per hour
7.22 =Total fuel burned in tons per hour
47.42% =average incoming moisture percent
6.01% =average dry moisture percent
968 =average inlet temperature
1,584 =average RTO temperature #1
1,572 =average RTO temperature #1
1,567 =average RTO temperature #1
1,563 =average RTO temperature #1
1,570 =average RTO temperature #1
1,576 =average RTO temperature #2
1,563 =average RTO temperature #2
1,572 =average RTO temperature #2
1,566 =average RTO temperature #2
1,565 =average RTO temperature #2

PRESS AUGUST 6, 1996**PM,NOX,CO,VOC**

DATA TIME:	START=	11:25	END=	11:45	HOURS=	0.33
	START=	12:20	END=	13:05	HOURS=	0.75
	START=	13:45	END=	14:15	HOURS=	0.50
	START=	14:30	END=	15:08	HOURS=	0.63
	START=	15:30	END=	16:34	HOURS=	<u>1.07</u>
					TOTAL=	3.28

BOARD WEIGHTS - LBS

average weights are determined by taking the weights of individual 4' x 8' peices.

23/32"
 per/peice 80.00
 per/ 8' x 24' 480.00

PLANT PRODUCTION RATE

3.28 =hours during testing
 30 =pressloads
 420 =no. of 8'x24' boards produced (pressloads x 14 boards per load)
 80,640 =volume produced in surface footage (pressloads x 8'x24'x14 openings)
 154,563 =volume produced 3/8" basis (pressloads x 8'x24'x 14 openings x 1.9167)
 201,600 =lbs of finished product (boards produced x weight of finished board)
 61,401 =lbs of finished product per hour (lbs of finshed product / hours)
 30.70 =tons of finished product per hour (lbs of finshed product per hour / 2000 lb

RESIN USAGE TAKEN FROM TOTALIZERS

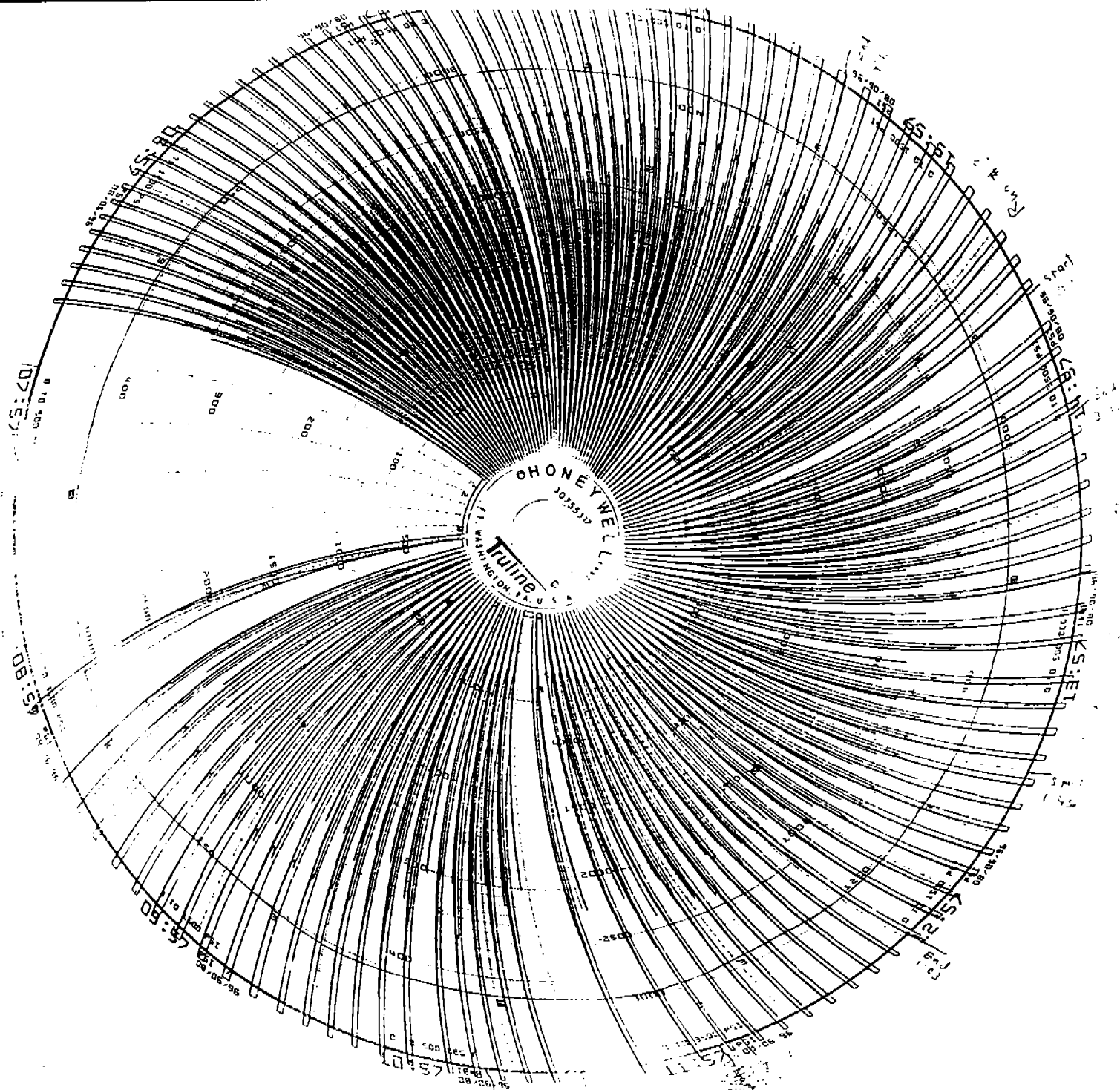
TIME	MDI	PHENOL	WAX
11:25-13:05	834	1,436	303
13:45-15:08	835	1,493	317
15:30-16:34	829	1,515	300

Ave. per hour	760.81	1,353.50	280.20
---------------	--------	----------	--------

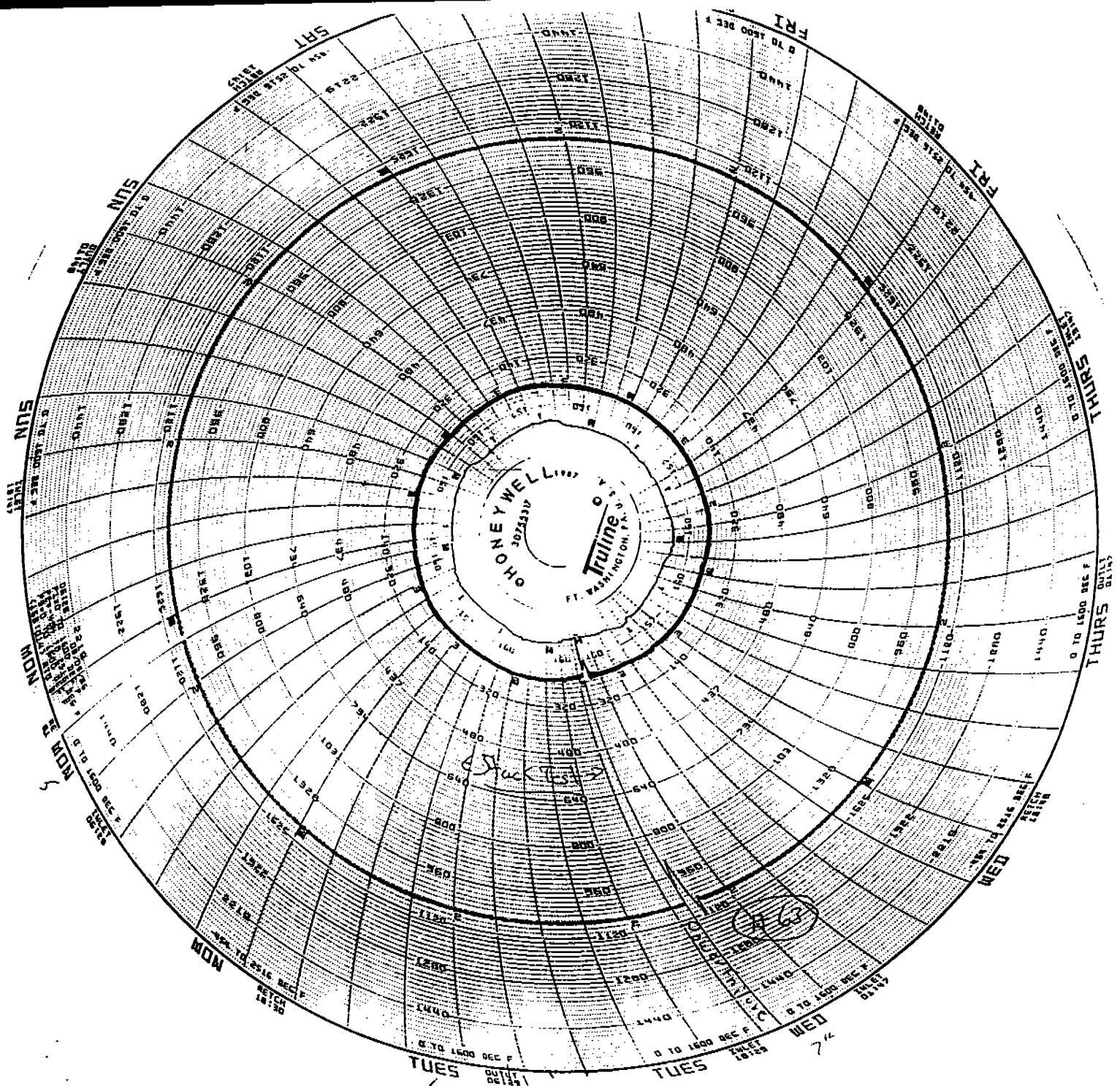
61,401 =average lbs. per hour finished product produced during testing
 760.81 =average lbs. per hour of MDI resin (100% solids) used during testing
 1.24% = MDI resin used as % of finished product

1,353.50 =average lbs. per hour of phenolic resin (100% solids) used during testing
 2.20% =Phenolic resin used as % of finished product

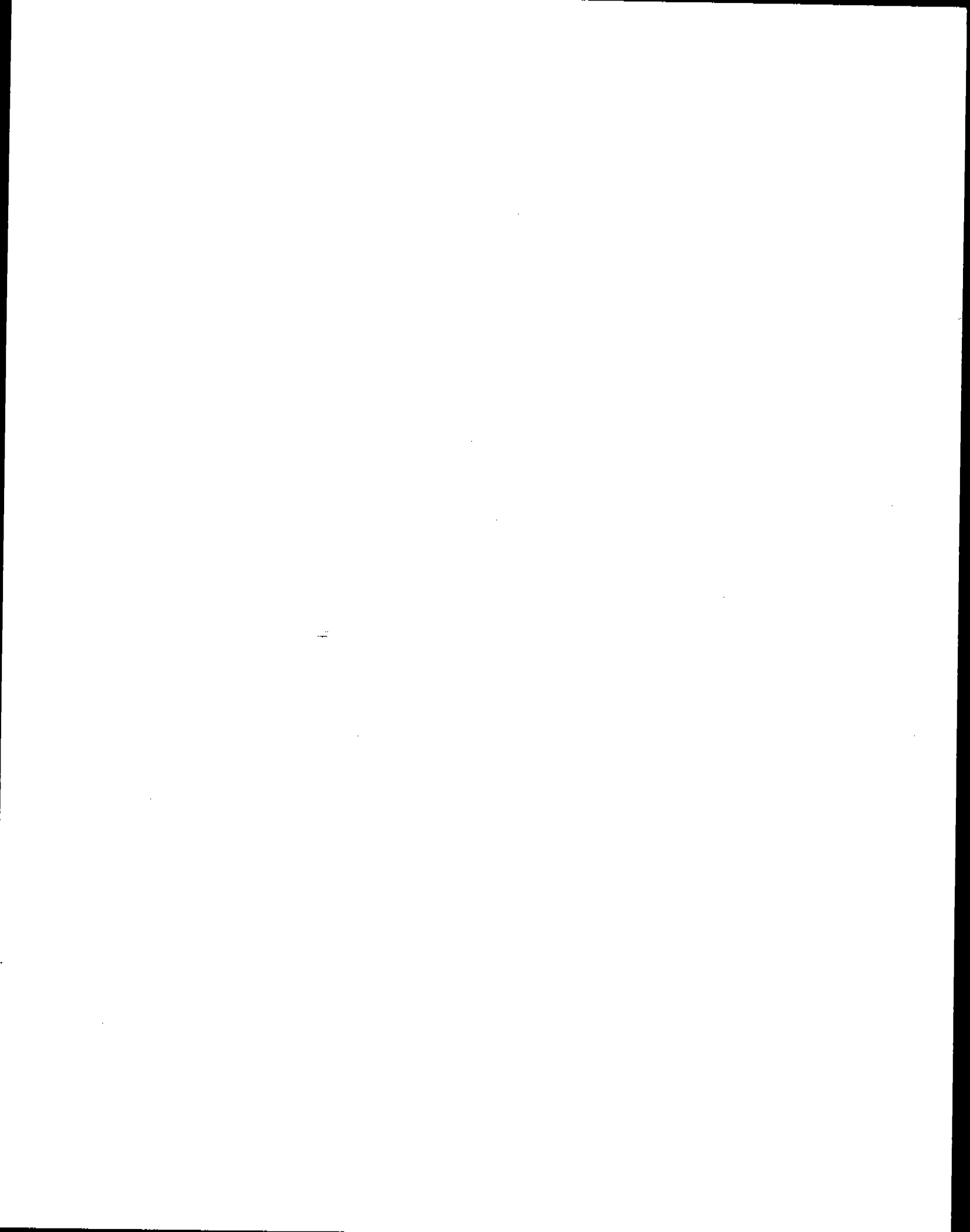
280.20 =average lbs. per hour of wax (100% solids) used during testing
 0.46% =wax used as % of finished product



Press Production Chart - August 6, 1996
23/32" Board Thickness
10 press loads per test run



Press RTO(#3) Chart - August 6, 1996



Roxboro OSB

RTO Stack Testing Form

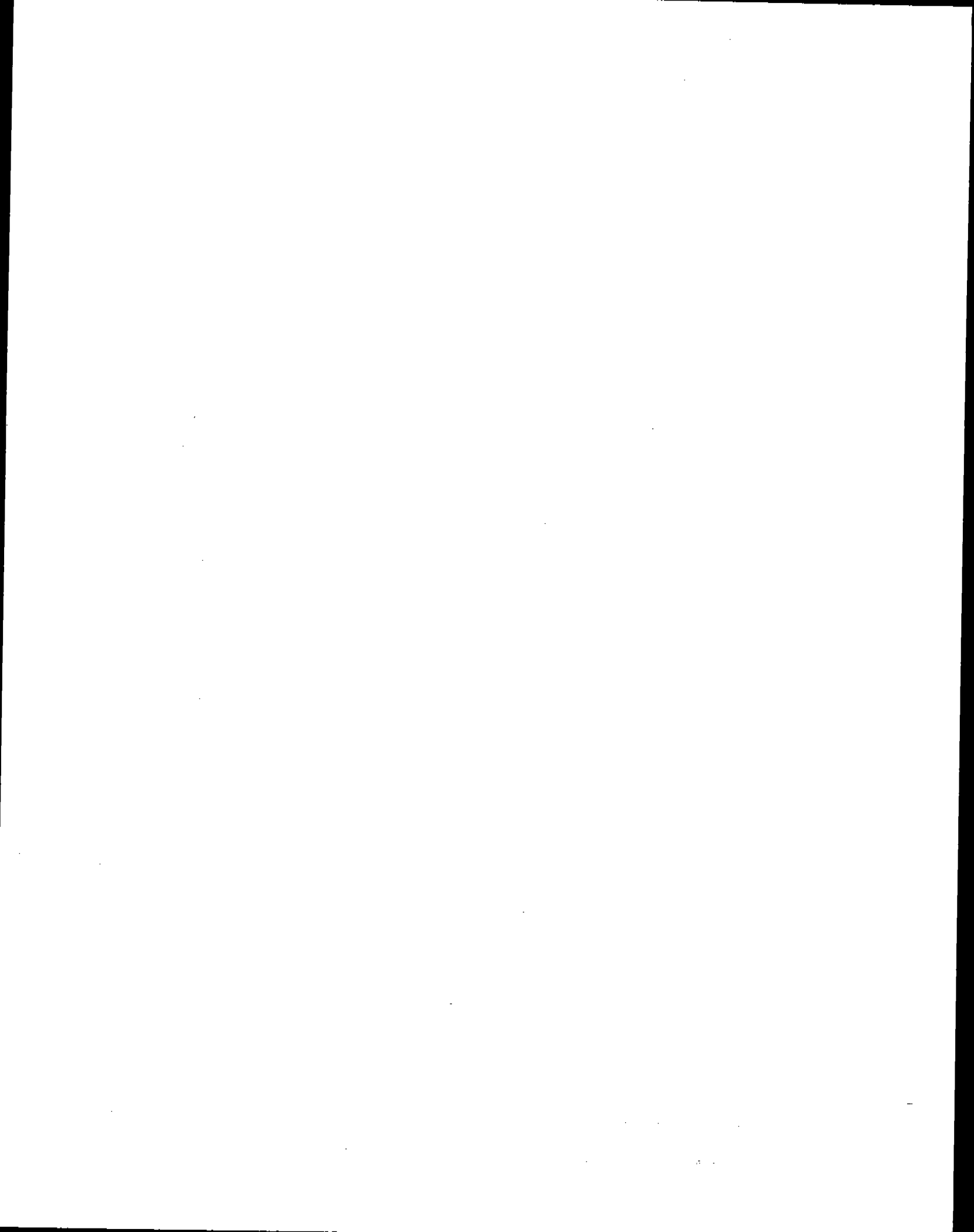
RTO# 3

Date	8 / 6 / 96
By	Strohbeck
Sheet #	1

BED TEMPERATURES										RTO TEMPERATURES										Inlet Valve Pressure	RTO Gas Reading																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
Time	#1	#2	#3	#4	#5	#6	#7																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
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RTO Fuel injection SP 1520

* This reading comes from software any of 5 thermocouples but is at a different time and may not agree with the other readings taken from the RTO.



3

By	S.
Sheet #	2

Date	8/6/96
By	Strubbech
Sheet #	2

BED TEMPERATURES										RTO TEMPERATURES									
Time	Inlet Vault							Pressure	RTO										
	#1	#2	#3	#4	#5	#6	#7		Inlet	Outlet	Rel. Temp.	Rel. Temp.	Rel. Temp.	Rel. Temp.	Rel. Temp.	Rel. Temp.	Rel. Temp.	Rel. Temp.	
12:00	244	197	152	142	143	117	214	123	227	1525	1542	1534	1491	1479	1530	1530	1530	1530	
10	141	119	185	214	184	149	142	124	221	1533	1520	1525	1523	1525	1518	1518	1518	1518	
20	138	161	189	207	200	152	143	123	221	1537	1518	1526	1527	1541	1522	1522	1522	1522	
30	147	141	147	170	208	219	168	122	220	1561	1526	1512	1510	1526	1520	1520	1520	1520	
40	138	153	184	203	220	156	145	124	219	1542	1513	1518	1516	1535	1519	1519	1519	1519	
50	199	157	144	146	179	149	249	126	226	1525	1542	1523	1496	1501	1528	1528	1528	1528	
60	248	197	156	142	144	149	217	126	230	1512	1533	1530	1490	1483	1519	1519	1519	1519	
1:00	203	220	210	157	141	141	175	124	227	1514	1509	1526	1513	1502	1513	1513	1513	1513	
1:10	203	220	210	157	141	141	175	124	227	1514	1509	1526	1513	1502	1513	1513	1513	1513	
1:20	203	220	210	157	141	141	175	124	227	1514	1509	1526	1513	1502	1513	1513	1513	1513	
1:30	203	220	210	157	141	141	175	124	227	1514	1509	1526	1513	1502	1513	1513	1513	1513	
1:40	203	220	210	157	141	141	175	124	227	1514	1509	1526	1513	1502	1513	1513	1513	1513	
1:50	141	150	179	196	233	163	149	126	219	1543	1515	1523	1521	1537	1519	1519	1519	1519	
2:00	140	154	182	200	226	158	177	125	220	1547	1521	1527	1523	1540	1519	1519	1519	1519	
2:10																			
2:20	146	141	154	176	216	201	163	123	220	1560	1529	1570	1503	1524	1531	1531	1531	1531	
2:30	163	148	140	155	192	203	205	124	229	1572	1547	1524	1504	1520	1534	1534	1534	1534	
2:40	154	144	143	163	202	217	183	124	226	1560	1535	1511	1492	1512	1522	1522	1522	1522	
2:50	159	147	143	159	196	213	192	125	226	1568	1541	1520	1501	1521	1529	1529	1529	1529	
3:00	147	143	154	174	213	213	148	125	220	1572	1532	1512	1506	1525	1532	1532	1532	1532	
3:10	200	190	155	143	177	174	223	125	227	1515	1535	1529	1486	1478	1541	1541	1541	1541	

Roxboro OSB

RTO# 3

RTO Stack Testing Form

Date	8/6/96
By	Strahbeck
Sheet #	3

		BED TEMPERATURES							Inlet Valve	RTO TEMPERATURES							Avox Gas Reading
Time		#1	#2	#3	#4	#5	#6	#7	Pressure	Inlet	Outlet	Ret. Temp.	Ret. Temp.	Ret. Temp.	Ret. Temp.	Ret. Temp.	
3:00																	
10																	
20																	
3:30		147	135	202	217	173	193	143	-0.91	126	220	1526	1513	1518	1521	1529	1510
40		143	142	163	182	222	139	158	-0.94	124	220	1552	1520	1512	1512	1527	1521
50		148	143	151	173	210	214	168	-0.85	124	220	1563	1529	1512	1507	1526	1525
60		148	144	152	174	210	218	169	-0.85	125	220	1561	1529	1517	1516	1527	1526
10		199	156	142	143	175	195	249	-0.76	124	226	1555	1536	1518	1488	1497	1528
20		179	151	141	147	130	200	247	-0.80	123	227	1557	1536	1517	1481	1501	1525
30		217	201	184	151	139	144	187	-0.84	124	225	1515	1527	1535	1512	1492	1519
30																	
40																	
50																	
60																	
0																	
10																	
20																	
30																	
40																	
50																	
60																	

Roxboro OSB

Production Rates During Testing

Dryer Stack Testing Form

STAGE

Date	8-6-96
By	THRE/VERH
Sheet #	

DRYER ID	Time	DRYER OPERATING PARAMETERS										DRY BIN LEVEL			THERMAL OIL #1		THERMAL OIL #2		Raw Fuel bin level
		Bin Speed	Bin Level	Outlet SP	Inlet Temp.	Outlet Temp.	Fuel Count	Bottom	Core	Top	Temp	Fuel Count	Temp	Fuel Count	Temp				
Dryer #1 bottom core top	0 11:25	48	60%	203	940	206	2531	60%	60%	60%	454	1722	464	1722	464	25%			
	10 12:20	33	60%	203	811	207	2723	60%	60%	60%	467	1893	474	1893	474	50%			
	20 1:45	44	60%	203	955	204	3445	60%	400%	60%	455	2315	462	2315	462	50%			
	30 3:30	40	40%	203	844	206	4240	60%	60%	60%	465	2156	468	2156	468	50%			
		--																	

① Test started
11:25

Test stopped
11:45

② Test started
12:20

Test stopped
1:05

① Test started
1:45

Test stopped
2:15 to 2:30

Test over at
3:00

② Tested started
at 3:30,

Test over at
4:30

DRYER AUGUST 9, 1996**PM,NOX,CO,VOC**

DATA TIME:	START=	17:20	END=	18:24	HOURS=	1.07
	START=	18:45	END=	19:55	HOURS=	1.17
	START=	20:20	END=	21:25	HOURS=	<u>1.08</u>
					TOTAL=	3.32

BOARD WEIGHTS - LBS

average weights are determined by taking the weights of individual 4' x 8' peices.

7/16"

per/peice 50.00

per/ 8' x 24' 300.00

PLANT PRODUCTION RATE

3.32 =hours during testing

49 =pressloads

686 =no. of 8'x24' boards produced (pressloads x 14 boards per load)

131,712 =volume produced in surface footage (pressloads x 8'x24'x14 openings)

153,668 =volume produced 3/8" basis (pressloads x 8'x24'x 14 openings x 1.1667)

205,800 =lbs of finished product (boards produced x weight of finished board)

62,050 =lbs of finished product per hour (lbs of finshed product / hours)

31.03 =tons of finished product per hour (lbs of finshed product per hour / 2000 lb)

FUEL BURNING RATE ESTIMATED BY DRY FUEL INPUT**DRYER #1**

5.2 = fuel calibration in pounds per count

1,804 = counts during testing hours

9,381 = lbs of fuel burned during testing

3.32 =hours during testing

2,828 =lbs of dry fuel burned per hour during testing (pounds of dry fuel / testing hours)

1.41 =tons of dry fuel burned per hour during testing (pounds of dry fuel / 2000 lbs)

8,500 =estimated BTU content per pound of dry fuel,

24.0 =estimated mmbtu input per hour (lbs of dry fuel per hour x btu content)

972 =average inlet temperature

45.10 =average incoming moisture percent

7.10 =average dry moisture percent

DRYER #2

5.2 = fuel calibration in pounds per count

1,823 = counts during testing hours

9,480 = lbs of fuel burned during testing

3.32 =hours during testing

2,858 =lbs of dry fuel burned per hour during testing (pounds of dry fuel / testing hours)

1.43 =tons of dry fuel burned per hour during testing (pounds of dry fuel / 2000 lbs)

8,500 =estimated BTU content per pound of dry fuel,

24.3 =estimated mmbtu input per hour (lbs of dry fuel per hour x btu content)

939 =average inlet temperature

51.90 =average incoming moisture percent

5.12 =average dry moisture percent

DRYER #3

5.2 = fuel calibration in pounds per count

1,871 = counts during testing hours

9,729 = lbs of fuel burned during testing

3.32 =hours during testing

2,933 =lbs of dry fuel burned per hour during testing (pounds of dry fuel / testing hours)

1.47 =tons of dry fuel burned per hour during testing (pounds of dry fuel / 2000 lbs)

8,500 =estimated BTU content per pound of dry fuel,

24.9 =estimated mmbtu input per hour (lbs of dry fuel per hour x btu content)

1,034 =average inlet temperature

48.15 =average incoming moisture percent

6.20 =average dry moisture percent

DRYER #4

5.2 = fuel calibration in pounds per count

1,869 = counts during testing hours

9,719 = lbs of fuel burned during testing

3.32 =hours during testing

2,930 =lbs of dry fuel burned per hour during testing (pounds of dry fuel / testing hours)

1.47 =tons of dry fuel burned per hour during testing (pounds of dry fuel / 2000 lbs)

8,500 =estimated BTU content per pound of dry fuel,

24.9 =estimated mmbtu input per hour (lbs of dry fuel per hour x btu content)

985 =average inlet temperature

44.95 =average incoming moisture percent

6.65 =average dry moisture percent

DRYER #5

5.2 = fuel calibration in pounds per count

1,846 = counts during testing hours

9,599 = lbs of fuel burned during testing

3.32 =hours during testing

2,894 =lbs of dry fuel burned per hour during testing (pounds of dry fuel / testing hours)

1.45 =tons of dry fuel burned per hour during testing (pounds of dry fuel / 2000 lbs)

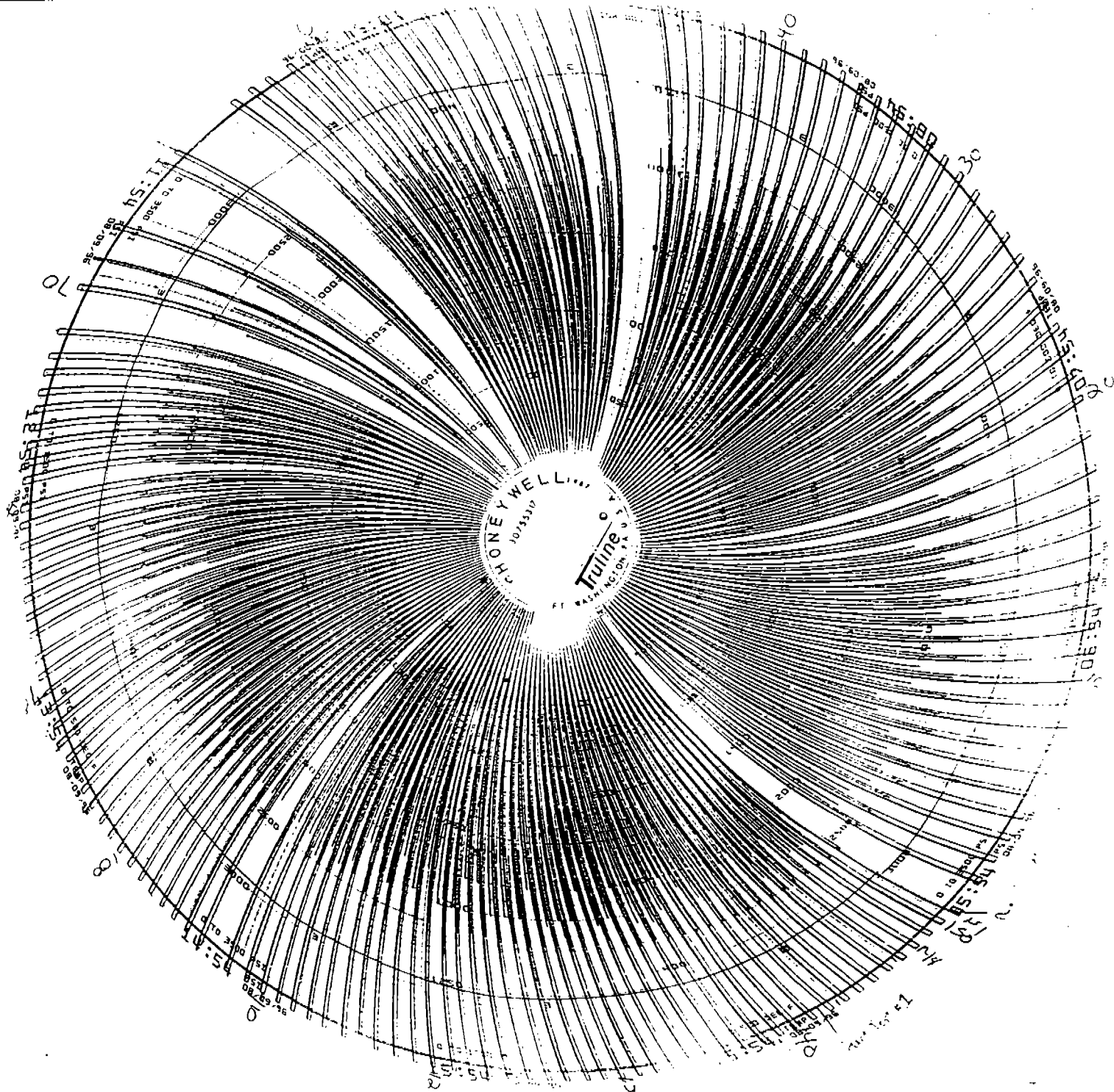
8,500 =estimated BTU content per pound of dry fuel,

24.6 =estimated mmbtu input per hour (lbs of dry fuel per hour x btu content)

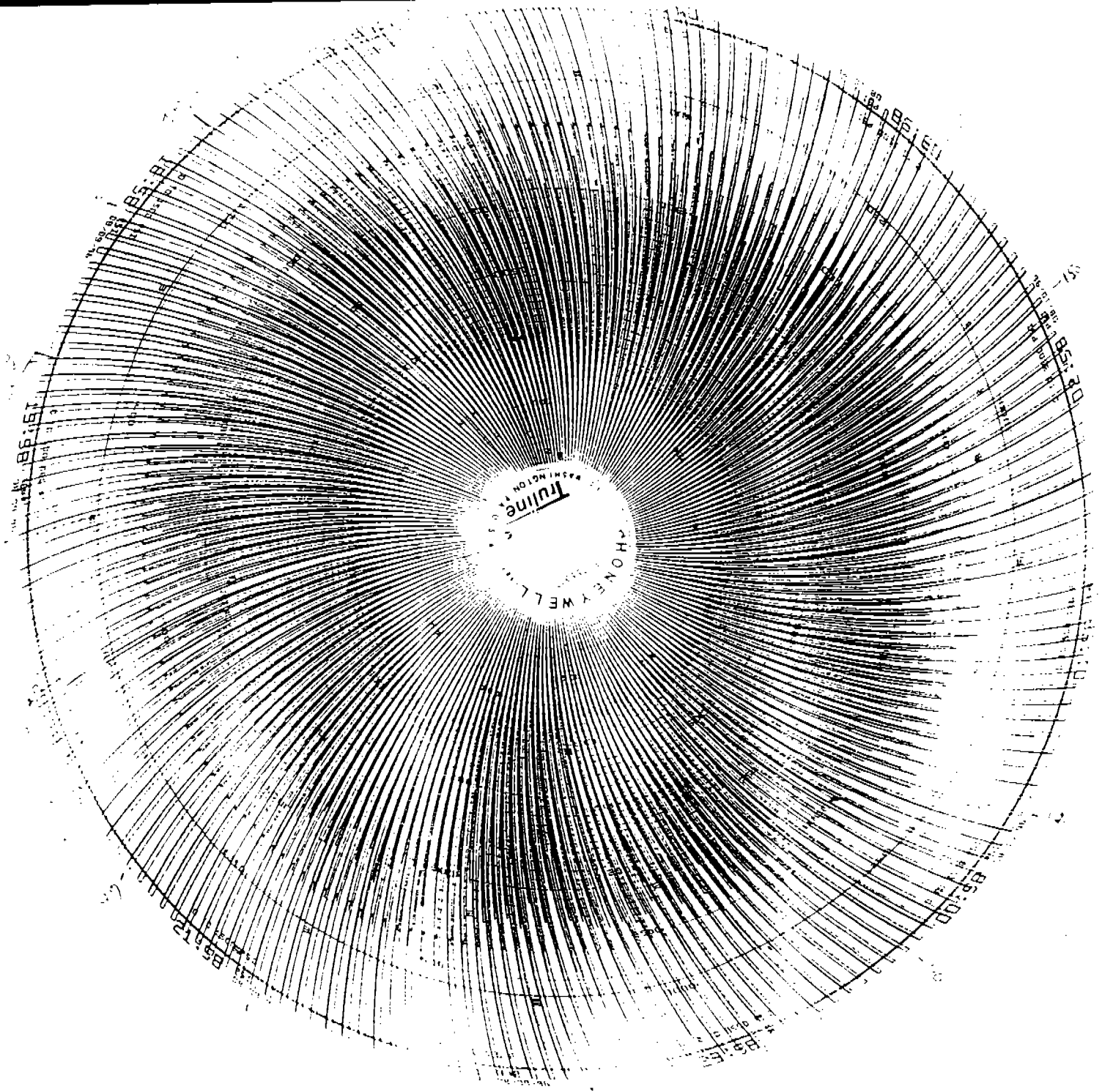
909 =average inlet temperature

47.00 =average incoming moisture percent

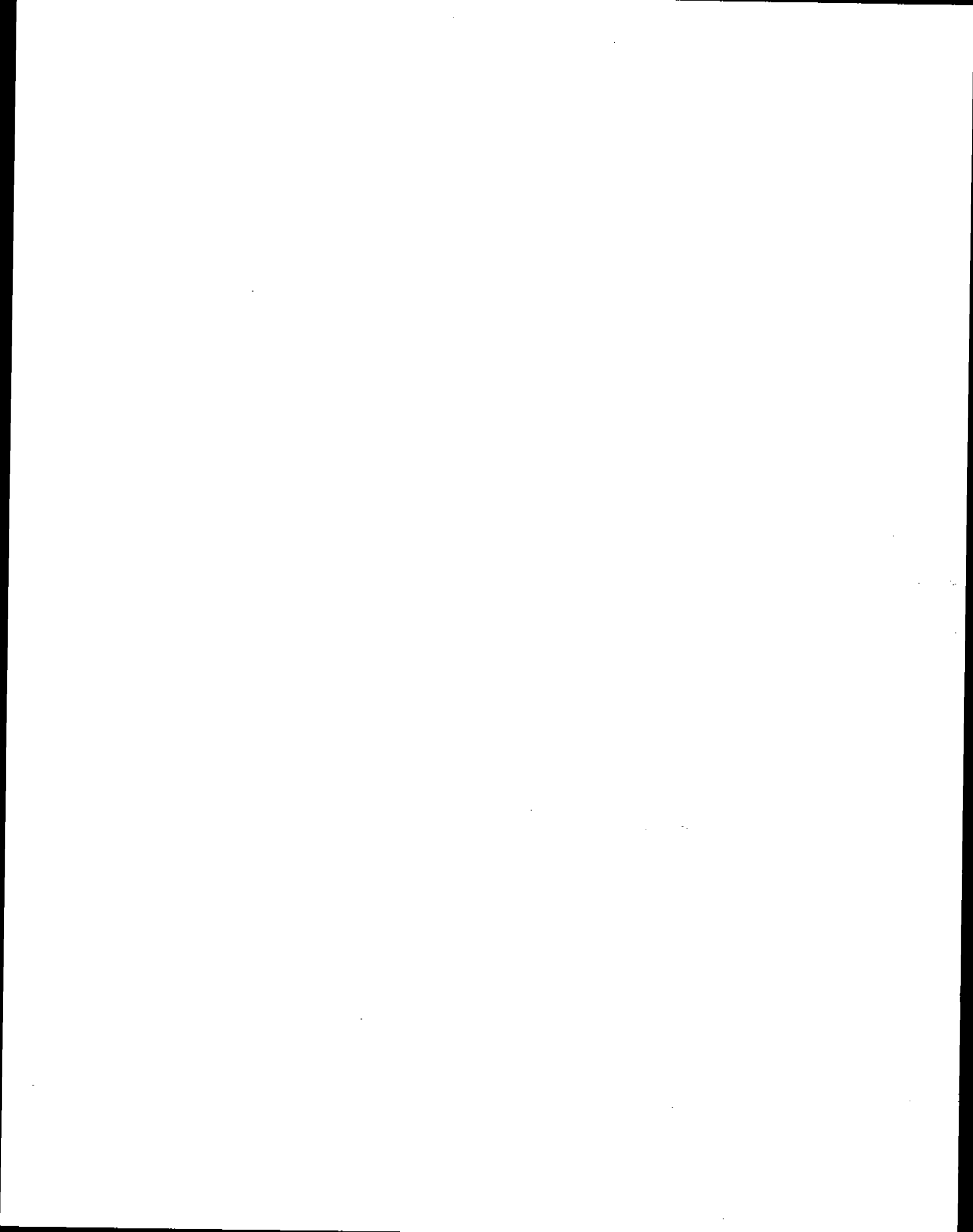
5.00 =average dry moisture percent

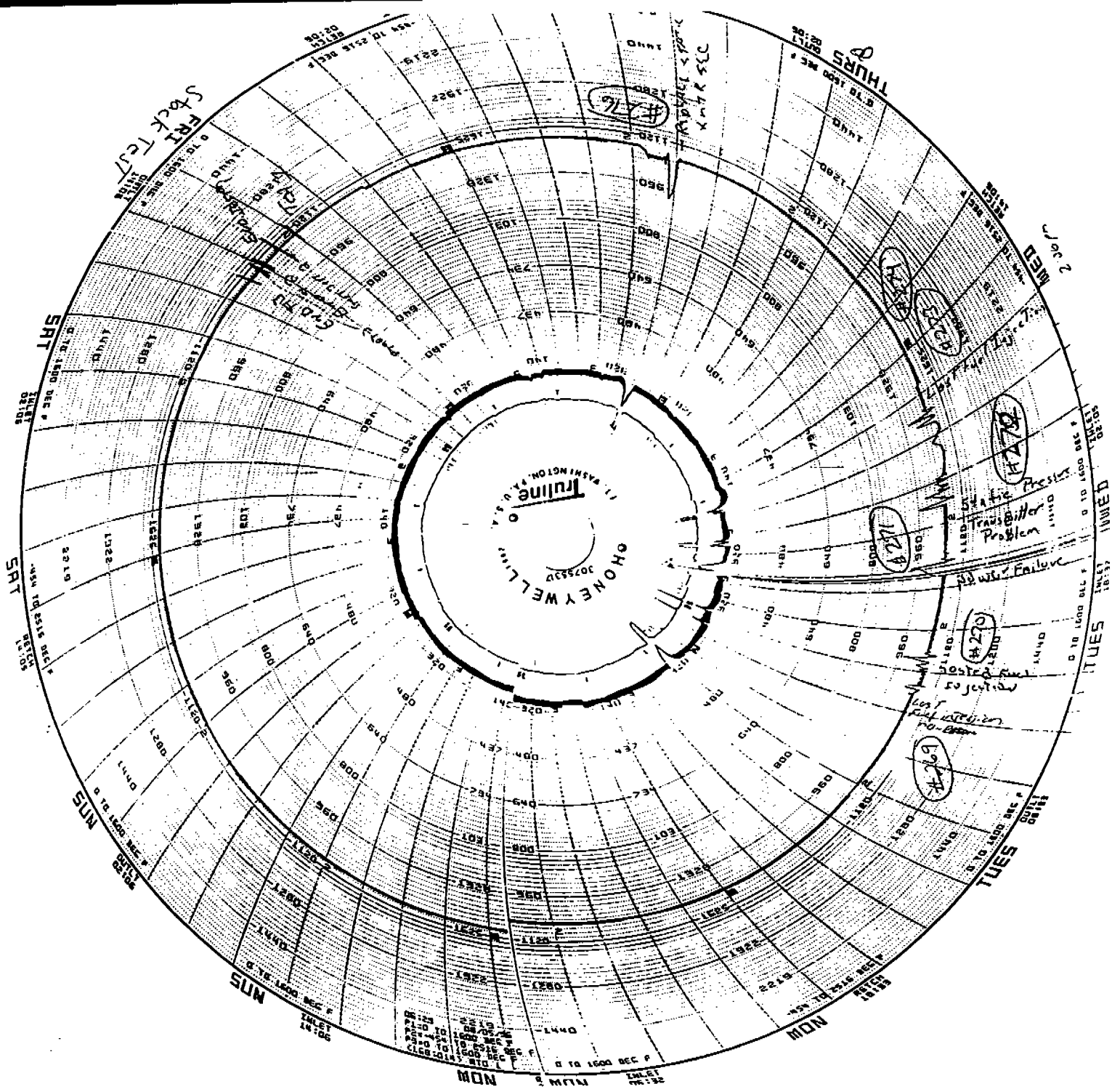


Press Production Chart - August 9, 1996
7/16" Board Thickness

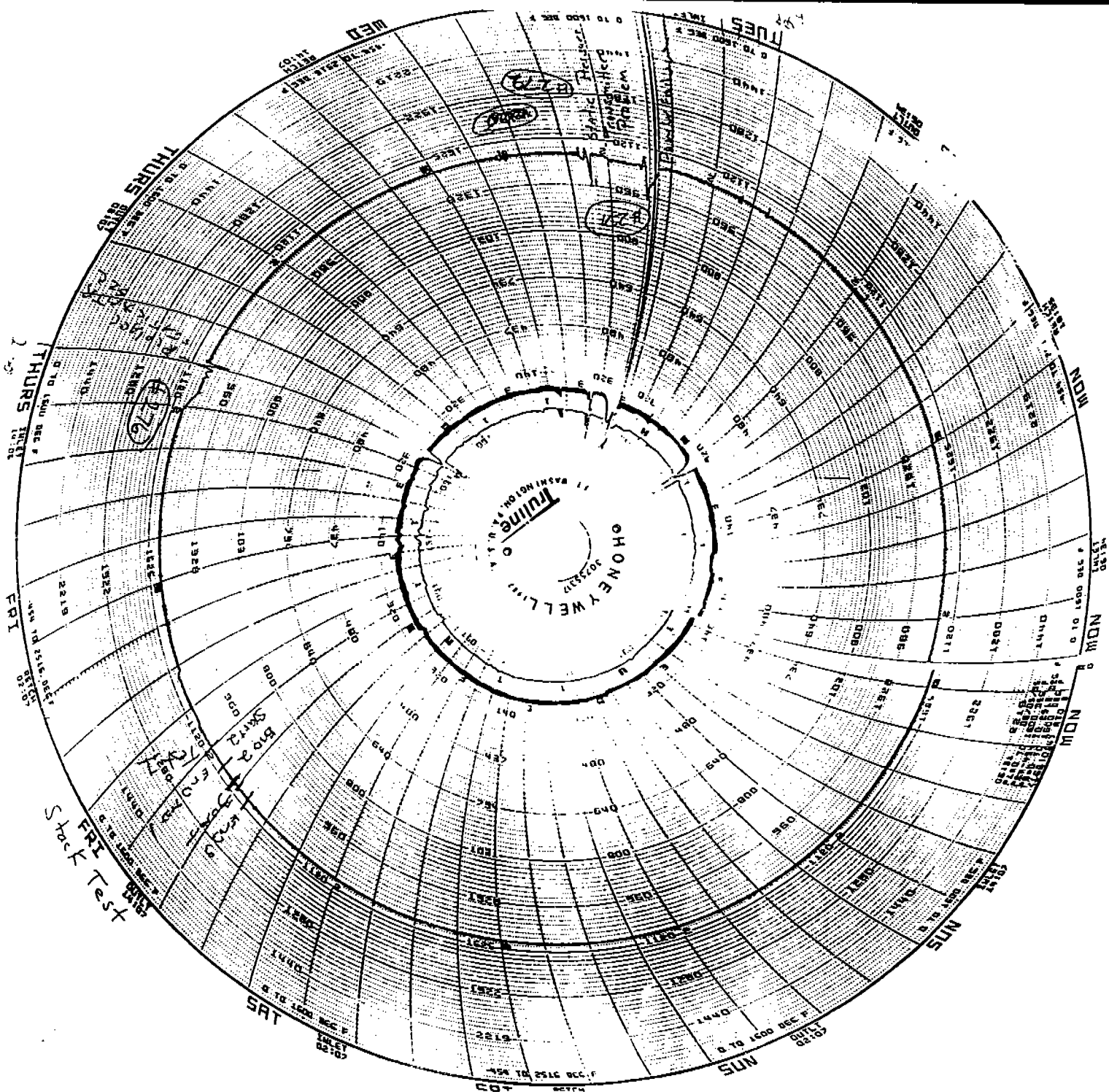


Press Production Chart - August 9, 1996
7-16" Board Thickness





Dryer RTO #1 Temperature Chart
August 9, 1996 Stack Test



Dryer RTO #2 Temperature Chart
August 9, 1996 Stack Test

Roxboro OSB

RTO Stack Testing Form

RTO#

1st Test - 5:25-6:25
2nd Test - 6:40-7:55

Date	8-9-96
By	Stacy Nelson / Gary Bann
Sheet #	

BED TEMPERATURES										RTO TEMPERATURES									
Time								Inlet Vault Pressure								Gas Reading			
	#1	#2	#3	#4	#5	#6	#7		Inlet	Outlet	Rel. Temp.	Rel. Temp.	Rel. Temp.	Rel. Temp.	Rel. Temp.				
5:25	206	191	187	209	263	426	246	-1.11	183	276	1587	1552	1577	1576	1576				
5:35	278	214	194	188	215	239	261	-0.99	184	274	1601	1572	1548	1562	1581				
5:45	237	241	265	206	192	192	222	-1.09	184	264	1589	1591	1571	1548	1561				
5:55	220	234	279	223	197	188	207	-0.97	184	266	1577	1582	1571	1564	1565				
6:05	192	213	255	284	226	192	189	-1.12	184	268	1573	1563	1582	1570	1556				
6:15	193	213	254	284	225	192	189	-1.06	184	268	1575	1564	1585	1574	1558				
6:25	188	199	238	268	291	263	192	-0.97	184	273	1569	1569	1567	1576	1568				
6:40	193	189	211	243	321	249	206	-1.12	185	284	1571	1562	1576	1566	1575				
6:50	200	196	191	222	276	276	228	-1.10	184	282	1577	1547	1559	1564	1573				
7:00	191	178	215	256	329	234	201	-1.16	184	268	1569	1565	1564	1563	1572				
7:10	275	223	199	189	199	224	252	-1.23	184	270	1596	1588	1569	1555	1575				
7:20	274	226	199	196	196	226	248	-0.90	184	269	1599	1586	1567	1552	1568				
7:30	248	248	235	202	191	194	223	-1.02	184	265	1580	1589	1570	1555	1563				
7:40	226	234	286	226	198	189	199	-0.95	184	266	1576	1583	1581	1575	1571				
7:50	215	227	271	244	226	196	191	-1.35	184	270	1577	1566	1587	1575	1558				
7:57	275	221	198	190	200	229	250	-0.89	184	270	1594	1585	1567	1553	1570				
8:00																			

Roxboro OSB

RTO Stack Testing Form

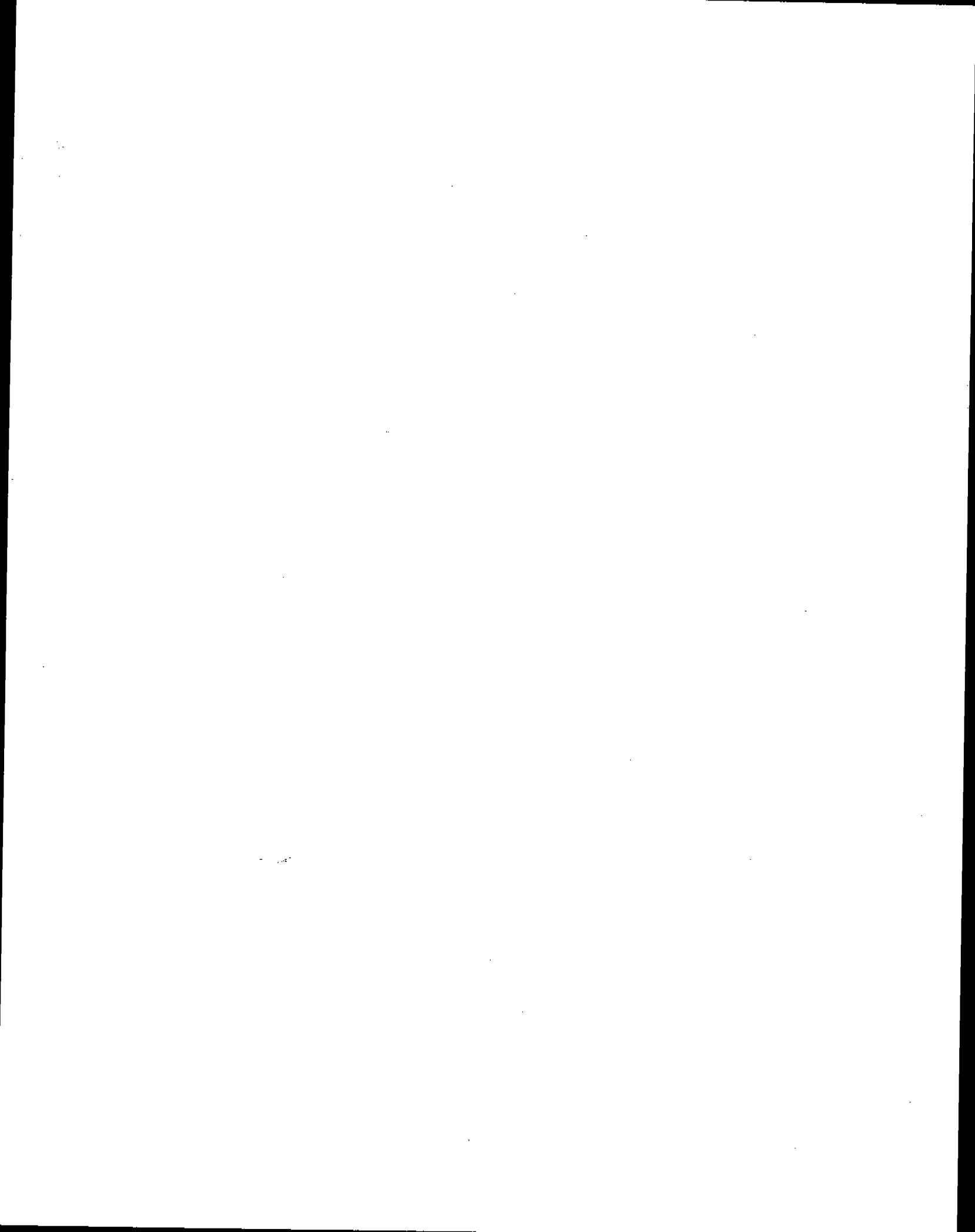
RTO#



2

Date	8-9-96
By	Kick Henderson
Sheet #	

Time	BED TEMPERATURES							Inlet Vent Pressure	RTO TEMPERATURES								Gas Reading
	#1	#2	#3	#4	#5	#6	#7		Inlet	Outlet	Rel. Temp.	Rel. Temp.	Rel. Temp.	Rel. Temp.	Rel. Temp.	Rel. Temp.	
8:15	203	195	204	240	283	243	225	-99	148	284	1576	1544	1568	1582			
8:36	272	265	215	196	199	231	266	-93	189	276	1598	1579	1569	1553	1571		
8:46	203	230	220	297	280	199	197	-103	191	282	1570	1584	1581	1568	1541		
8:55	194	200	259	263	284	208	198	-98	190	286	1562	1559	1573	1565	1557		
9:05	197	194	280	260	303	238	206	-136	188	289	1582	1584	1566	1570	1570		
9:15	198	195	226	254	298	250	207	-122	188	289	1586	1581	1557	1565	1573		
9:25	213	197	197	227	273	284	232	-95	190	285	1577	1543	1566	1565	1579		
9:40	202	212	199	195	233	252	288	-99	190	282	1601	1561	1558	1585	1578		
9:50	280	254	212	196	201	231	266	-99	189	276	1606	1587	1574	1555	1565		
10:00	256	265	266	208	196	198	237	-110	189	272	1587	1592	1581	1568	1555		
10:10	198	225	225	296	230	200	194	-111	188	284	1565	1562	1582	1568	1547		
10:20	201	224	281	249	226	200	195	-98	190	284	1565	1562	1582	1565	1549		
10:30	198	195	224	261	303	234	205	-101	189	288	1566	1562	1568	1564	1569		
10:40	205	195	205	238	282	290	222	-985	189	285	1525	1580	1569	1565	1590		
10:50	225	201	197	213	262	274	262	-117	191	282	1591	1551	1566	1568	1580		
11:00	196	203	254	278	306	210	194	-6.9X	190	289	1561	1560	1570	1568	1559		



2. The second section focuses on the role of communication in project management. It highlights the need for clear, concise, and timely communication between team members and stakeholders. The text provides guidelines for effective communication, such as using appropriate channels and formats, and encourages the use of regular meetings and reports to keep everyone informed.

3. The third part of the document addresses the challenges of resource allocation and management. It discusses how to identify and prioritize tasks, allocate resources efficiently, and monitor progress. The text suggests using tools like Gantt charts and PERT diagrams to visualize project timelines and resource usage. It also emphasizes the importance of flexibility in adjusting plans as needed.

4. The final section discusses the importance of risk management and contingency planning. It outlines steps for identifying potential risks, assessing their impact, and developing strategies to mitigate them. The text stresses the need for proactive risk management to avoid unexpected setbacks and ensure the successful completion of the project.

Roxboro OSB RTO Stack Testing Form

RTO#

23 TEST

Rich Harrison
8-9-96

[illegible]

Roxboro OSB

Production Rates During Testing

Dryer Stack Testing Form

Date	8/8/76
By	D. Appleby
Sheet #	#1 Dryer 7B5T

DRYER OPERATING PARAMETERS										DRY BIN LEVEL				THERMAL OIL #1					THERMAL OIL #2				New Fuel		H.O.		Dryer		
Dryer	10	Time	In Speed	Bin Level	Qdnt. SP	Hot Temp.	Qdnt. Temp.	Fuel Count		Bottom	Core	Top	Hot Temp.	Qdnt. Temp.	Fuel Count	Hot Temp.	Qdnt. Temp.	Stack Temp.	Bin Level										
Dryer #1	0	5:25	52	60	203	983	202	8774		50	50	50	443	466	3330	443	467	52	451	Full									
bottom	10	5:35	52	60	203	960	200			50	50	50	444	467		444	468	4330											
core	20	5:45	52	60	203	1144	196			50	50	50	441	465		441	466	4330											
	30	5:55	52	60	203	1038	202			50	50	50	438	463		438	464	5008											
	40	6:05	52	60	203	990	192			50	50	50	436	461		436	463	5008											
	50	6:15	52	60	203	1004	202			50	50	50	438	462		438	464	5008											
	60	6:25	52	60	203	834	204	9222		50	50	50	440	464	3695	440	465	425	441	Full									
Dryer #2	0	5:25	52	60	208	990	204	4249																					
bottom	10	5:35	52	60	208	999	202																						
core	20	5:45	52	60	208	950	209																						
	30	5:55	52	60	208	950	209																						
	40	6:05	52	60	208	920	209																						
	50	6:15	52	60	208	903	210																						
	60	6:25	52	60	208	888	210	4684																					
Dryer #3	0	5:25	52	60	211	152	206	4345																					
bottom	10	5:35	52	60	211	161	202																						
core	20	5:45	52	60	211	1153	209																						
	30	5:55	52	60	211	1117	209																						
	40	6:05	52	60	211	1029	218																						
	50	6:15	52	60	211	1012	213																						
	60	6:25	52	60	211	1015	216	4830																					
Dryer #4	0	5:25	52	60	208	972	202	1642																					
bottom	10	5:35	52	60	208	1019	204																						
core	20	5:45	52	60	208	1056	204																						
	30	5:55	52	60	208	1043	209																						
	40	6:05	52	60	208	1031	204																						
	50	6:15	52	60	208	1075	202																						
	60	6:25	52	60	208	1009	212	2130																					
Dryer #5	0	5:25	52	40	204	1011	212	3474																					
bottom	10	5:35	52	40	224	1036	221																						
core	20	5:45	52	40	224	1038	235																						
	30	5:55	52	40	224	910	224																						
	40	6:05	52	40	224	1024	215																						
	50	6:15	52	40	224	984	226																						
	60	6:25	52	40	208	938	229	3965																					

T. OIL
5.5% N

#1	#2
5:25	1208°F
5:35	1169°F
5:45	1159°F
5:55	1080°F
6:05	1063°F
6:15	1067°F
6:25	1016°F

Moisture	Wet
#1	8.6%
#2	7.0%
#3	6.4%
#4	7.0%
#5	5.0%

5:00 PM

Roxboro OSB

Production Rates During Testing

Dryer Stack Testing Form

Date	8/9/96
By	D. HEDEN
Sheet	Dryer Test Copy

DRYER OPERATING PARAMETERS										DRY BIN LEVEL				THERMAL OIL #1				THERMAL OIL #2				H.O. Dryer	
Dryer #	ID	Time	In Speed	Bin Level	Oil #1	Hot Temp.	Oil Temp.	Fuel Cost		Bottom	Core	Top	Hot Temp.	Oil Temp.	Fuel Cost	Hot Temp.	Oil Temp.	Stack Temp	Bin Level	New No.			
Dryer #1	0	7:45	52	50	2035	1016	196	9861		60	50	50	444	467	4231	447	467	447	447	447	447	447	447
bottom	10	7:55		50		988	206	9935		50	50	50	444	467	4231	447	467	447	447	447	447	447	447
core	20	8:05		50		954	198	99		50	50	50	444	467	4231	447	467	447	447	447	447	447	447
	30	8:15		50		1023	204	117		50	50	50	444	467	4231	447	467	447	447	447	447	447	447
	40	8:25		50		935	204	202		50	50	50	444	467	4231	447	467	447	447	447	447	447	447
	50	8:35		50		1023	198	278		50	50	50	444	467	4231	447	467	447	447	447	447	447	447
Dryer #2	0	7:45	52	50	208	934	206	5243		60	50	50	444	467	4231	447	467	447	447	447	447	447	447
bottom	10	7:55		50		918	207	5359		50	50	50	444	467	4231	447	467	447	447	447	447	447	447
core	20	8:05		50		984	201	5455		50	50	50	444	467	4231	447	467	447	447	447	447	447	447
	30	8:15		50		965	207	5564		50	50	50	444	467	4231	447	467	447	447	447	447	447	447
	40	8:25		50		1018	201	5636		50	50	50	444	467	4231	447	467	447	447	447	447	447	447
	50	8:35		50		1010	209	5716		50	50	50	444	467	4231	447	467	447	447	447	447	447	447
Dryer #3	0	7:45	52	50	211	1081	206	5482		60	50	50	444	467	4231	447	467	447	447	447	447	447	447
bottom	10	7:55		50		1084	212	5565		50	50	50	444	467	4231	447	467	447	447	447	447	447	447
core	20	8:05		50		1034	216	5768		50	50	50	444	467	4231	447	467	447	447	447	447	447	447
	30	8:15		50		1003	215	5829		50	50	50	444	467	4231	447	467	447	447	447	447	447	447
	40	8:25		50		1061	212	5895		50	50	50	444	467	4231	447	467	447	447	447	447	447	447
	50	8:35		50		1012	215	5952		50	50	50	444	467	4231	447	467	447	447	447	447	447	447
Dryer #4	0	7:45	52	50	208	993	207	2884		60	50	50	444	467	4231	447	467	447	447	447	447	447	447
bottom	10	7:55		50		994	207	2856		50	50	50	444	467	4231	447	467	447	447	447	447	447	447
core	20	8:05		50		982	207	2950		50	50	50	444	467	4231	447	467	447	447	447	447	447	447
	30	8:15		50		975	210	3055		50	50	50	444	467	4231	447	467	447	447	447	447	447	447
	40	8:25		50		936	207	3116		50	50	50	444	467	4231	447	467	447	447	447	447	447	447
	50	8:35		50		950	210	3186		50	50	50	444	467	4231	447	467	447	447	447	447	447	447
Dryer #5	0	7:45	52	50	208	894	212	3234		60	50	50	444	467	4231	447	467	447	447	447	447	447	447
bottom	10	7:55		50		923	238	4462		50	50	50	444	467	4231	447	467	447	447	447	447	447	447
core	20	8:05		50		866	230	4722		50	50	50	444	467	4231	447	467	447	447	447	447	447	447
	30	8:15		50		815	232	4901		50	50	50	444	467	4231	447	467	447	447	447	447	447	447
	40	8:25		50		782	232	4963		50	50	50	444	467	4231	447	467	447	447	447	447	447	447
	50	8:35		50		786	226	5010		50	50	50	444	467	4231	447	467	447	447	447	447	447	447
	60	8:45		50		818	222	5059		50	50	50	444	467	4231	447	467	447	447	447	447	447	447

T. OIL
SECTIO N

MIDISTONE

7:00pm

#1	10.4%
#2	7.8%
#3	7.0%
#4	6.4%
#5	5.6%

Date	8/7/96
By	D. HEDDY
Stack	Dryer Test
Sheet	0001

DRYER OPERATING PARAMETERS										THERMAL OIL #1										THERMAL OIL #2										RAW FUEL	
Dryer ID	Time	In Speed	In Level	Out Sp	In Temp	Out Temp	Fuel Count	Bottom	Core	Top	Inlet Temp	Outlet Temp	Fuel Count	Inlet Temp	Outlet Temp	Stack Temp	Bin Level	M.B.	M.B.												
Dryer #1	8:55	52	40	203	973	200	435	60	60	60	442	466	4698	442	467	487	80%	30%	30%												
Bottom	9:05		40		992	204	512	60	60	60	440	466	4752	440	466	487															
Core	9:15		30		899	207	569	60	60	60	440	465	4804	440	466	487															
Top	9:25		30		969	201	643	60	60	60	440	464	4863	440	465	487															
Bottom	9:35																														
Core	9:45																														
Top	9:55	52		203																											
Dryer #2	8:55	52	40	208	1029	204	5882																								
Bottom	9:05		40		923	215	5950																								
Core	9:15		40		908	209	6001																								
Top	9:25		40		915	213	6072																								
Bottom	9:35																														
Core	9:45																														
Top	9:55	52		208																											
Dryer #3	8:55	52	40	211	939	219	6035																								
Bottom	9:05		35		984	209	6103																								
Core	9:15		35		979	216	6158																								
Top	9:25		40		929	213	6220																								
Bottom	9:35																														
Core	9:45																														
Top	9:55	52		211																											
Dryer #4	8:55	52	40	208	967	207	3222																								
Bottom	9:05		35		001	210	3389																								
Core	9:15		35		929	206	3441																								
Top	9:25		40		923	209	3511																								
Bottom	9:35																														
Core	9:45																														
Top	9:55	52		208																											
Dryer #5	8:55	52	35	224	796	221	5142																								
Bottom	9:05		35		819	218	5211																								
Core	9:15		30		832	226	5265																								
Top	9:25		30		791	238	5320																								
Bottom	9:35																														
Core	9:45																														
Top	9:55	52		224																											

TESTING Completed @ 9:25 PM

MOISTURE 8.00%

T-OIL

T-SECTION

#1

#2

#3

#4

#5

1240°F

1216°F

1222°F

1276°F

1209°F

1182°F

1216°F

1222°F

1276°F

1209°F

Dry

#1 8.40%

#2 7.82%

#3 6.22%

#4 6.40%

#5 4.20%

TEST IN/4 Completed @ 9:25 PM

MOISTURE

8:00 PM

T - SECTION

T - OIL

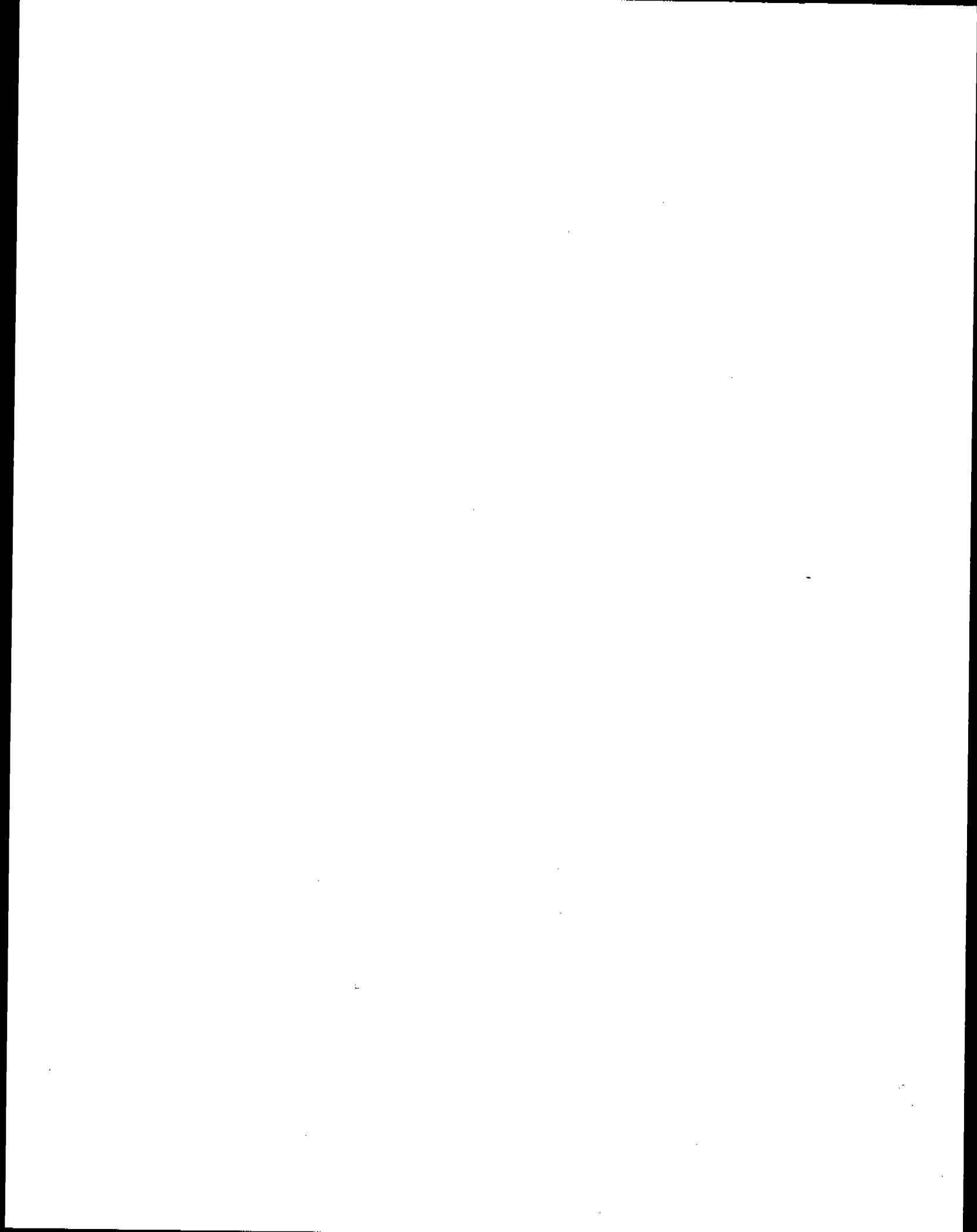
#1	#2
8:55	1240°F
9:05	1269°F
9:15	1276°F
9:25	1259°F
9:35	1209°F
9:45	
9:55	

#1	#2
8:40	7.8%
8:50	6.2%
9:00	6.4%
9:10	4.2%
9:20	
9:30	

8-6-96

Roxboro stack test results			RTO GAS USAGE		
TIME	Minutes	RTO #3		gas use	
11:30		28221			
11:45	15	28224	STOP	3	
12:20		28227	START		
13:03	45	28232	END	5	
				8000	CUBIC FEET
2 TEST					
13:45		28236			
14:12	27	28239	STOP	3	
14:30		28241	START		
14:58		28243			
15:04	34	28244	END	3	
				6000	CUBIC FEET
3 TEST					
15:30		28246	START		
16:31	61	28253	END	7	
				7000	CUBIC FEET
TIME		RTO #1		RTO #2	
17:25		10327		19089	
18:30		10330	3000 FT3	19094	5000 FT3
TEST 2					
18:45		10330		19095	
19:45		10333	3000 FT3	19100	5000 FT3
TEST 3					
20:20		10334		19102	
21:20		10337	3000 FT3	19107	5000 FT3

8-9-96



2696

Roxboro OSB		Resin use(Lb)				WOOD USE(Lb)	
Time	BSL	CORE	TOP		BSL	CORE	TOP
11:29	2148	78585	2252		30061	39609	31496
11:39	2477	78763	2539		34318	46380	35408
11:56	2524	78839	2600	STOP	35230	49058	36026
12:14	2804	79075	2895	START	38935	53538	40106
12:20	2911	79075	3028		40573	58407	42162
12:30	3215	79233	3275		44847	64585	45621
12:40	3396	79364	3512		47391	69627	48920
12:50	3701	79513	3799		51566	75368	52622
13:00	3998	79657	4115		55625	80932	57213
13:05	4035	79731	4160		56155	84291	58272
TOTAL(Lb)	1607	910	1613		22389	40202	22696
TEST 2	BSL	CORE	TOP		BSL	CORE	TOP
13:45	5214	80328	5356		72707	107120	74462
13:55	5450	80460	5578		75939	112195	77570
14:05	5712	80602	5818		79598	117772	80977
14:13	5849	80721	5981	STOP	81285	122094	82887
14:30	6166	80875	6259	START	85689	128060	86839
14:40	6457	81005	6560		89736	133496	90916
14:50	6717	81147	6847		93351	138876	94898
15:00	6936	81287	7130		96603	144368	98995
15:02	7008	81317	7142		97588	145511	98995
TOTAL(Lb)	1477	835	1508		20477	32425	20581
TEST 3	BSL	CORE	TOP		BSL	CORE	TOP
15:30	7621	81678	7716		105940	159399	107247
15:40	7885	81822	7990		109608	165116	110825
15:50	8171	81958	8287		113745	170314	114877
16:00	8415	82094	8569		117077	175777	118794
16:10	8614	82236	8794		119971	181148	122194
16:20	8906	82369	9030		125276	186526	125668
16:30	9098	82507	9269		126807	191817	128915
TOTAL(Lb)	1477	829	1553		20867	32418	21668

DATE: 8-6-94 SHIFT: A



	6	7	8	9	10	11	12	1	2	3	4	5
TIME OF PL	6:13	7:11		9:35	10:35	11:33	12:20	13:49	14:41	15:51	16:45	5:24
LOAD NO.	3	17		31	38	46	52	61	75	86	97	103
BOARD SIZE	7/16	7/16		23/32	23/32	23/32	23/32	23/32	23/32	23/32	23/32	23/32
LINE SPEED	85	85		52	52	62	62	62	62	62	62	84
SL BUNKER	48	49		47	45	63	53	53	53	53	45	45
CORE BUNKER	32	32		31	31	37	37	37	37	37	31	31
MAT SCALE	16.0	18.7		26.7	26.0	23.7	25.1	26.1	26.5	25.9	26.7	16.2
CLOSING TIME	45	45		81	60	60	60	60	62	70	49	50
POSITION	424	424		705	705	705	705	705	705	705	405	42
O.T.	170	170		265	265	265	265	265	265	265	170	170
DECOMP. TIME	18	18		31	30	31	31	32	32	32	20	18
PRESS TEMP.	420°	420°		425	420	420	419	420	418	419	420	420
TOTAL CYCLE T.	209	209		316	316	315	315	316	316	316	209	204
MC	BSL											
FROM	CORE											
LINE	TSL											
#1	9.0								10.9	9.8		
#2	6.0								7.3	6.8		
#3	8.4								9.6	8.4		
#4	6.0								7.0	5.6		
#5	5.0								5.4	4.2		
THICKNESS	448	443		712	722	736	740	712	714	710	436	451
WEIGHT	49.5	50.5		78	81.0	79.5	81.5	80.0	81.5	79.6	50	51
LENGTH	1/16	1/16		1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16
WIDTH	1/32	1/32		1/32	1/32	1/32	1/32	1/32	1/32	1/32	1/32	1/32
SQUARENESS	1/16	1/16		0	1/16	0	1/16	1/16	0	1/16	1/16	1/16
UNIT HEIGHT	29 1/4	29 1/4		31 1/4	31 1/4	31 0	31 1/4	31 1/4	31 1/4	31 1/4	29 1/4	29 1/4
STAMP QUALITY	GOOD	GOOD		GOOD	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD
DENSITY				41	42	41	42	43	42			
DOWN GRADE	0	0		0	0	0	0	0	0	0	0	0
PF % / MDI %	6.5 / 2.35	6.5 / 2.35		6.5 / 2.35	6.5 / 2.35	6.5 / 2.35	6.5 / 2.35	6.5 / 2.35	6.5 / 2.35	6.5 / 2.35	6.5 / 2.35	6.5 / 2.35
RESIN COVERAGE												
APA - WAREHOUSE	OK	456 24		OK	OK	OK	OK	OK	OK	OK	OK	OK

RR TEMP	74	THICK	.721	WAX BEATS PER M.	11:00	5:00
TSL RPM	20	WEIGHT	80.07	TSL	32	30
ORE RPM	10	DENSITY	41.65		28	30
BSL RPM	10	A-GRADE	77.53	BSL	40	40
PRESS LOADS						

1/4	3/8	7/16	15/32	1/2	19/32	23/32
—	—	44	—	—	—	68
CULL						
—	—	176	—	—	—	141

	BSL	CORE	TSL			
RESIN 11:00	2148	78585	2252			
5:00	9602	82776	4770			
WOOD 11:00	30061	37607	31496			
5:00	133536	202010	135473			
TANKS	1	2	3	4	5	6
11:00	10'	2'8"	0	4'10"	10'6"	11'6"
5:00	18'	1'6"	0	6'10"	9'8"	9'1"
USAGE	BSL%	CORE%	TSL%	% PF	% MDI	% WAX
11:00	7.15	2.84	7.15	21.39	47.66	1.80
5:00	7.20	2.58	7.23	6.94	50.22	1.72

5136

DATE: 8-9 SHIFT



		6	7	8	9	10	11	12	1	2	3	4	5	
TIME OF PL		619	743	855	956	1033	1141	1229	1322	1448	1535	1647	1752	
LOAD NO.		3	18	31	43	49	65	69	80	102	114	132	148	
BOARD SIZE		7/16	-	-	-	-	-	-	-	-	-	-	-	
LINE SPEED		65	-	75	85	94	-	-	94	-	-	-	-	
SL BUNKER		38	37	42	49	53	55	54	54	54	55	56	57	
CORE BUNKER		25	24	28	32	37	37	37	36	36	36	36	37	
MAT SCALE		16.6	16.4	16.8	16.5	16.6	16.5	16.8	16.4	16.3	16.5	16.4	16.7	
CLOSING TIME		60	58	49	45	45	60	45	65	45	45	45	55	
POSITION		424	-	-	-	-	-	-	-	-	-	-	-	
O.T.		188	195	205	195	163	163	163	163	158	-	-	-	
DECOMP. TIME		18	18	18	18	18	18	18	17	18	18	17	18	
PRESS TEMP		421	419	420	420	417	420	421	421	420	420	419	419	
TOTAL CYCLE T		228	235	244	234	203	203	203	203	200	198	198	197	
M.C.	BSL	9.0%	-	10.5%	-	11.6%	-	-	8.8%	9.0%	-	8.2%	-	
FROM	CORE	6.8%	-	8.2%	-	9.8%	-	-	6.2%	6.5%	-	6.8%	-	
LINE	TSL	8.5%	-	8.7%	-	10.0%	-	-	8.0%	8.6%	-	7.9%	-	
MC	#1 Face	Down	Down	6.0	6.2	7.0	6.0	6.4	10.4	9.4	6.4	6.6	3.0	
FROM	#2 Core	10.0	9.0*	7.0	7.4	5.8	5.6	6.0	9.0	10.0	7.2	5.2	7.0	
RYERS	#3 Face	7.0	5.2	7.2	7.0	6.0	5.6	5.8	9.2	8.6	7.2	6.6	7.0	
	#4 Core	7.2	8.8*	8.2	8.0	6.8	6.0	6.2	9.8	9.6	7.8	6.0	6.4	
	#5 Face	Down	Down	9.0	8.8	6.0	5.8	6.0	10.8	8.2	6.0	7.4	8.6	
THICKNESS		441	453	436	439	457	451	430	432	446	439	453	441	
WEIGHT		52	52.5	49	50	50.5	51.5	50	50	50.5	50.5	51.0	50.5	
LENGTH		1/16	1/16	1/32	1/16	1/16	1/16	1/32	1/16	1/32	1/16	1/16	1/16	
WIDTH		1/16	1/32	1/32	1/32	1/32	1/32	1/32	1/32	1/32	1/16	1/32	1/32	
SQUARENESS		1/32	1/32	0	1/32	0	1/32	0	1/16	1/32	1/32	1/16	1/32	
UNIT HEIGHT		29 3/4	29 3/4	29 1/4	29 1/2	29 1/2	29 3/4	29 1/4	30	29 3/4	29 1/2	29 3/4	29 1/2	
STAMP QUALITY		Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	
DENSITY		-	-	-	-	-	-	-	-	-	-	-	-	
DOWN GRADE		2	13	18	21	27	30	61	90	130	134	136	139	
PF % / MDI %		6.5/2.1	-	-	-	6.5/2.1	-	-	-	-	-	-	-	
RESIN COVERAGE		-	-	-	-	-	-	-	-	-	-	-	-	
APPA WAREHOUSE		456-32	456-32	WHSE	WHSE	WHSE	WHSE	WHSE	WHSE	456-32	WHSE	WHSE	WHSE	
AUG		443	443	443	443	443	443	443	443	443	443	443	443	
WAX BEATS PER M.		11:00	11:00	11:00	11:00	11:00	11:00	11:00	11:00	11:00	11:00	11:00	11:00	
RESIN TEMP	74	THICK	443	11:00	5:00									
ISL RPM	20	WEIGHT	50.67	TSL	36	48								
CORE RPM	20	DENSITY	42.87	20	28									
BSL RPM	20	A-GRADE	78.90	BSL	40	32								
PRESS LOADS														
1/4	3/8	7/16	15/32	1/2	19/32	23/32								
		157												
DULL														
		140												
USAGE														
11:00	BSL%	6.34	CORE%	2.07	TSL%	6.46	% PF	6.02	% MDI	1.80	% WAX	0.65		
5:00	BSL%	6.09	CORE%	2.07	TSL%	6.16	% PF	6.15	% MDI	2.32	% WAX	12.92		

0' 8' 9"

DATE: 8-9-96 SHIFT: D

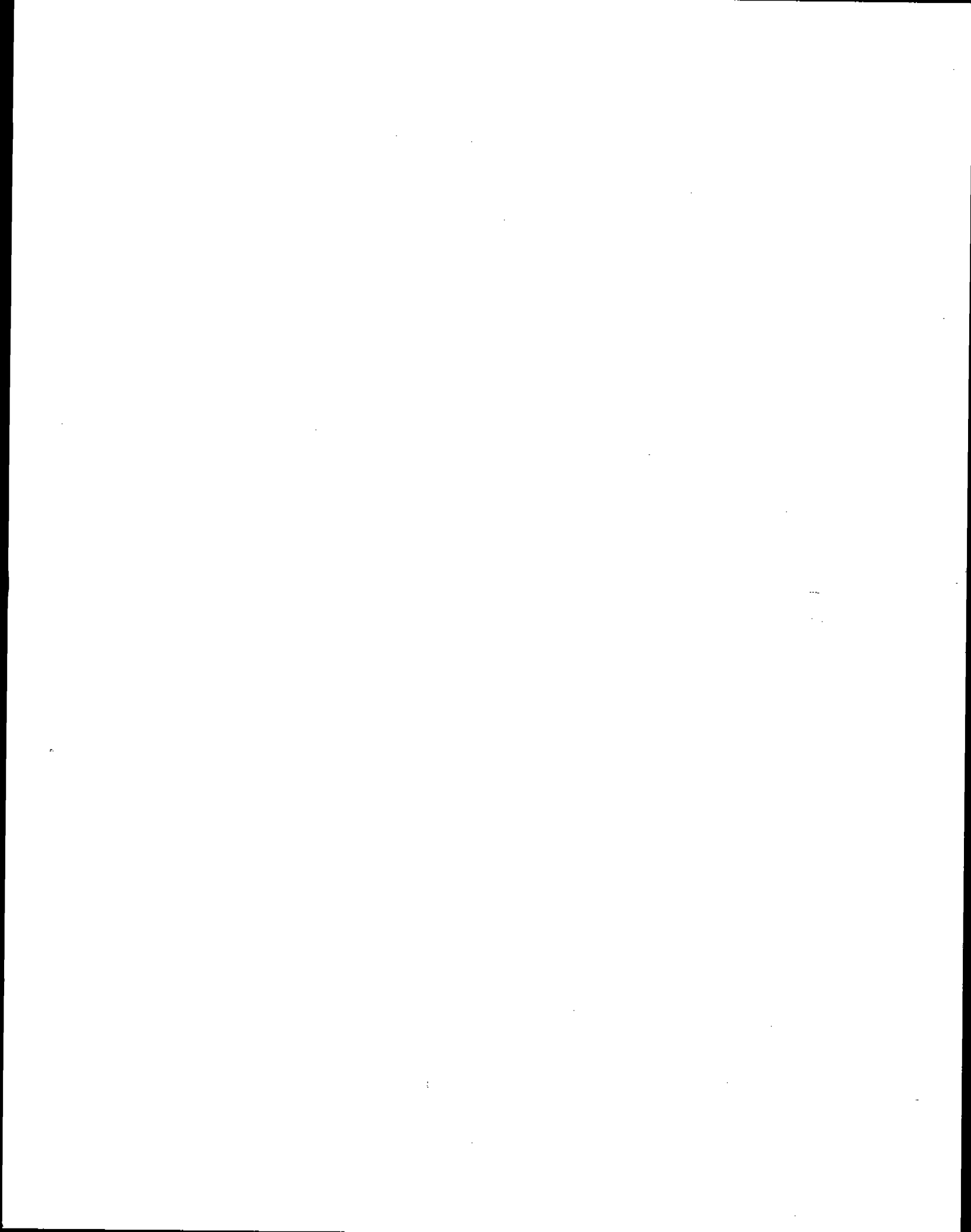


	6	7	8	9	10	11	12	1	2	3	4	5	
TIME OF PL	18:14	19:05	20:12	21:04	22:10	23:18	00:09					5:17	
LOAD NO.	3	17	34	48	66	84	97	114	133	146	162	180	
BOARD SIZE	7/16	7/16	7/16	7/16	7/16	7/16	7/16	7/16	7/16	7/16	7/16	7/16	
LINE SPEED	94	94	94	94	94	94	94	94	94	94	94	94	
SL BUNKER	57	56	55	55	55	53	52	51	51	52	53	55	
CORE BUNKER	37	36	36	36	36	35	34	34	34	35	36	37	
MAT SCALE	16.3	16.9	16.0	16.6	16.1	16.4	17.0	16.1	15.5	16.0	15.9	16.2	
CLOSING TIME	59	64	58	57	56	58	45	45	45	45	45	50	
POSITION	424	424	424	424	424	424	424	424	424	424	424	424	
O.T.	158	158	158	158	158	158	158	158	158	158	158	158	
DECOMP. TIME	18	18	18	18	18	18	18	18	18	18	18	18	
PRESS TEMP.	421	420	420	420	420	418	420	418	419	420	421	420	
TOTAL CYCLE T.	197	197	197	197	197	197	197	197	197	197	197	197	
M.C.	BSL	9.0	8.4		1		12.1		9.4		9.0		
FROM	CORE	6.2	6.2				7.1		7.1		7.2		
LINE	TSL	8.8	8.8				12.0		3.2		8.4		
MC FROM DRYERS	#1	5.0	6.4	3.4	5.0	6.8	6.2	5.8	6.6	5.2	6.0	4.6	3.4
	#2	4.4	7.8	7.0	4.6	4.2	6.6	6.4	6.0	5.6	5.8	8.6	4.2
	#3	5.2	2.0	6.2	6.4	4.8	5.2	6.0	5.8	7.4	6.8	5.4	5.2
	#4	6.8	6.4	6.5	6.0	5.2	9.8	6.8	8.4	6.0	6.0	6.8	5.3
	#5	5.2	5.6	4.2	6.0	11.0	13.4	9.2	6.0	5.4	6.6	6.6	5.0
THICKNESS	433	449	446	453	443	454	452	439	440	432	439	447	
WEIGHT	49.5	52	51	51.5	51	52	51	49.5	49.5	49.5	49	50.5	
LENGTH	1/16	1/32	0	1/16	1/16	1/16	1/16	1/32	1/16	1/16	1/16	1/16	
WIDTH	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	
SQUARENESS	0	1/32	1/16	3/32	1/8	0	0	0	1/16	3/32	1/16	0	
UNIT HEIGHT	29 1/2	29 1/8	29 3/4	29 5/8	29 3/4	30	30	29 1/2	29 1/2	29 5/8	29 1/2	29 3/8	
STAMP QUALITY	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD	
DENSITY	42.37	43.43	42.88	42.63	43.17	42.95	40.31	40.28	40.19	40.10	41.86	40.37	
DOWN GRADE	0	6	-	-	60	63	-	-	-	75	-	83	
PF % / MDI %	62/61	-	-	-	-	-	-	-	-	-	-	-	
RESIN COVERAGE	4	OK	OK	OK	OK	OK	B	OK	OK	OK	OK	OK	
APR - WAREHOUSE	4	OK	OK	OK	OK	OK	B	OK	OK	OK	OK	OK	

IR TEMP	74	THICK	444	11:00	5:00
TSL RPM	20	WEIGHT	50.42	TSL 36	27
CORE RPM	20	DENSITY	42.59	24	15
BSL RPM	20	A-GRADE	99.45	BSL 36	27

1/4	3/8	7/16	15/32	1/2	19/32	23/32
		91				
CULL		88				

		BSL	CORE	TSL			
RESIN	11:00	99011	128240	99432			
	5:00	106670	131942	107322			
WOOD	11:00	1535777	2202255	1526767			
	5:00	1660888	2373344	1651350			
TANKS		1	2	3	4	5	6
2	11:00	12'4	8'0	-	69	5'5	5'4
	5:00	12'4	7'4		64	4'6	4'5
USAGE		BSL%	CORE%	TSL%	% PF	% MDI	% WAX
	11:00	6.11	215	6.40	6.07	2.12	1.41
	5:00	6.12	2.16	6.33	6.04	2.12	0.87



Press Enclosure Verification

Enclosure specifications:

$$\text{Total Surface Area} = 41,138 \text{ ft}^2$$

$$\text{NDO's Area} = 1,276 \text{ ft}^2$$

NDO to Total Area Ratio:

$$\frac{1,276}{41,138} \times 100 = 3.1 \%$$

NDO Equivalent Diameters:

$$\text{Board Opening Area} = 44 \text{ ft}^2 (4' \times 11')$$

$$\text{Board Opening Perimeter} = 30 \text{ ft}$$

$$\text{Equivalent Diameter Board Opening: } \frac{44 \text{ ft}^2}{30 \text{ ft}} = 1.5 \text{ ft}$$

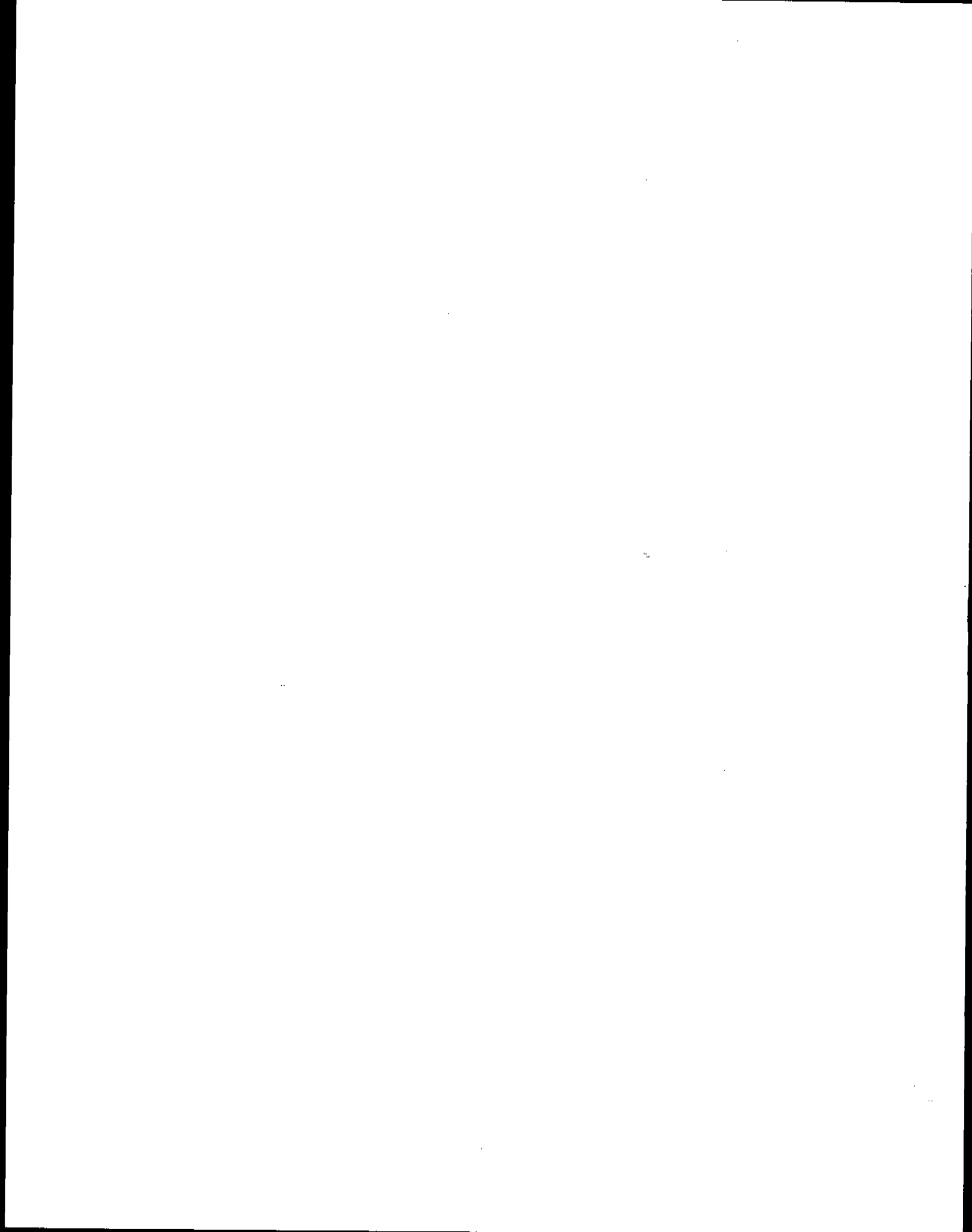
$$\text{Door Opening Area} = 21 \text{ ft}^2 (3' \times 7')$$

$$\text{Door Opening Perimeter} = 20 \text{ ft}$$

$$\text{Equivalent Diameter Door Opening: } \frac{21 \text{ ft}^2}{20 \text{ ft}} = 1.1 \text{ ft}$$

All VOC emission sources are more than 4 times the equivalent diameters calculated above.

Attachments A & B verify the air velocity through all NDO's in the enclosure.





Louisiana-Pacific Corporation

10475 Boston Road
 Roxboro, NC 27573
 910/599-8080
 910/599-5153 FAX

RTO PRESS ENCLOSURE INSPECTION FOR AIR VELOCITY

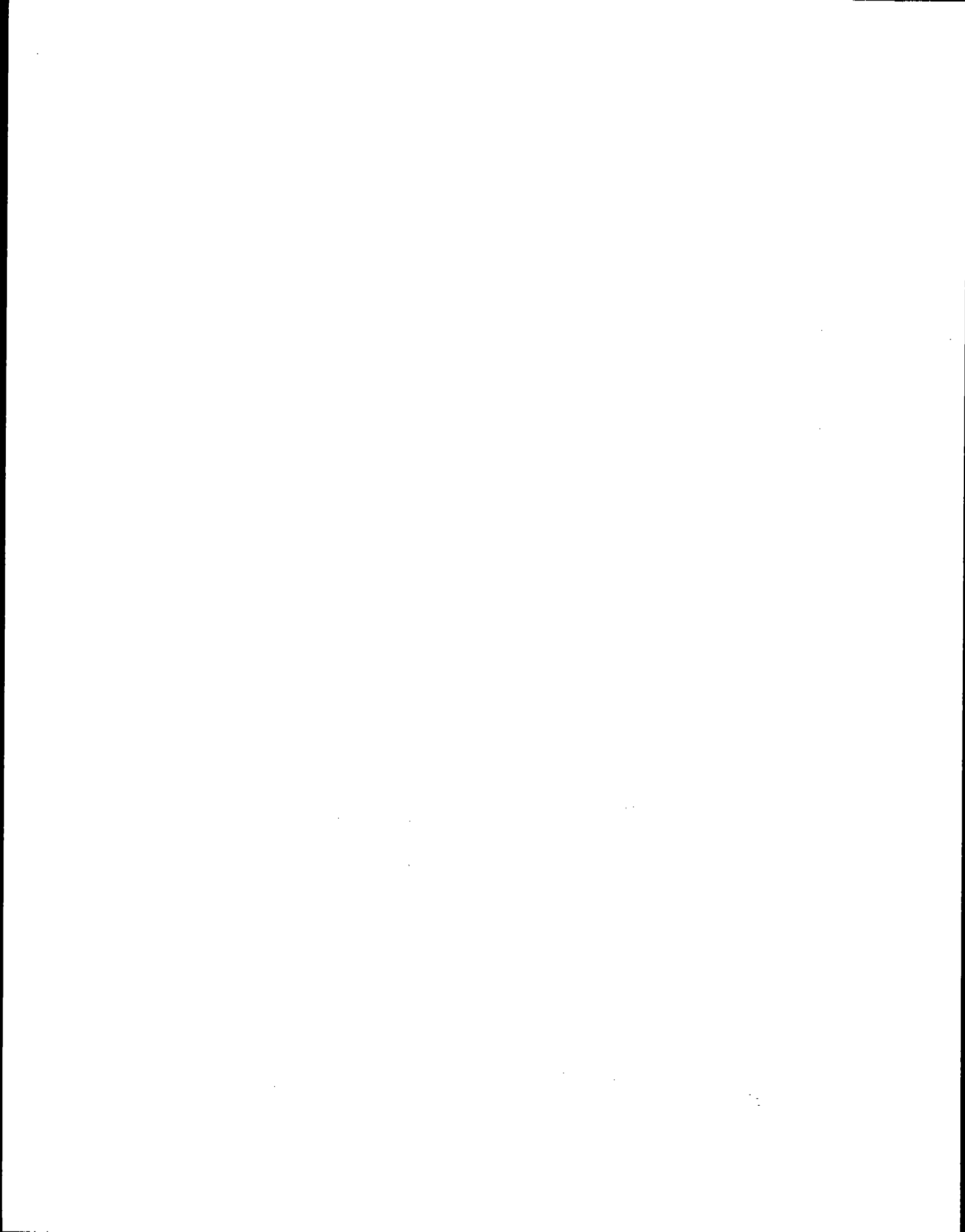
DATE: 9/17/96Initials Sph C

Press in operation. 1:25pm

Ground Floor DoorsDOOR #1 closed
(West side)DOOR#2 _____
(South side)DOOR#3 _____
(South side)DOOR#4 _____
(South side)DOOR#5 _____
(East side)DOOR#6 _____
(East side)**Second Level Doors**DOOR #1 400
(West side)DOOR#2 420
(West side)Opening #1 380
(West side)DOOR#3 420
(East side)DOOR#4 420
(East side)Board opening West side 420East side 410Any modifications to press enclosure: NO

**Units in FPM

C:\procedure\press\presenc1.wps





Louisiana-Pacific Corporation

Attachment B

10475 Boston Road
Roxboro, NC 27573
910/599-8080
910/599-5153 FAX

RTO PRESS ENCLOSURE INSPECTION FOR AIR VELOCITY

DATE: 8/16/196
9:40 AM

Initials Sph

Press in Operation

Ground Floor Doors

DOOR #1 370 fpm
(West side)

DOOR#2 430 fpm
(South side)

DOOR#3 460 fpm
(South side)

DOOR#4 390 fpm
(South side)

DOOR#5 390 fpm
(East side)

DOOR#6 350 fpm
(East side)

Any modifications to press enclosure: No

Second Level Doors

DOOR #1 300 fpm
(West side)

DOOR#2 310 fpm
(West side)

Opening #1 300 fpm
(West side)

DOOR#3 300 fpm
(East side)

DOOR#4 350 fpm
(East side)

NDD West Side 300 fpm

NDD East Side 310 fpm

REPORT CERTIFICATION

El Reference Number 15575A

The sampling and analysis performed for this report were carried out under my direction and supervision, and I hereby certify that, to the best of my knowledge, the test report is authentic and accurate.

Signature: Carl F. Fink
Date: 9-5-96

Carl F. Fink
Project Director
Client Services Division

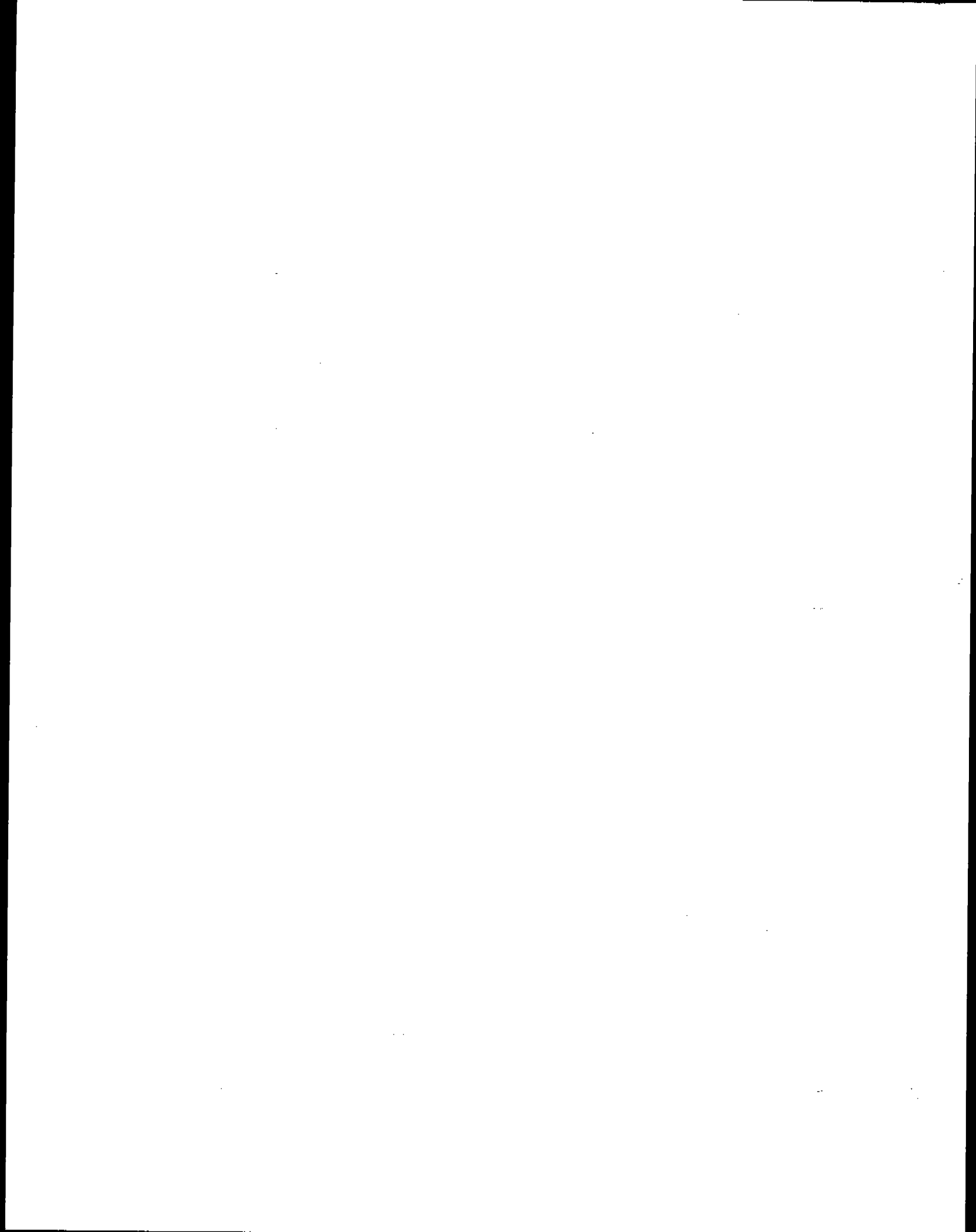


Table of Contents

LIST OF TABLES AND FIGURES	iii
1.0 INTRODUCTION	
1.1 Background	1-1
1.2 Outline of Test Program	1-1
1.3 Test Participants	1-1
2.0 SUMMARY OF RESULTS	
2.1 Presentation	2-1
2.2 Cyclonic Flow Checks	2-1
3.0 PROCESS DESCRIPTION AND OPERATION	
3.1 General	3-1
3.2 Source Air Flow	3-1
4.0 SAMPLING AND ANALYTICAL PROCEDURES	
4.1 General	4-1
4.2 Sampling Points	4-1
4.3 Cyclonic Flow Check	4-1
4.4 Volumetric Air Flow Rates	4-1
4.4.1 Flue Gas Velocity	4-1
4.4.2 Flue Gas Composition	4-3
4.4.3 Flue Gas Moisture Content	4-3
4.5 Emissions Determinations	4-3
4.5.1 Carbon Dioxide, Oxygen, Carbon Monoxide, Nitrogen Oxides, and Total Hydrocarbons	4-3
4.5.2 Filterable and Condensable Particulate	4-5
4.6 Equipment Calibration	4-6
5.0 QUALITY ASSURANCE/QUALITY CONTROL	
5.1 General	5-1
5.2 Preventive Maintenance and Equipment Calibration	5-1
5.3 Sample Processing	5-3
5.4 Instrument Calibration	5-4
5.5 Blanks and Spikes	5-4
5.6 Internal/External System Audit Checks	5-5
5.7 Data Reduction and Validation	5-5
5.8 QA/QC Summary	5-6

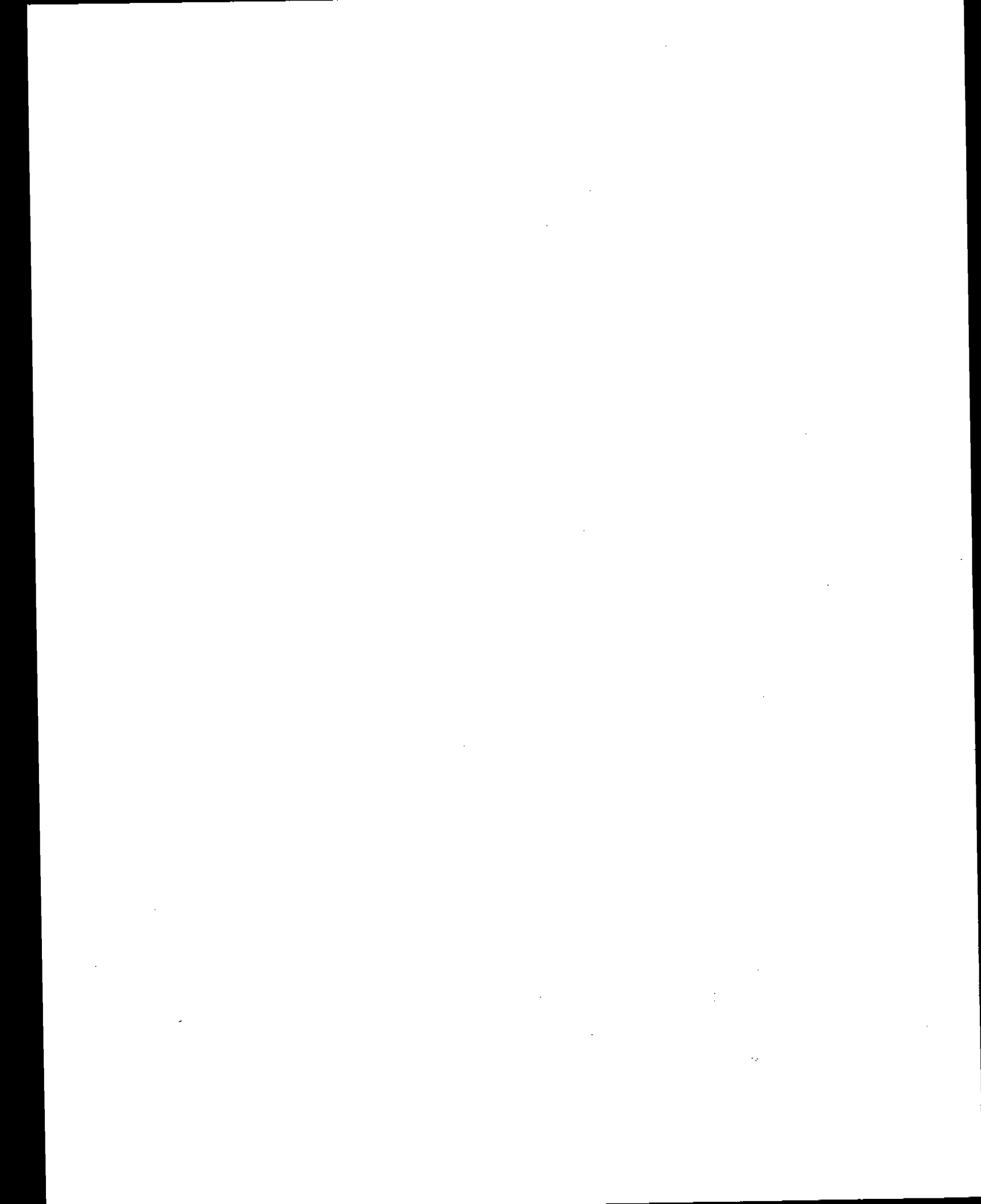


Table of Contents (continued)

APPENDIX A. TEST RESULTS

1. RTO No. 1 Stack	
a. Carbon Monoxide, Nitrogen Oxides, and Total Hydrocarbons	1
b. Filterable and Condensible Particulate.....	11
2. RTO No. 2 Stack	
a. Carbon Monoxide, Nitrogen Oxides, and Total Hydrocarbons	15
b. Filterable and Condensible Particulate.....	25
3. RTO No. 3 Stack	
a. Carbon Monoxide, Nitrogen Oxides, and Total Hydrocarbons	29
b. Filterable and Condensible Particulate.....	39
4. Example Calculations	43

APPENDIX B. FIELD DATA

1. RTO No. 1 Stack	
a. Carbon Monoxide, Nitrogen Oxides, and Total Hydrocarbons	51
b. Filterable and Condensible Particulate.....	65
2. RTO No. 2 Stack	
a. Carbon Monoxide, Nitrogen Oxides, and Total Hydrocarbons	75
b. Filterable and Condensible Particulate.....	89
3. RTO No. 3 Stack	
a. Carbon Monoxide, Nitrogen Oxides, and Total Hydrocarbons	97
b. Filterable and Condensible Particulate.....	113
4. Plume Opacity	121
5. Sampling Point Determinations and Cyclonic Flow Checks	137

APPENDIX C. ANALYTICAL DATA..... 143

APPENDIX D. CALIBRATION DATA

1. Manual Test Methods	153
2. Instrumental Test Methods	189

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List of Tables and Figures

<u>Table</u>	<u>Figure</u>		
1-1	-	Test Log.....	1-2
1-2	-	Test Participants.....	1-3
2-1	-	Test Results Versus Permitted Limits	2-2
Run-By-Run Tests Summaries			
RTO No. 1 Stack			
2-2	-	Carbon Monoxide, Nitrogen Oxides, and Total Hydrocarbons	2-3
2-3	-	Filterable and Condensible Particulate	2-4
RTO No. 2 Stack			
2-4	-	Carbon Monoxide, Nitrogen Oxides, and Total Hydrocarbons	2-6
2-5	-	Filterable and Condensible Particulate	2-7
RTO No. 1 Stack			
2-6	-	Carbon Monoxide, Nitrogen Oxides, and Total Hydrocarbons	2-9
2-7	-	Filterable and Condensible Particulate	2-10
Air Flow Schematics			
-	3-1	RTO Nos. 1, and 2.....	3-2
-	3-2	RTO No. 3.....	3-3
-	4-1	RTO Nos. 1, 2, and 3 Stack Test Locations	4-2
5-1	-	In-House Equipment Calibration	5-2
5-2	-	Quality Assurance/Quality Control Criteria	5-6

1.0 INTRODUCTION

1.1 Background

Louisiana-Pacific Corporation has conducted a testing program to quantify specific emissions from the Regenerative Thermal Oxidizers (RTOs) at their Roxboro OSB Plant in Roxboro, North Carolina. The purpose of the testing is to show that RTO Nos. 1, 2, and 3 are in compliance with specific condition 3.a and 3.b of Air Permit No. 7760R2.

1.2 Outline of Test Program

Stationary source sampling was conducted on August 6 and 9, 1996. Table 1-1 is a test log which presents the sampling locations, sampling objectives, sampling methods, test dates, and run numbers for the test program. Several runs utilized volumetric air flow rates and/or flue gas composition data from other runs; refer to Table 1-1.

1.3 Test Participants

Table 1-2 lists the personnel involved in the test program.

TABLE 1-1
TEST LOG
AUGUST 1996

Test Location	Sampling Objective	Test Method	Test Date	Run Numbers	Flue Gas Composition	Volumetric Air Flow Rate
RTO No. 1 Stack	O ₂ /CO ₂ , NO _x , CO, & THC	EPA 3A, 7E, 10, & 25A	8/09	S1-CEM-1	S1-CEM-1	S1-M5/202-1
			8/09	S1-CEM-2	S1-CEM-2	S1-M5/202-2
			8/09	S1-CEM-3	S1-CEM-3	S1-M5/202-3
	Filterable & Condensible Particulate	EPA 5 & 202	8/09	S1-M5/202-1	S1-CEM-1	NA
			8/09	S1-M5/202-2	S1-CEM-2	
			8/09	S1-M5/202-3	S1-CEM-3	
	Plume Opacity	EPA 9—	8/09	S1-M9-1	NA	NA—
			8/09	S1-M9-2		
			8/09	S1-M9-3		
RTO No. 2 Stack	O ₂ /CO ₂ , NO _x , CO, & THC	EPA 3A, 7E, 10, & 25A	8/09	S2-CEM-1	S2-CEM-1	S2-M5/202-1
			8/09	S2-CEM-2	S2-CEM-2	S2-M5/202-2
			8/09	S2-CEM-3	S2-CEM-3	S2-M5/202-3
	Filterable & Condensible Particulate	EPA 5 & 202	8/09	S2-M5/202-1	S2-CEM-1	NA
			8/09	S2-M5/202-2	S2-CEM-2	
			8/09	S2-M5/202-3	S2-CEM-3	
	Plume Opacity	EPA 9	8/09	S2-M9-1	NA	NA
			8/09	S2-M9-2		
			8/09	S2-M9-3		
RTO No. 3 Stack	O ₂ /CO ₂ , NO _x , CO, & THC	EPA 3A, 7E, 10, & 25A	8/06	S3-CEM-1	S3-CEM-1	S3-M5/202-1
			8/06	S3-CEM-2	S3-CEM-2	S3-M5/202-2
			8/06	S3-CEM-3	S3-CEM-3	S3-M5/202-3
	Filterable & Condensible Particulate	EPA 5 & 202	8/06	S3-M5/202-1	S3-CEM-1	NA
			8/06	S3-M5/202-2	S3-CEM-2	
			8/06	S3-M5/202-3	S3-CEM-3	
	Plume Opacity	EPA 9	8/06	S3-M9-1	NA	NA
			8/06	S3-M9-2		
			8/06	S3-M9-3		

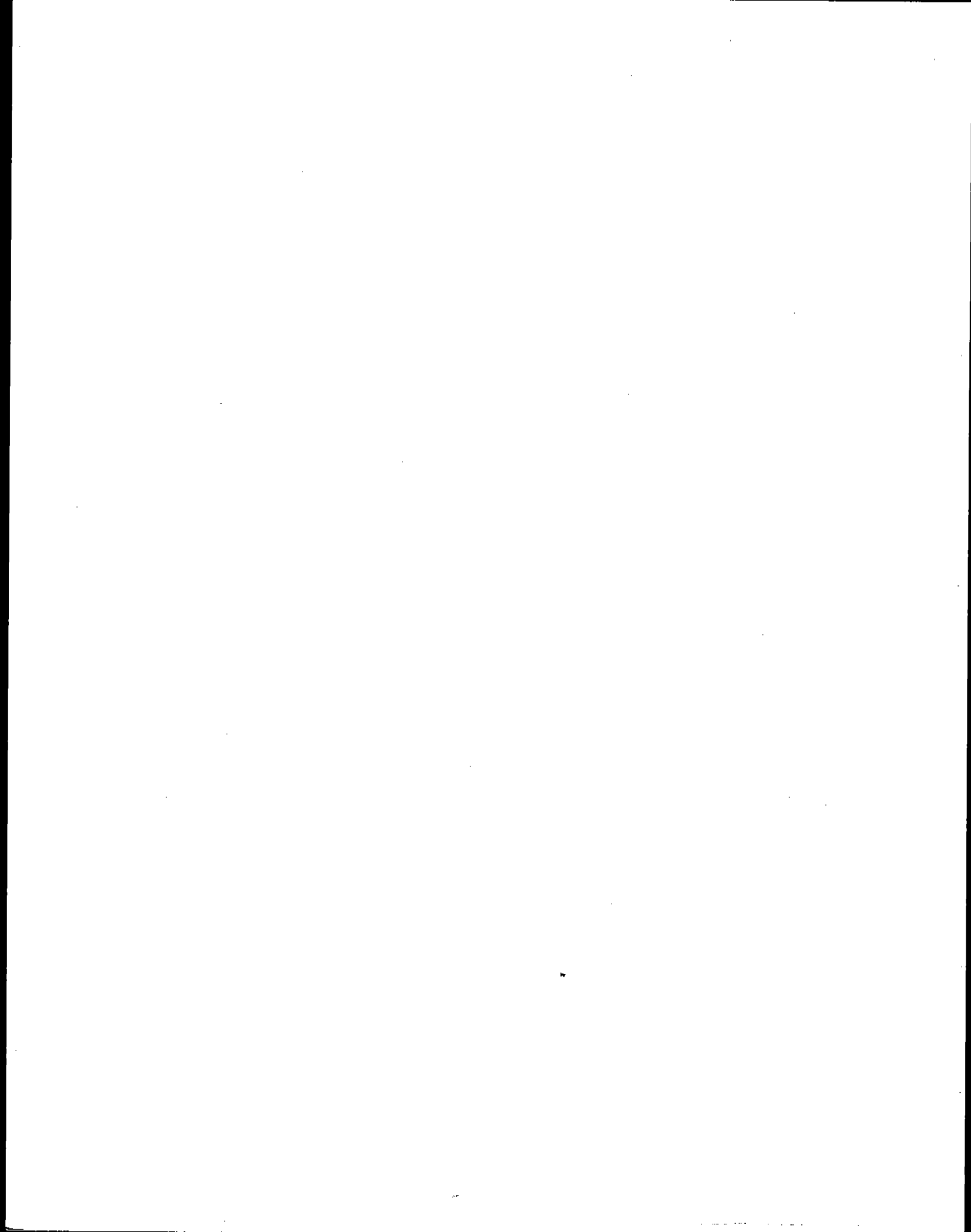
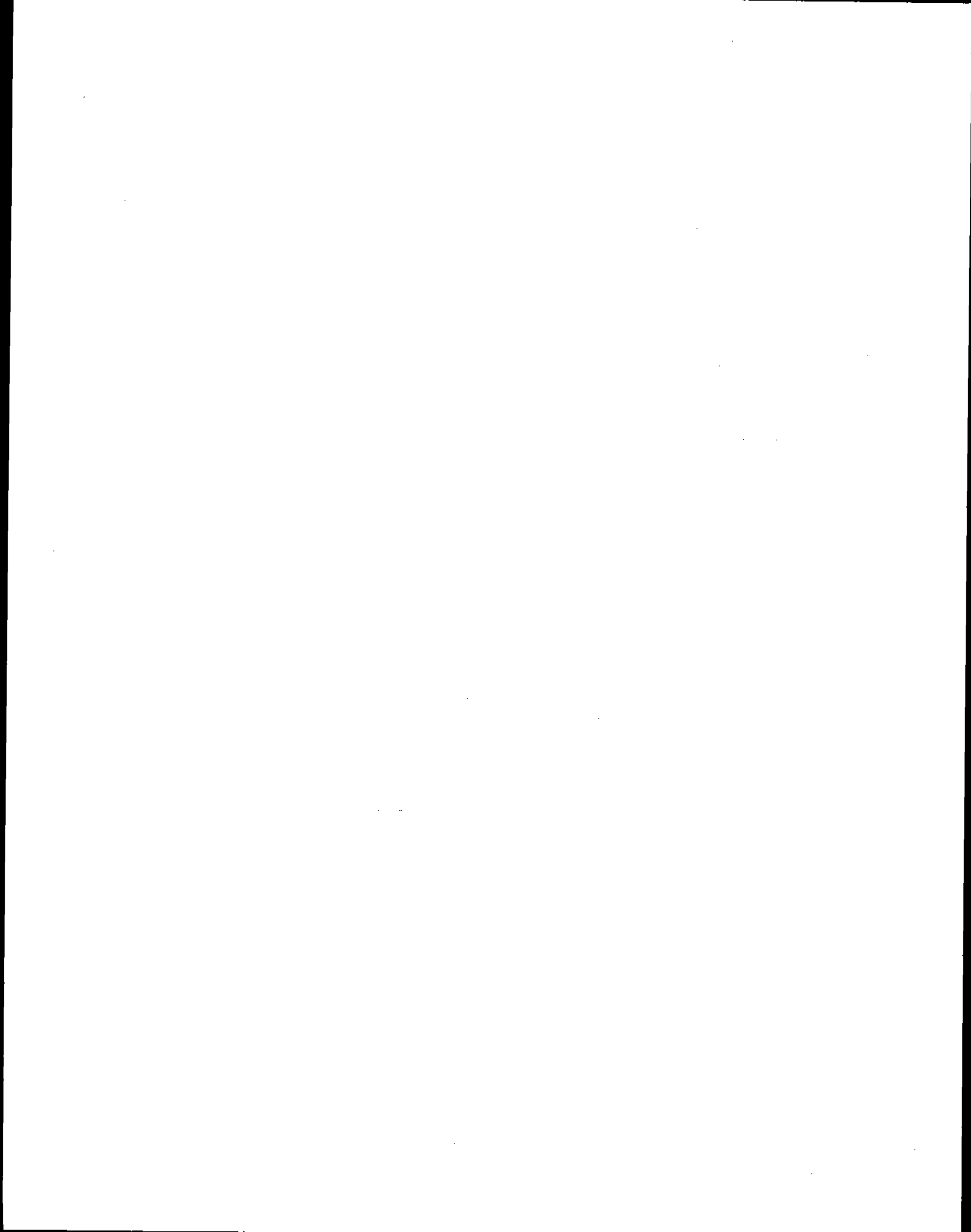


TABLE 1-2
TEST PARTICIPANTS
AUGUST 1996

Louisiana-Pacific Corporation	Shane McCarthy Test Coordinator
North Carolina Dept. of Environment, Health, and Natural Resources	Stephen G. Hall Test Observer
Entropy, Inc.	Carl F. Fink Project Director
	Todd C. Meissner Project Manager
	Patrick F. Daley Sampling Team Leader
	Craig E. Haden Sampling Team Leader
	Dennis D. Holzschuh Sampling Team Leader
	Jeffrey D. Kunstling Sampling Team Leader
	William E. Morgan Sampling Team Leader
	Danny L. Speer Sampling Team Leader
	Michael G. Worthy Instrument Operator (CEM)
	Lauren A. Sherwood Instrument Operator (CEM)
	James B. Winegar VE Observer
	Jeffrey S. Coppedge Laboratory Technician



2.0 SUMMARY OF RESULTS

2.1 Presentation

Table 2-1 presents the test results versus the permitted limits. Tables 2-2 through 2-7 present run-by-run test summaries; refer to the "List of Tables and Figures" of the "Table of Contents." Due to the near absence of a visible plume, the results of the plume opacity observations are not summarized in this section. All of the readings were zero.

Detailed test results are presented in Appendix A; field data is given in Appendix B; and analytical data can be found in Appendix C.

2.2 Cyclonic Flow Checks

A cyclonic flow check was performed at each sampling location to determine if any cyclonic flow existed. Average yaw angles of $< 11^\circ$ were measured, indicating acceptable locations with respect to EPA Method 1 requirements.

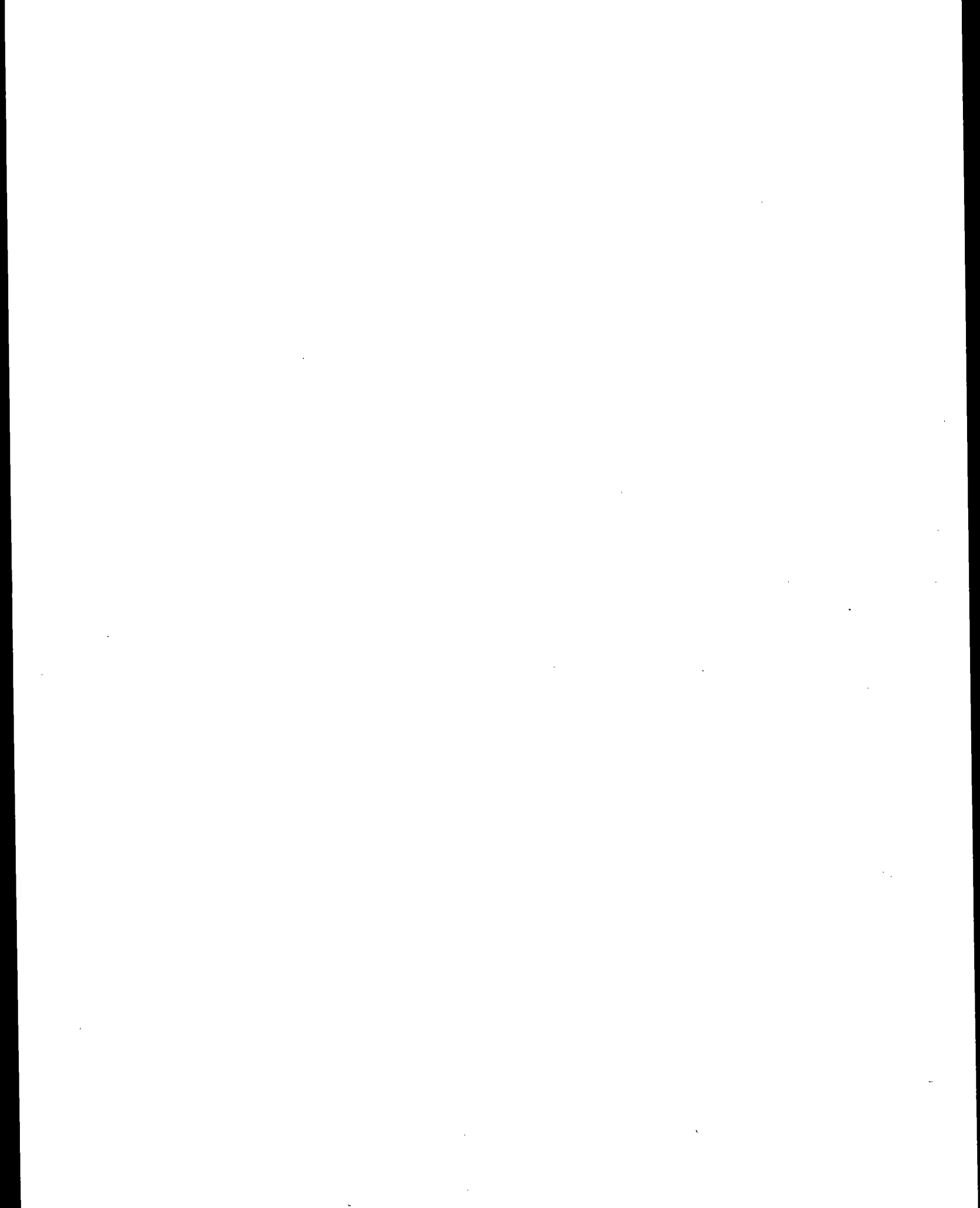


TABLE 2-1
TEST RESULTS VERSUS PERMITTED LIMITS
RTO NOS. 1, 2, AND 3
AUGUST 1996

	Rep 1	Rep 2	Rep 3	Average	Permit Limit
RTO NO. 1 STACK					
Emission Rate, lb/hr					
Carbon Monoxide	16.5	11.6	11.4	13.2	--
Nitrogen Oxides as NO ₂	16.9	16.0	18.7	17.2	--
Total Hydrocarbons as C	2.43	2.10	2.22	2.25	--
Total Particulate*	9.83	6.22	10.7	8.92	--
RTO NO. 2 STACK					
Emission Rate, lb/hr					
Carbon Monoxide	19.0	13.0	10.2	14.1	--
Nitrogen Oxides as NO ₂	18.6	17.0	19.3	18.3	--
Total Hydrocarbons as C	2.10	2.20	1.79	2.03	--
Total Particulate*	10.6	6.25	4.91	7.25	--
COMBINED RTO NOS. 1 AND 2					
Emission Rate, lb/hr					
Carbon Monoxide	35.5	24.6	21.6	27.3	37.0
Nitrogen Oxides as NO ₂	35.5	33.0	38.0	35.5	41.0
Total Hydrocarbons as C	4.53	4.30	4.01	4.28	8.0
Total Particulate*	20.4	12.5	15.6	16.2	22.56
RTO NO. 3 STACK					
Emission Rate, lb/hr					
Carbon Monoxide	2.89	2.13	2.23	2.41	18.5
Nitrogen Oxides as NO ₂	2.88	3.15	2.99	3.01	15.0
Total Hydrocarbons as C	1.72	1.85	1.77	1.78	3.25
Total Particulate	2.12	0.979	1.88	1.66	7.17

* Total particulate includes filterable and condensable particulate.

1890

1891

1892

1893

1894

1895

1896

1897

1898

1899

1900

1901

1902

1903

1904

1905

1906

1907

1908

1909

1910

1911

1912

1913

1914

1915

TABLE 2-2
CARBON MONOXIDE, NITROGEN OXIDES, AND TOTAL HYDROCARBON
TESTS SUMMARY

RTO No. 1 Stack

	<u>S1-CEM-1</u>	<u>S1-CEM-2</u>	<u>S1-CEM-3</u>	<u>Average</u>
Test Date	8/9/96	8/9/96	8/9/96	
Run Start Time	1720	1845	2020	
Run Finish Time	1826	1955	2125	
<u>Flue Gas Parameters</u>				
CO ₂ , percent by volume, dry	3.93	3.76	3.73	3.81
O ₂ , percent by volume, dry	16.39	16.82	16.73	16.65
Air Flow Rate, dry SCFM	74,132	73,687	75,094	74,304
<u>Carbon Monoxide</u>				
Concentration, ppmvd	51.0	36.0	34.9	40.6
Emission Rate, lb/hr	16.5	11.6	11.4	13.2
<u>Nitrogen Oxides as NO₂</u>				
Concentration, ppmvd	31.8	30.4	34.7	32.3
Emission Rate, lb/hr	16.9	16.0	18.7	17.2
<u>THC as Carbon</u>				
Concentration, ppmvw	13.5	12.1	12.6	12.7
Concentration, ppmvd	17.5	15.3	15.8	16.2
Emission Rate, lb/hr	2.43	2.10	2.22	2.25

4. The fourth part of the document provides a summary of the key findings and conclusions of the audit. It identifies the areas where the company's financial statements are in compliance with the relevant standards and the areas where there are deficiencies. It also provides recommendations for how the company can improve its financial reporting practices.

5. The fifth part of the document is a conclusion that summarizes the overall findings of the audit and provides a final assessment of the company's financial health. It also includes a statement of the auditor's independence and a declaration of the accuracy of the audit results.

TABLE 2-3

FILTERABLE AND CONDENSIBLE PARTICULATE TESTS SUMMARY

RTO No. 1 Stack

	S1-M5/202-1	S1-M5/202-2	S1-M5/202-3	Average
Run Date	8/09/96	8/09/96	8/09/96	
Run Start Time	1720	1845	2020	
Run Finish Time	1825	1955	2125	
Test Train Parameters:				
Volume Of Dry Gas Sample, SCF *	39.608	37.898	38.669	
Percent Isokinetic:	108.2	105.9	104.3	
Flue Gas Parameters:				
CO ₂ , Percent By Volume, Dry	3.9	3.8	3.7	3.8
O ₂ , Percent By Volume, Dry	16.4	16.8	16.7	16.6
Temperature, °F	274	274	275	274
Air Flow Rate, Dry SCFM *	74,132	73,687	75,094	74,304
Air Flow Rate, Wet ACFM	135,805	131,228	133,031	133,355
Filterable Particulate:				
Concentration, grains/DSCF *	0.00927	0.00753	0.00938	0.00873
Emission Rate, lb/hr	5.89	4.76	6.04	5.56
Inorganic (Aqueous) Condensible Part.:				
Concentration, grains/DSCF *	1.09E-003	2.44E-004	4.55E-003	1.96E-003
Emission Rate, lb/hr	0.693	0.154	2.93	1.26
Organic Condensible Particulate:				
Concentration, grains/DSCF *	0.00510	0.00208	0.00263	0.00327
Emission Rate, lb/hr	3.24	1.31	1.70	2.08

* 68° F (20° C) -- 29.92 Inches of Mercury (Hg)

(Continued next page)



TABLE 2-3 (Continued)

FILTERABLE AND CONDENSIBLE PARTICULATE TESTS SUMMARY

RTO No. 1 Stack

	<u>S1-M5/202-1</u>	<u>S1-M5/202-2</u>	<u>S1-M5/202-3</u>	<u>Average</u>
<u>Total Particulate:</u>				
Concentration, grains/DSCF *	0.0155	0.00985	0.0166	0.0140
Emission Rate, lb/hr	9.83	6.22	10.7	8.92

* 68° F (20° C) -- 29.92 Inches of Mercury (Hg)

TABLE 2-4
CARBON MONOXIDE, NITROGEN OXIDES, AND TOTAL HYDROCARBON
TESTS SUMMARY

RTO No. 2 Stack

	<u>S2-CEM-1</u>	<u>S2-CEM-2</u>	<u>S2-CEM-3</u>	<u>Average</u>
Test Date	8/9/96	8/9/96	8/9/96	
Run Start Time	1720	1845	2020	
Run Finish Time	1825	1955	2125	
<u>Flue Gas Parameters</u>				
CO ₂ , percent by volume, dry	4.00	3.82	3.49	3.77
O ₂ , percent by volume, dry	16.20	16.59	17.16	16.65
Air Flow Rate, dry SCFM	67,277	67,904	72,564	69,248
<u>Carbon Monoxide</u>				
Concentration, ppmvd	64.7	43.8	32.2	46.9
Emission Rate, lb/hr	19.0	13.0	10.2	14.1
<u>Nitrogen Oxides as NO₂</u>				
Concentration, ppmvd	38.6	34.9	37.2	36.9
Emission Rate, lb/hr	18.6	17.0	19.3	18.3
<u>THC as Carbon</u>				
Concentration, ppmvw	12.7	13.5	11.1	12.4
Concentration, ppmvd	16.7	17.4	13.2	15.7
Emission Rate, lb/hr	2.10	2.20	1.79	2.03



TABLE 2-5

FILTERABLE AND CONDENSIBLE PARTICULATE TESTS SUMMARY

RTO No. 2 Stack

	S2-M5/202-1	S2-M5/202-2	S2-M5/202-3	Average
Run Date	8/09/96	8/09/96	8/09/96	
Run Start Time	1720	1845	2020	
Run Finish Time	1825	1955	2125	
Test Train Parameters:				
Volume Of Dry Gas Sample, SCF *	50.778	51.479	50.788	
Percent Isokinetic: —	105.6	103.2	97.9 —	
Flue Gas Parameters:				
CO ₂ , Percent By Volume, Dry	4.0	3.8	3.5	3.8
O ₂ , Percent By Volume, Dry	16.2	16.6	17.2	16.7
Temperature, °F	282	284	286	284
Air Flow Rate, Dry SCFM *	67,277	67,904	72,564	69,248
Air Flow Rate, Wet ACFM	126,391	124,965	123,319	124,892
Filterable Particulate:				
Concentration, grains/DSCF *	0.0121	0.00872	0.00605	0.00896
Emission Rate, lb/hr	6.99	5.08	3.76	5.28
Inorganic (Aqueous) Condensible Part.:				
Concentration, grains/DSCF *	3.43E-003	5.40E-004	1.15E-003	1.71E-003
Emission Rate, lb/hr	1.98	0.314	0.718	1.00
Organic Condensible Particulate:				
Concentration, grains/DSCF *	2.80E-003	1.47E-003	6.99E-004	1.66E-003
Emission Rate, lb/hr	1.61	0.855	0.435	0.967

* 68° F (20° C) -- 29.92 Inches of Mercury (Hg)

(Continued next page)

TABLE 2-5 (Continued)

FILTERABLE AND CONDENSIBLE PARTICULATE TESTS SUMMARY

RTO No. 2 Stack

	<u>S2-M5/202-1</u>	<u>S2-M5/202-2</u>	<u>S2-M5/202-3</u>	<u>Average</u>
Total Particulate:				
Concentration, grains/DSCF *	0.0184	0.0107	0.00790	0.0123
Emission Rate, lb/hr	10.6	6.25	4.91	7.25

* 68° F (20° C) -- 29.92 Inches of Mercury (Hg)

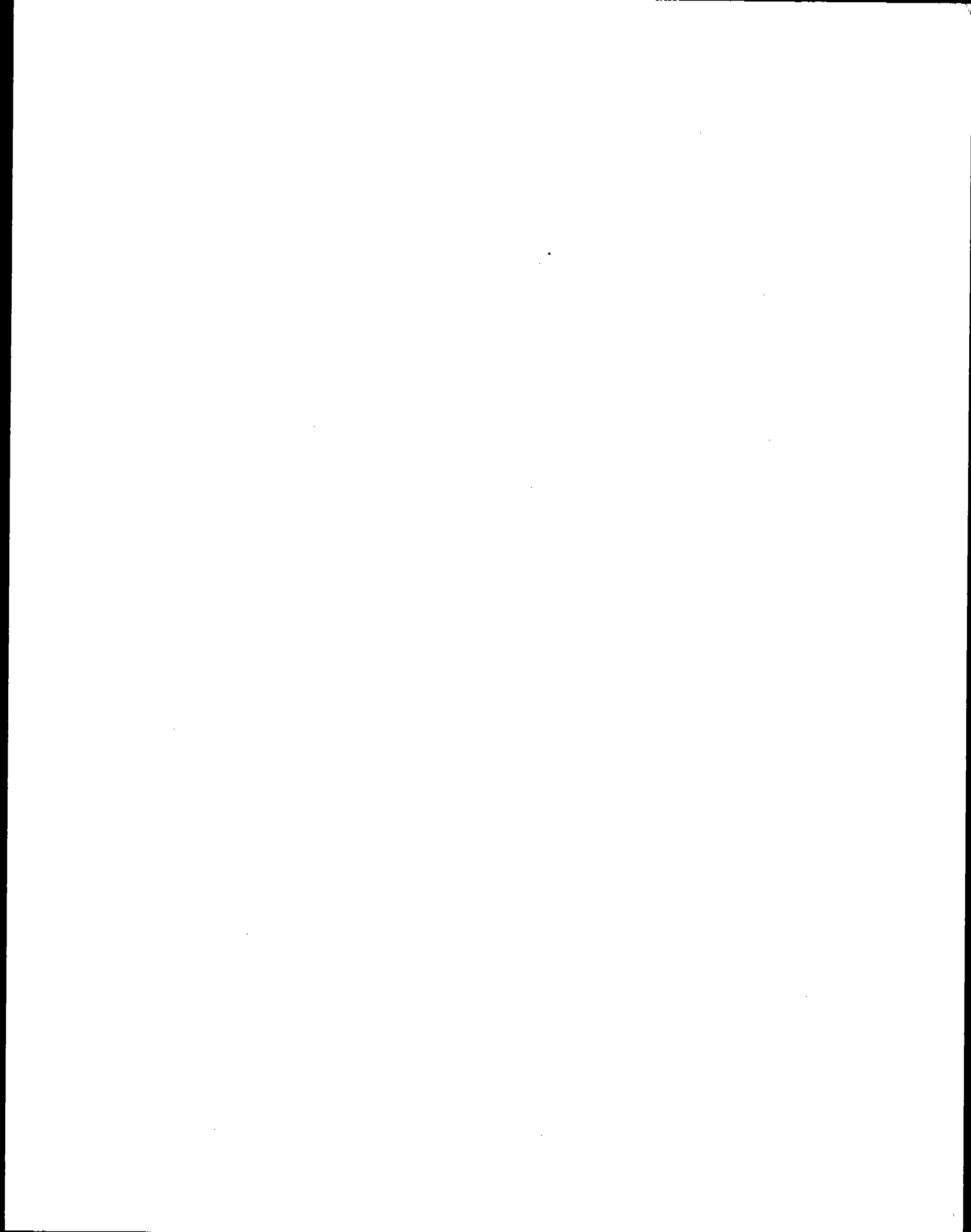


TABLE 2-6
CARBON MONOXIDE, NITROGEN OXIDES, AND TOTAL HYDROCARBON
TESTS SUMMARY

RTO No. 3 Stack

	<u>S3-CEM-1</u>	<u>S3-CEM-2</u>	<u>S3-CEM-3</u>	<u>Average</u>
Test Date	8/6/96	8/6/96	8/6/96	
Run Start Time	1125	1345	1530	
Run Finish Time	1305	1503	1630	
<u>Flue Gas Parameters</u>				
CO ₂ , percent by volume, dry	0.37	0.38	0.38	0.38
O ₂ , percent by volume, dry	20.45	20.58	20.60	20.54
Air Flow Rate, dry SCFM	118,228	118,966	116,038	117,744
<u>Carbon Monoxide</u>				
Concentration, ppmvd	5.60	4.10	4.40	4.70
Emission Rate, lb/hr	2.89	2.13	2.23	2.41
<u>Nitrogen Oxides as NO₂</u>				
Concentration, ppmvd	3.40	3.70	3.60	3.57
Emission Rate, lb/hr	2.88	3.15	2.99	3.01
<u>THC as Carbon</u>				
Concentration, ppmvw	7.50	8.10	8.00	7.87
Concentration, ppmvd	7.76	8.30	8.14	8.07
Emission Rate, lb/hr	1.72	1.85	1.77	1.78

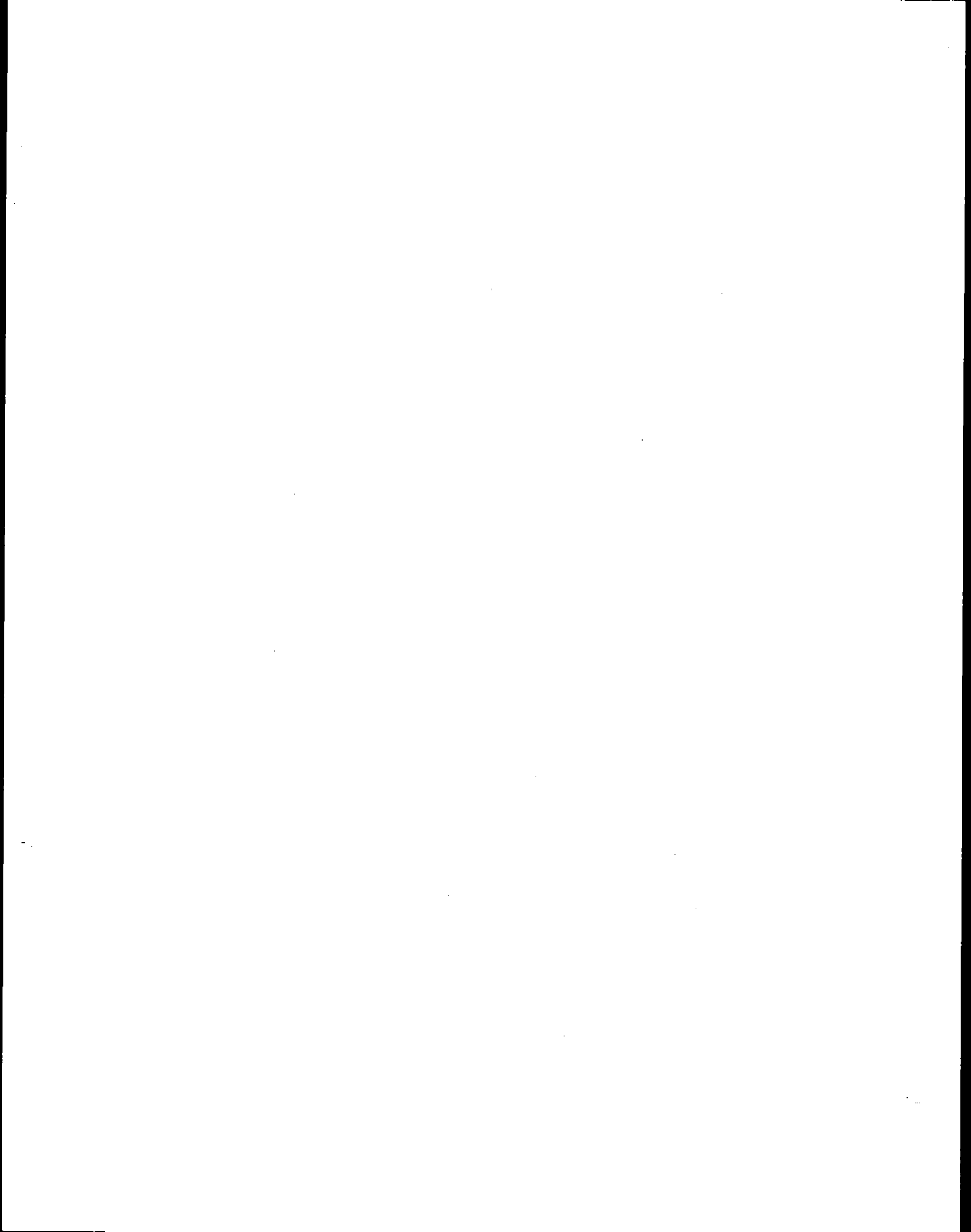


TABLE 2-7

FILTERABLE AND CONDENSIBLE PARTICULATE TESTS SUMMARY

RTO No. 3 Stack

	S3-M5/202-1	S3-M5/202-2	S3-M5/202-3	Average
Run Date	8/06/96	8/06/96	8/06/96	
Run Start Time	1125	1345	1530	
Run Finish Time	1302	1508	1634	
Test Train Parameters:				
Volume Of Dry Gas Sample, SCF *	51.702	41.813	41.548	
Percent Isokinetic:	97.0	99.6	100.5	
Flue Gas Parameters:				
CO ₂ , Percent By Volume, Dry	.4	.4	.4	.4
O ₂ , Percent By Volume, Dry	20.4	20.6	20.6	20.5
Temperature, °F	232	234	233	233
Air Flow Rate, Dry SCFM *	118,228	118,966	116,038	117,744
Air Flow Rate, Wet ACFM	161,490	160,998	155,712	159,400
Filterable Particulate:				
Concentration, grains/DSCF *	4.48E-004	5.17E-004	1.26E-003	7.42E-004
Emission Rate, lb/hr	0.454	0.527	1.26	0.747
Inorganic (Aqueous) Condensible Part.:				
Concentration, grains/DSCF *	1.13E-003	4.43E-004	1.86E-004	5.86E-004
Emission Rate, lb/hr	1.15	0.452	0.185	0.596
Organic Condensible Particulate:				
Concentration, grains/DSCF *	5.07E-004	0.0	4.46E-004	3.18E-004
Emission Rate, lb/hr	0.514	0.0	0.443	0.319

* 68° F (20° C) -- 29.92 Inches of Mercury (Hg)

(Continued next page)

TABLE 2-7 (Continued)

FILTERABLE AND CONDENSIBLE PARTICULATE TESTS SUMMARY

RTO No. 3 Stack

	<u>S3-M5/202-1</u>	<u>S3-M5/202-2</u>	<u>S3-M5/202-3</u>	<u>Average</u>
Total Particulate:				
Concentration, grains/DSCF *	2.09E-003	9.60E-004	1.89E-003	1.65E-003
Emission Rate, lb/hr	2.12	0.979	1.88	1.66

* 68° F (20° C) -- 29.92 Inches of Mercury (Hg)

3.0 PROCESS DESCRIPTION AND OPERATION

3.1 General

Louisiana-Pacific Corporation manufactures oriented strand board (OSB) at their Roxboro, North Carolina facility. The manufacture of OSB begins with pine logs trucked to the facility, off-loaded and stored or fed into a whole log (drum) debarker. The debarked log proceeds to a whole log waferizer which slices the logs into thin wafers.

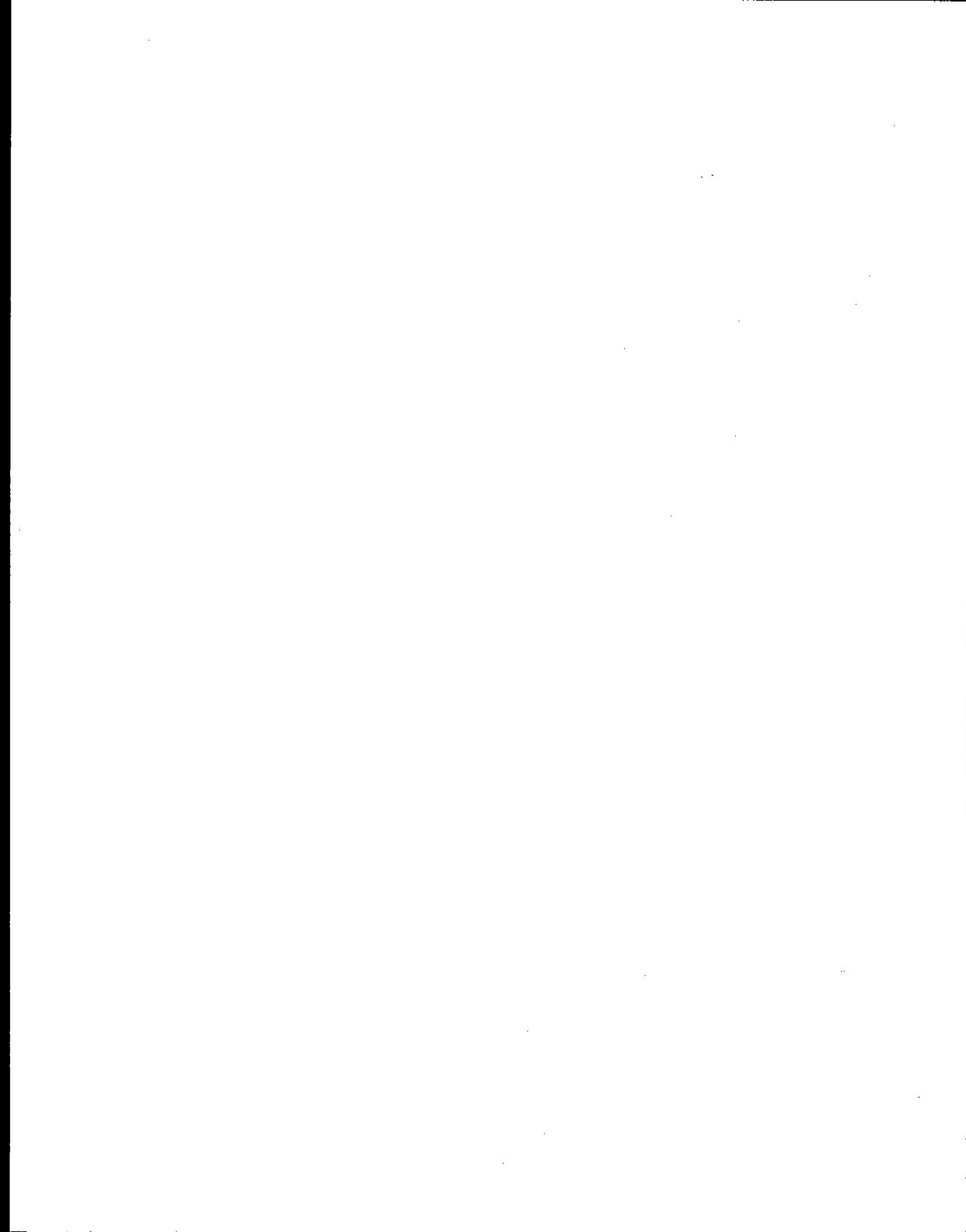
The wafers are collected on conveyor belts that transport them to green wafer storage bins above the triple-pass rotary dryers; into which they are fed via gravity and rotary air locks. The inlet temperatures of these dryers may range between 800° and 1100° F. The wafers are moved through the dryers by air flows of approximately 45,000-55,000 acfm. A primary cyclone removes the wood material and a screen separates the usable wafers from small fines. These dry fines are collected and pneumatically transported to storage bins for use as fuel for the wafer dryer burners and thermal oil heater while the exhaust air stream passes through a fabric filter. The exhaust air from this process then passes through a multicyclone and to the two dryer RTO's (Nos. 1 and 2) for thermal oxidation.

The dry wafers are collected and transported to bins via enclosed, rake conveyors. These dry wafer bins supply wafers to the blenders (core and face) where resin and wax are added. The resinated wafers are fed out of the blenders to the forming line where four (4) mechanical formers lay down successive layers of wafers (bottom face-core-core-top face). This "mat" then passes via a caul system to the press loader where mats are stacked for loading into the press. The press is then loaded (14 mats) and closes with pressure and heat setting the resin. Thermal oil at approximately 420° F supplies the heat for this process. The thermal oil is heated in two natural gas fired thermal oil heaters whose emissions are routed to each of the five (5) dryers and then the dryer RTO's. Emissions from the enclosed press area are collected via exhaust fans and directed to the press RTO (No. 3). The RTO's are operated between 1400° and 1600° F.

The testing covered in this report was performed at the RTO Nos. 1, 2, and 3 Stacks.

3.2 Source Air Flow

Figure 3-1 is an air flow schematic which shows the passage of flue gases exhausted from the dryers. Figure 3-2 is an air flow schematic which shows the passage of flue gases exhausted from the press.



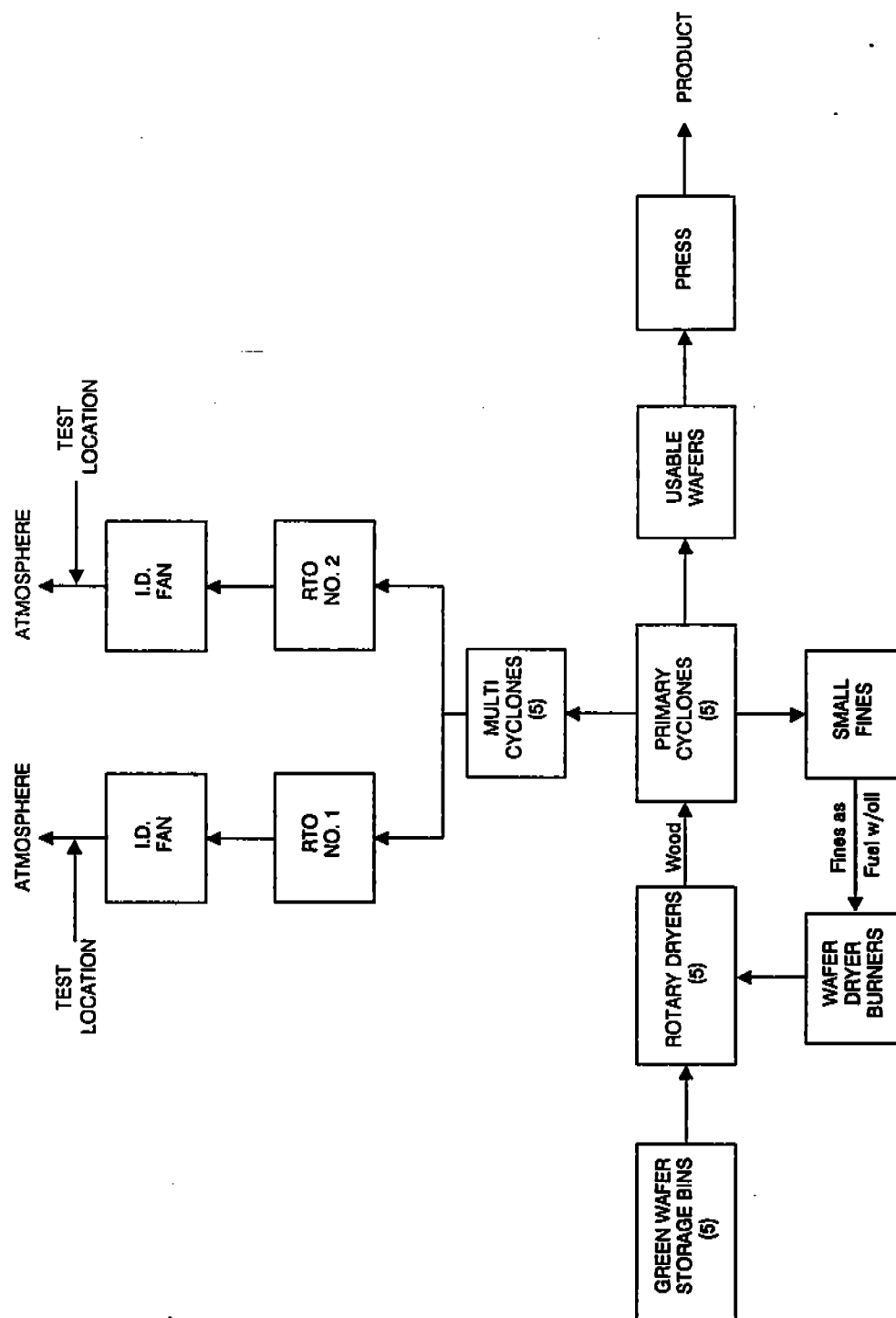
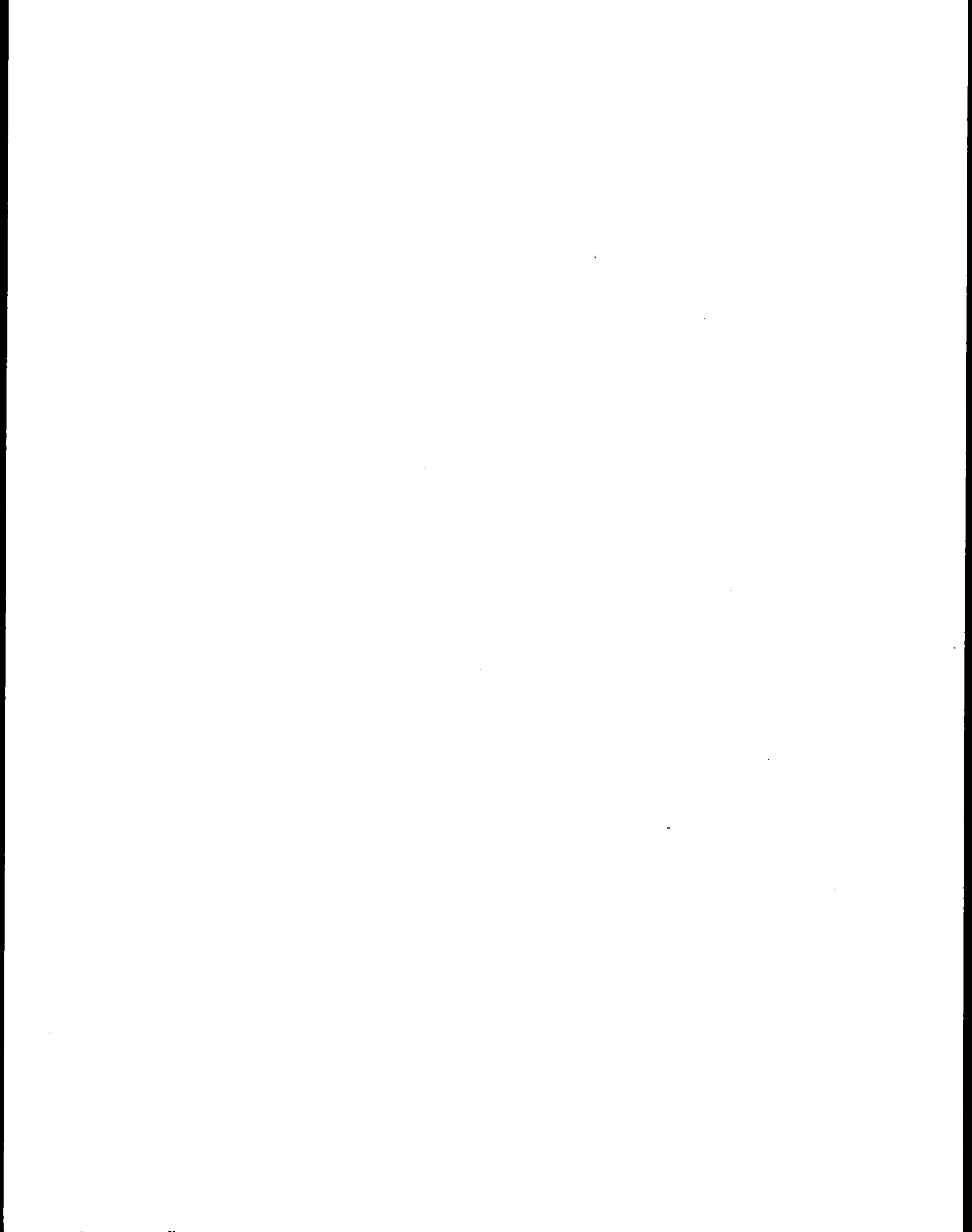


FIGURE 3-1. RTO NOS. 1 AND 2 AIR FLOW SCHEMATIC



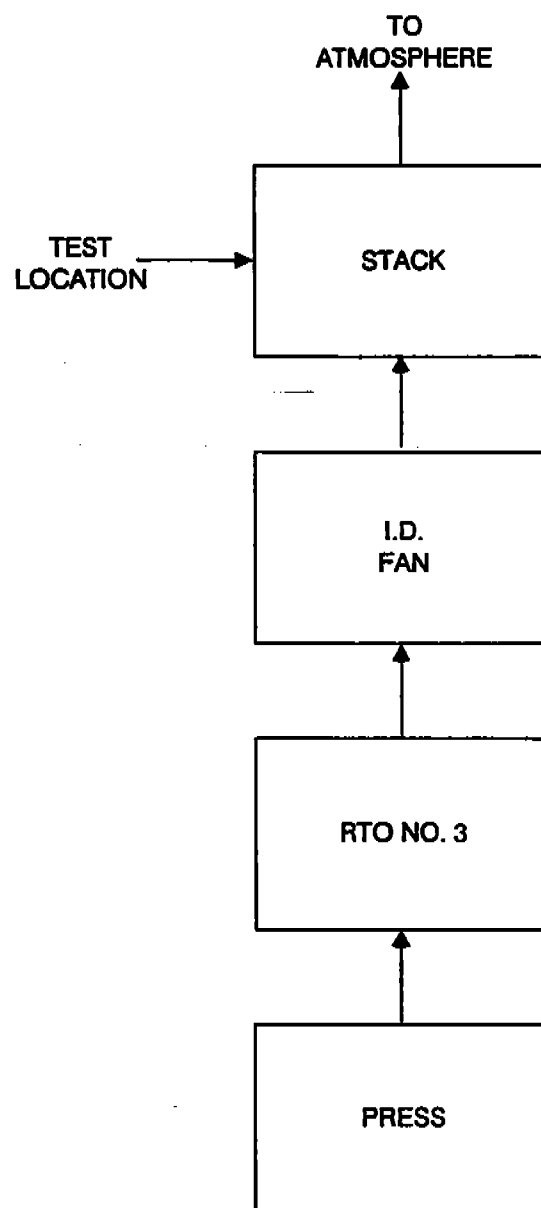


FIGURE 3-2. RTO NO. 3 AIR FLOW SCHEMATIC

4.0 SAMPLING AND ANALYTICAL PROCEDURES

4.1 General

All sampling and analytical procedures were those recommended by the United States Environmental Protection Agency and the North Carolina Department of Environment, Health, and Natural Resources. This section provides brief descriptions of the sampling and analytical procedures.

4.2 Sampling Points

The number and location of the sampling points were determined according to the procedures outlined in EPA Method 1. As shown in Figure 4-1, the stack cross sections were divided into 24 equal areas with 12 sampling points on each of two axes.

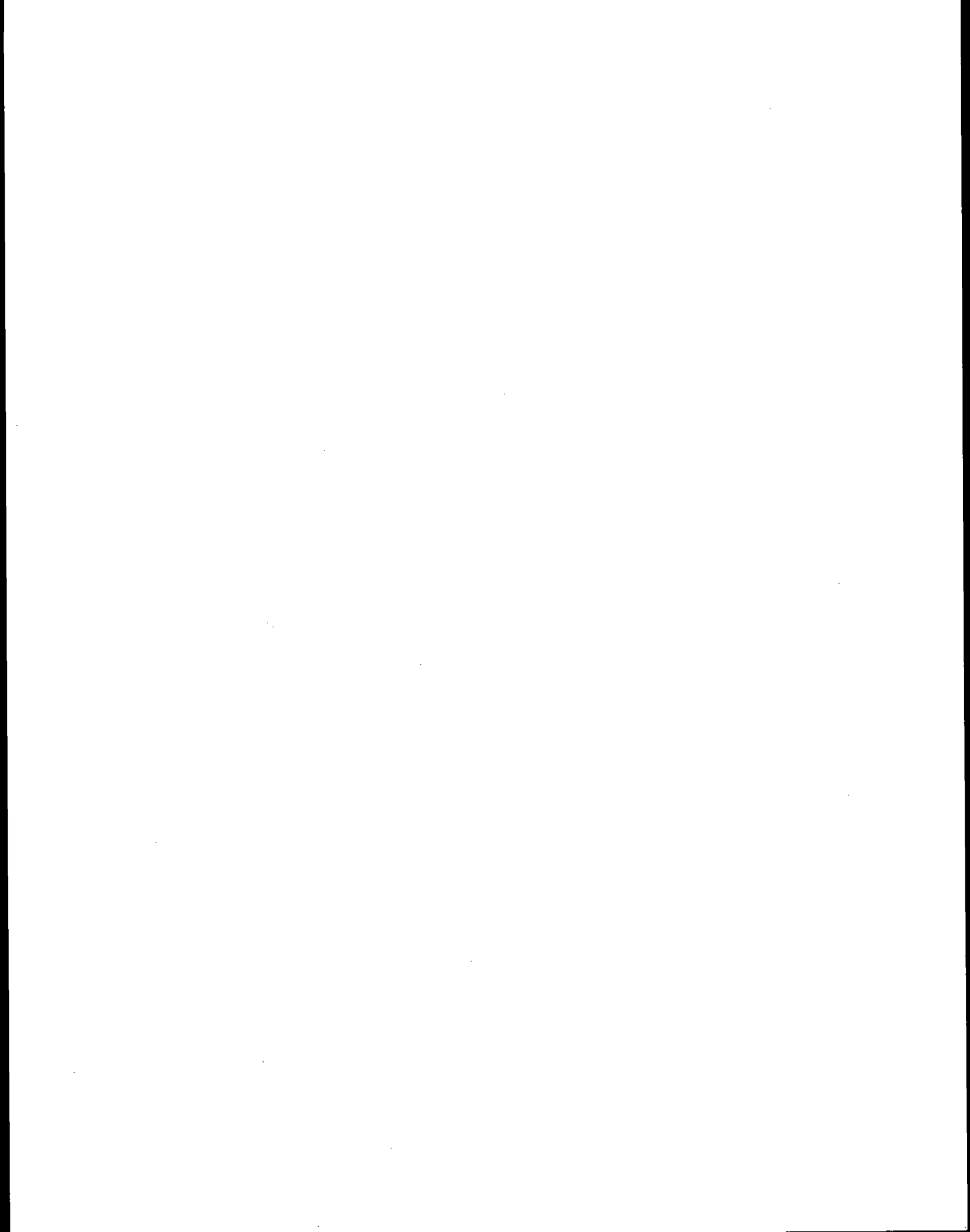
4.3 Cyclonic Flow Check

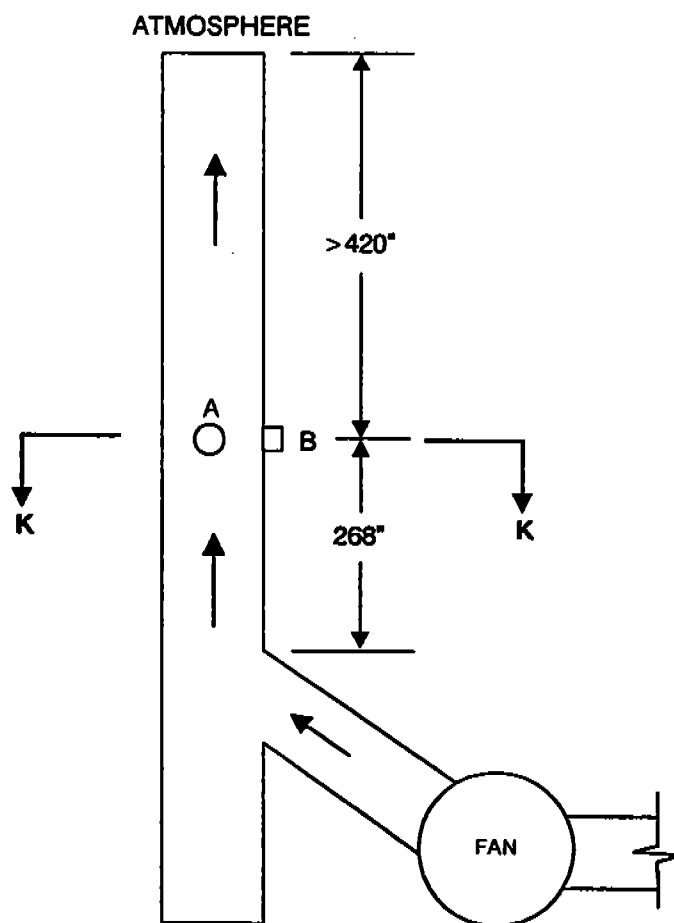
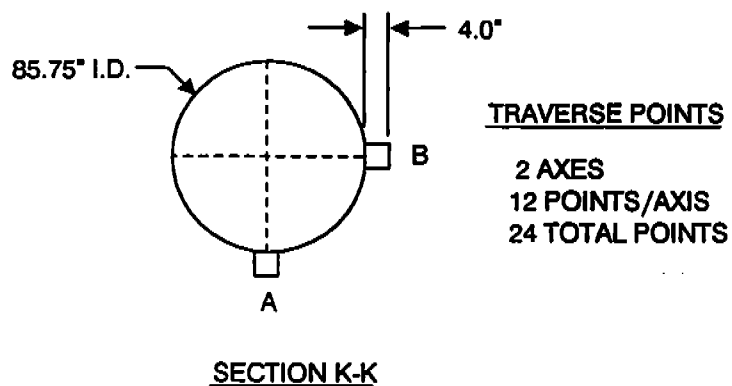
A Type S Pitot tube assembly, Magnehelic gauges, and a universal protractor (angle finder) were used to determine the flow angles at each of the sampling or velocity traverse points. At each point, the Pitot tube was positioned at a right angle to the air flow. The angles were determined by rotating the Pitot tube until a null reading was obtained on the Magnehelic gauges. When the null reading was obtained, the angle of the Pitot tube was recorded.

4.4 Volumetric Air Flow Rates

4.4.1 Flue Gas Velocity

The flue gas velocity and volumetric flow rate were determined according to the procedures outlined in EPA Method 2. Velocity head measurements (ΔP) were made using Type S Pitot tubes conforming to the geometric specifications outlined in EPA Method 2. Accordingly, each has been assigned a coefficient of 0.84. Differential pressures were measured with Magnehelic gauges of appropriate range. Flue gas temperatures were measured with chromel-alumel thermocouples equipped with hand-held digital readouts.





NOTE: RTO No. 3 Stack has an additional 20 foot section that was added after the ports.

FIGURE 4-1. RTO NOS. 1, 2, AND 3 STACK TEST LOCATIONS

4.4.2 Flue Gas Composition

Sample Collection. Determination of the oxygen (O_2) and carbon dioxide (CO_2) concentrations in the flue gas stream were made using instrumentation and test procedures that conform with the requirements of EPA Method 3A. The analyzers and procedures used in the determination of O_2 and CO_2 are discussed in Section 4.5.1.

4.4.3 Flue Gas Moisture Content

The moisture content was determined in conjunction with the combined EPA Methods 5 and 202 train discussed in the following sections.

4.5 Emissions Determinations

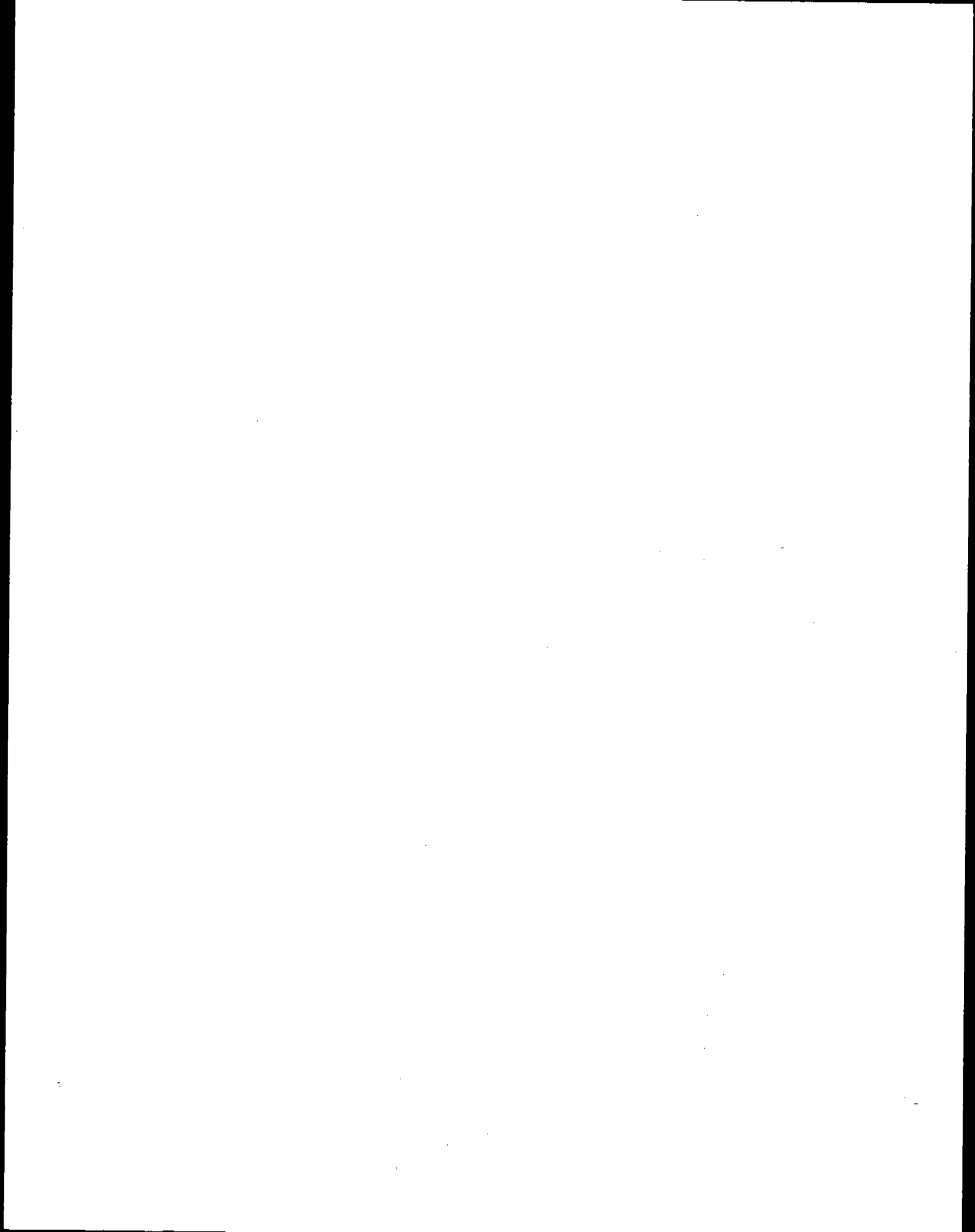
4.5.1 Carbon Dioxide, Oxygen, Carbon Monoxide, Nitrogen Oxides, and Total Hydrocarbons

Continuous emissions monitoring (CEM) was conducted for carbon dioxide (CO_2) and oxygen (O_2) concentrations and nitrogen oxides (NO_x), carbon monoxide (CO), and total hydrocarbons (THC) emissions. The sampling and analytical procedures for CO_2/O_2 , NO_x , CO, and THC were in accordance with EPA Methods 3A, 7E, 10, and 25A, respectively.

The extractive monitors require that the effluent gas sample be conditioned to eliminate any possible interference (i.e., water vapor and/or particulate matter) before being transported and injected into each analyzer. All components of the sampling system which contacted the sample were constructed of Type 316 stainless steel or Teflon. The outputs from the monitors were connected to a computerized data acquisition system (DAS).

The CO_2/O_2 , NO_x , and CO sample collection system consisted of a heated probe with an in-stack glass wool particulate filter, heated sample lines, a moisture removal trap, an out-of-stack secondary particulate filter, and a pump. The THC sample collection system was the same except no moisture removal trap or secondary particulate filter were used. All samples were routed through a distribution manifold board for delivery to the analyzers. The configuration of the sampling system allows for the injection of calibration gases directly to the analyzers or through the sampling system. All pretest and posttest calibration procedures were performed as outlined in the specific EPA methods. The operation of each analyzer and the DAS are described below.

ACS Fuji 3300 CO/ CO_2 Analyzer. This nondispersive infrared analyzer automatically and continuously monitors the CO and CO_2 concentrations. The theory of operation is based on the principle that both gases have a unique absorption line spectrum in the infrared region. The instrument consists of an infrared light source, a chopper, a measuring cell, and a two-chamber, sealed detector.

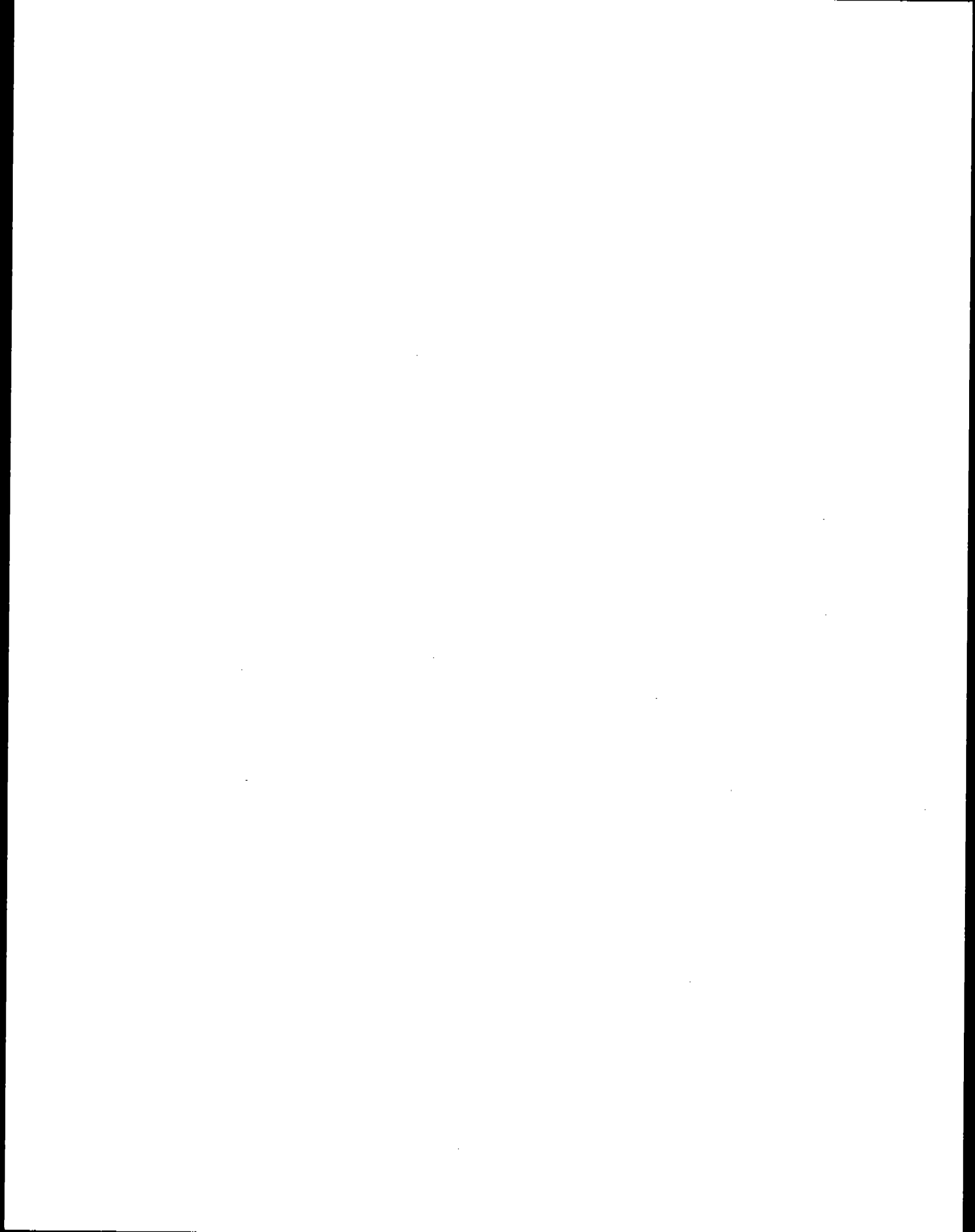


The infrared light beam emitted by the source passes through the measuring cell which is filled with a continuously flowing gas sample. Before reaching the front chamber of the detector, the light beam is partially absorbed or attenuated by the gas species of interest in the cell. Both the front and rear chambers of the detector are filled with a reference gas. The difference in the amount of light absorbed between the front and rear chambers is dependent on the concentration of the gas species of interest within the measuring cell and creates a pressure differential between the two chambers. The pressure differential is then observed as gas flow by the micro-flow sensor located in the channel communicating the two chambers. The resulting AC signal from the sensor is rectified, amplified, and linearized into DC voltage signal for output.

Thermo Environmental Instruments Model 48/GFC CO Analyzer. The analyzer utilizes the gas filter correlation (GFC) technique to determine CO concentrations. The GFC technique involves the use of a high CO concentration filter which, when inserted into the infrared light beam, produces a reference beam, i.e., no further infrared radiation can be attenuated by the CO in the effluent sample. The CO filter is located on a modulated copper wheel which allows the use of a single infrared source and detector. A multiple pass optical bench/sample chamber of the white cell design provides improved sensitivity with a smaller chamber length.

Thermo Environmental Instruments Model 10 NO/NO_x Analyzer. This analyzer automatically and continuously determines the concentration of the nitric oxide (NO) or nitrogen oxides (NO_x) in the effluent. The analytical technique is chemiluminescence. The sample is routed through a converter where the NO₂ is dissociated to form NO. The sample is then passed through a reaction chamber where the NO is quantitatively converted to NO₂ by gas phase oxidation with molecular ozone produced within the analyzer. In this reaction, the NO₂ molecules are elevated to an electronically excited state and immediately reverted to a nonexcited ground state. This reversion is accompanied by the emission of photons, which impinge on a photomultiplier detector and generate a low level DC current. The current is then amplified and used to drive a front panel meter and a data recorder. The NO_x concentration seen by the instrument includes the contributions of both the NO in the sample and the NO resulting from the dissociation of the NO₂ in the sample.

Ratfisch Model RS-55 (or equivalent) THC Analyzer. This analyzer automatically and continuously monitors the THC concentrations in a flowing gas mixture. The theory of operation is based on the principle of flame ionization detection. In the flame ionization detector, hydrogen is mixed with the sample gas and is burned in a small jet. The ionization current in the hydrogen flame is measured. In a pure hydrogen flame, very few ions are produced, but if an organic component or hydrocarbon is burned in the flame, the ion current is greatly increased. The current provides a quantitative measure of the amount of hydrocarbons in the flame. The current is converted to a voltage output. The hydrogen flame ionization detector is extremely sensitive and is



capable of detecting hydrocarbon levels in the low parts per million range and is insensitive to inorganic gases such as nitrogen, carbon dioxide, and water vapor.

Teledyne Model 320P-4 O₂ Analyzer. This analyzer was designed specifically to measure O₂ in flue gas streams. It utilizes a patented micro-fuel cell that consumes O₂ from the atmosphere surrounding the measuring probe. The consumption of O₂ generates a proportional electric current, which is amplified and used to drive a built-in front panel meter with a scale of 0 to 25%. The analyzer incorporates its own integral pump and power system.

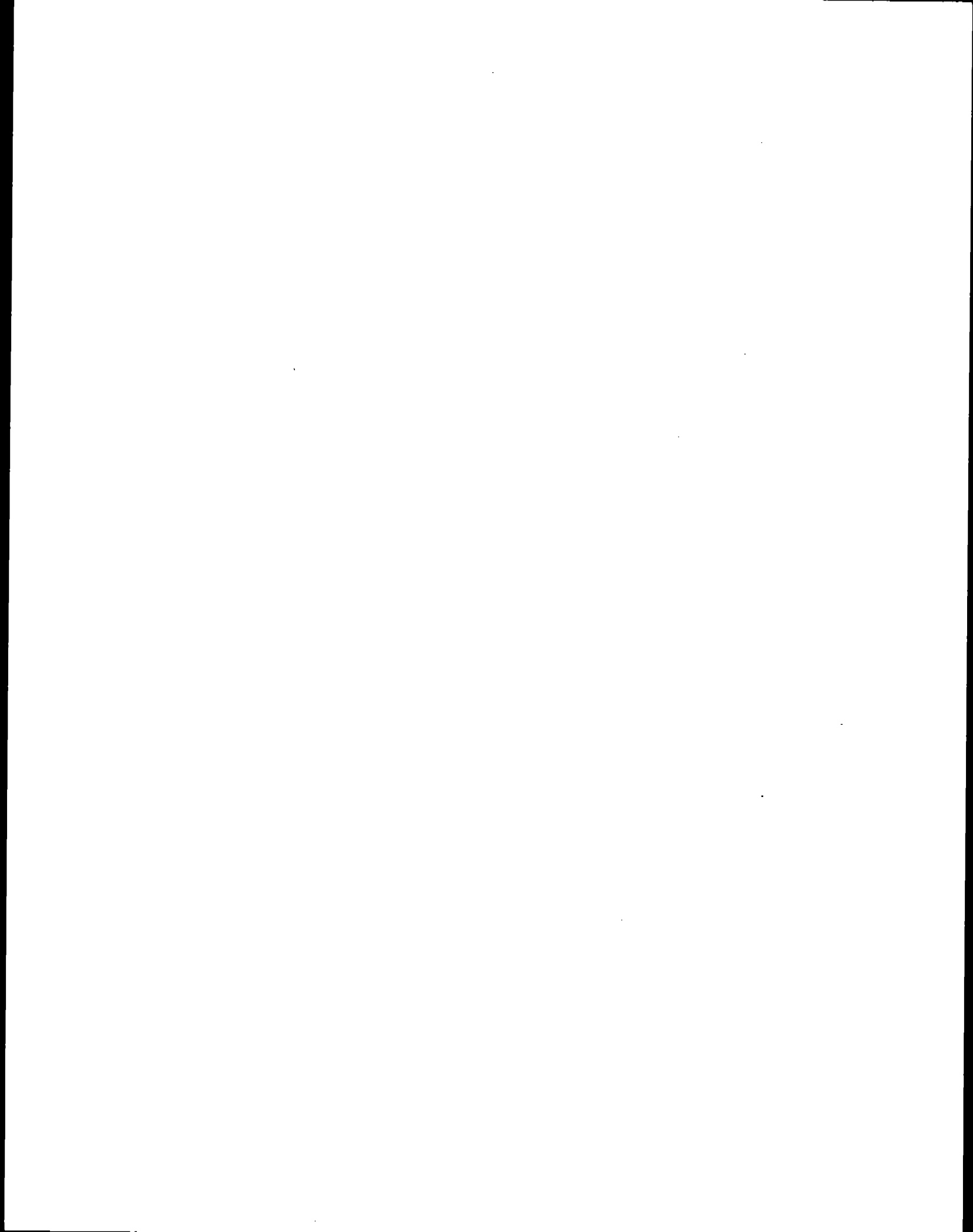
Data Acquisition System. The DAS uses an IBM compatible computer with hard disk storage and an internal 12-bit analog-to-digital converter with a 16-channel multiplexer. In addition to providing an instantaneous display of analyzer responses, the DAS compiles the analyzer data collected once each second and averages them, calculates emission rates, and documents analyzer calibrations. The DAS integrates the real-time measurements and provides printouts of 1-minute, 15-minute, and 60-minute averaged emissions.

4.5.2 Filterable and Condensible Particulate

Sample Collection. Samples were withdrawn isokinetically from the source using a combined EPA Methods 5 and 202 sampling train. The sampling train consisted of a nozzle, a heated glass probe with a Type S Pitot tube attached, a filter, four chilled impingers, and a metering console. The particulate sample was collected on a Whatman EPM2000 glass fiber filter supported by a Teflon frit and maintained at a temperature of 248°F ± 25°F. The first three impingers each contained 100 mL of deionized, distilled (DI) water and the fourth contained preweighed silica gel. Each of the 24 points was sampled for 2.5 minutes, resulting in net run times of 60 minutes.

Sample Recovery. The filter was removed from the filter holder and placed in a 250 mL glass jar. The DI water reagent was returned to the original 1000 mL glass jar, weighed, the weight recorded on the label, and the liquid level marked. The silica gel was returned to the original tared container, weighed, and the weight recorded on the label. The volume of water vapor condensed in the impingers and the volume of water vapor collected in the silica gel were summed and entered into moisture content calculations.

The nozzle, probe, and fronthalf of the filter holder were rinsed with acetone into a 500 mL glass jar. The backhalf of the filter holder, impingers, and connecting glassware were rinsed twice with water into the 1000 mL jar containing the DI water reagent then twice with MeCl₂ into a separate 500 mL glass jar.

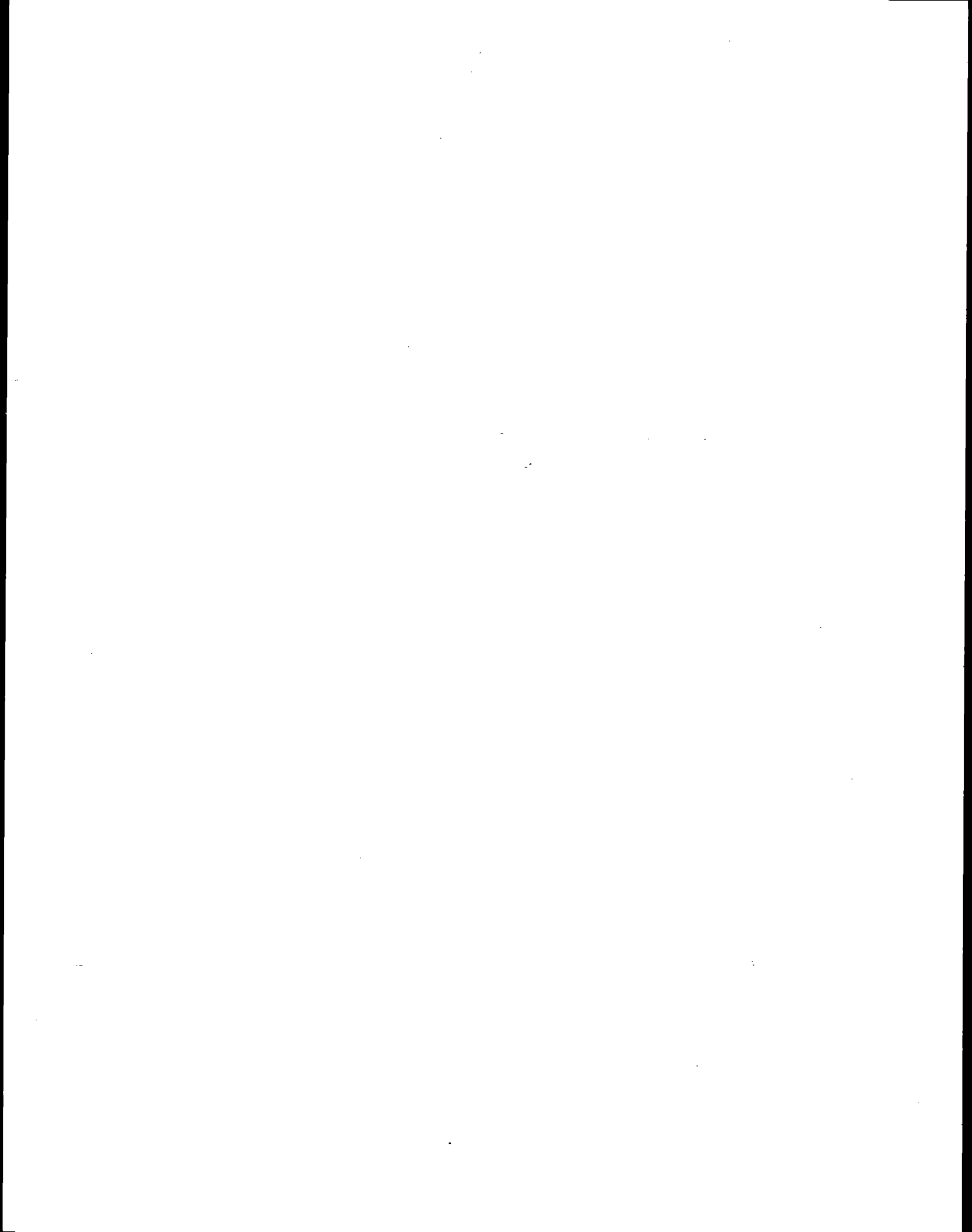


Sample Analysis. EPA Method 5 analytical procedures were used to analyze the filter and front-half acetone rinse for filterable particulate. EPA Method 202 analytical procedures were used to analyze the combined DI water reagent/DI water rinses and MeCl_2 rinses for condensable particulate.

4.6 Equipment Calibration

Pertinent calibration data are provided in Appendix D.

Entropy used EPA Protocol No. 1 gases for all continuous emissions testing. The calibration gas certificates of analysis are presented in Appendix D.



5.0 QUALITY ASSURANCE/QUALITY CONTROL

5.1 General

Entropy, Inc. (EI) is committed to the continued implementation of a Quality Assurance Program to assure the quality of sampling and analytical procedures of environmental measurement data. The Quality Assurance measures taken during this test project equal or exceed the minimum QA/QC recommendations as set forth by the U.S. Environmental Protection Agency (EPA) for a particular method.

The following sections outline the QA program implemented by EI to justify the validity of test procedures. As applicable, the QA system for the various test programs addresses the following areas:

- Preventive Maintenance & Equipment Calibration
- Sample Processing
- Analytical Instrument Calibration
- Blanks and Spiked Samples
- Internal/External System Checks
- Data Reduction & Validation
- QA/QC Summary

5.2 Preventive Maintenance and Equipment Calibration

An effective preventive maintenance program decreases downtime and thus increases data completeness and quality. Pretest and posttest equipment calibrations are conducted in a manner and at a frequency which meets or exceeds U.S. EPA specifications.

Each item transported to the field is inspected to detect equipment problems which may originate during periods of storage. All equipment returning from the field is cleaned, repaired, reconditioned, and recalibrated as necessary. Routine maintenance on equipment (dry gas meters, pumps, Magnehelics, manometers, Pitot tubes, and nozzles) is carried out periodically for leaks, corrosion, dents, or any other damage. Table 5-1 shows the activities for equipment calibration.

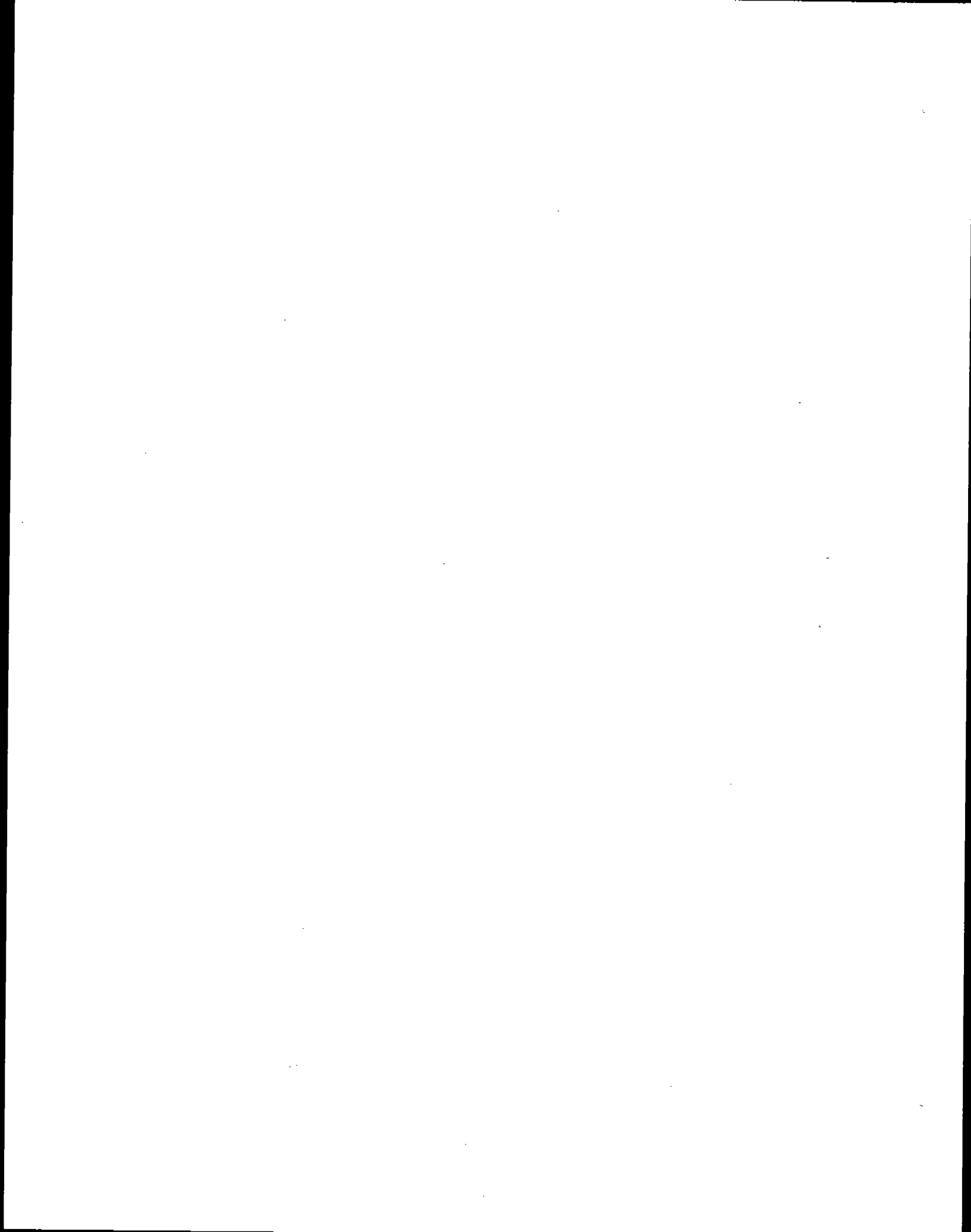


TABLE 5-1
IN-HOUSE EQUIPMENT CALIBRATION

Apparatus	Calibration Method And Frequency	Specifications	Corrective Action
Type S Pitot Tubes	Standards contained in EPA Method 2	Coefficient of 0.84 ± 0.02	Refurbish or recalibrate
	Visual inspection prior to shipment to test site and again prior to each day of testing		
Manometers	Leak checked before and after each field use		Adjust or replace
Magnehelic Gauges	Initially calibrate over full range	0-10" water column	
	After each field use, checked against inclined manometer at average settings encountered during testing	Within $\pm 5\%$	Repair and Recalibrate
Thermometers - Impinger - Dry Gas Meter - Filter Box	After purchase and prior to each field use, using ASTM Hg-in-glass thermometer	Impinger = $\pm 2^\circ\text{F}$ DGM = $\pm 5.4^\circ\text{F}$ FB = $\pm 5.4^\circ\text{F}$	Adjust, determine correction factor, or reject
	After purchase and prior to each field use, using ASTM mercury-in-glass thermometer		
Thermocouple/ Potentiometer	After purchase. 3-point (ice bath, boiling water, and hot oil) using ASTM Hg-in-glass thermometer	$\pm 1.5\%$ of absolute temperature	Adjust, determine correction factor, or reject
	Before and after each field use, compared to ASTM Hg-in-glass thermometer at ambient conditions		
Dry Gas Meter and Orifice	Full calibration (every 6 months) over wide range of orifice settings to obtain calibration factor (isokinetic meter box) as per EPA Method 5	DGM = ± 0.02 from avg. coeff. for each run Orifice = ± 0.15 " H ₂ O over delta H range of 0.4"-4.0"	Adjust or replace
	10-minute quick calibration before sending to test site and again prior to first day of field use (isokinetic)	$\pm 3\%$ of full calibration γ $\pm 5\%$ of full calibration γ	Use if no backup Do not use
	Calculate γ_{qa} on-site for each test run to determine if the meter gamma (γ) has changed (EPA Method 5 Section 5.3.2 Alternate Procedures as approved by Administrator)	Average γ_{qa} must be within $\pm 5\%$ of full calibration γ	Perform post test calibration at average delta H and highest vacuum encountered during testing to determine if meter gamma has changed (isokinetic)
	A post test isokinetic meter box calibration is performed after every job at the approximate average delta H to determine if meter gamma has changed (isokinetic) as per EPA Method 5	$\pm 5\%$ of full calibration Gamma (initial or recalibration) that yields the lowest sample volume for the testing is used for calculations	Recalibrate or replace
Critical Orifice	Dry gas meter transfer standard (EPA Method 5 Alternate)	Calibrated to obtain K factor	Replace/repair and Recalibrate

* See Appendix D for EMTIC guideline document

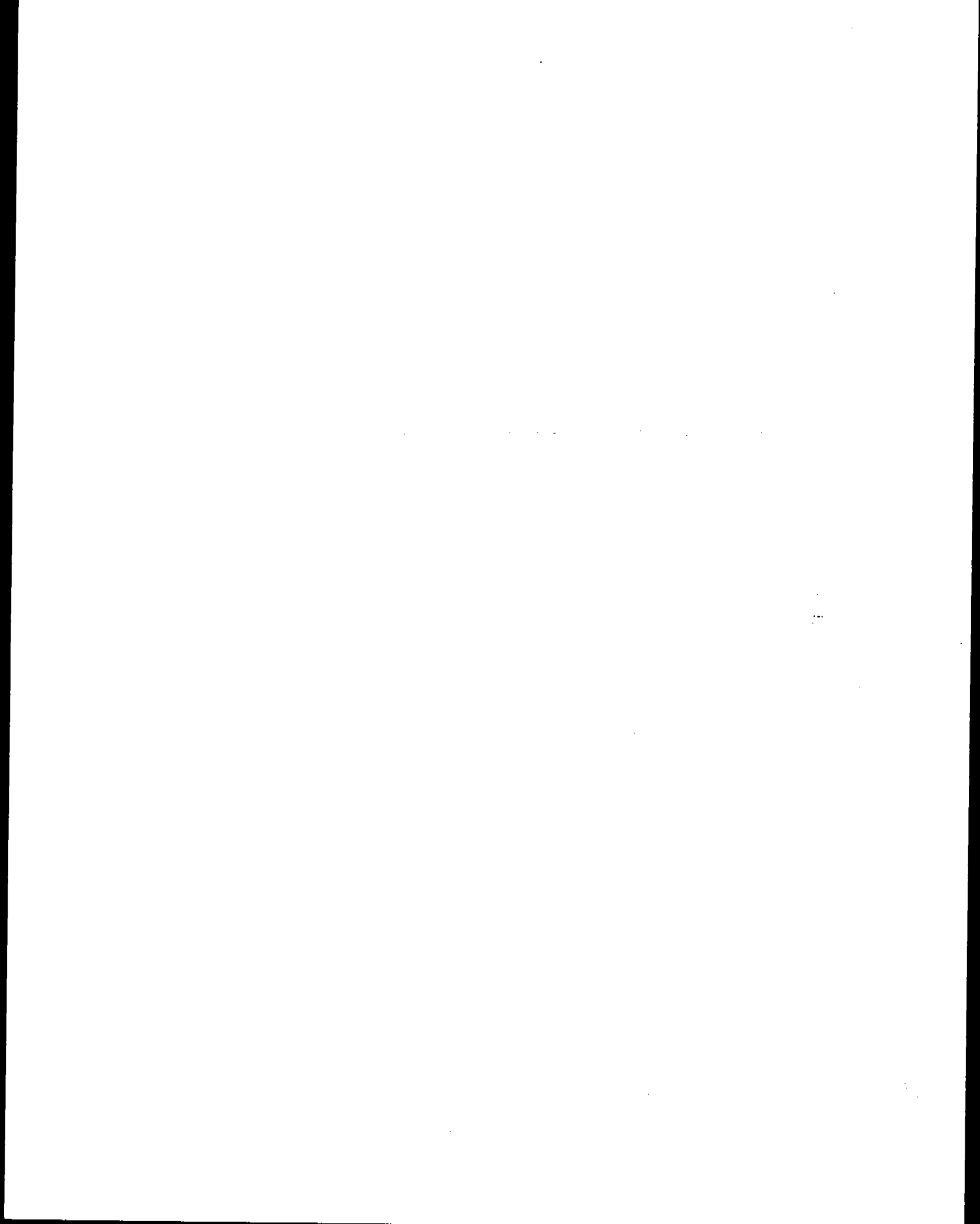


TABLE 5-1 (Continued)
IN-HOUSE EQUIPMENT CALIBRATION

Apparatus	Calibration Method And Frequency	Specifications	Corrective Action
Barometer	Before and after each field use against an aneroid barometer	$\pm 0.1''$ mercury	Adjust to agree
	Reference barometer adjusted for elevation differences		
Probe Nozzle	Average of 5 I.D. measurements using a micrometer. Visual inspection before and after each field use	Difference between high and low measurement $\leq 0.004''$	Repair and recalibrate

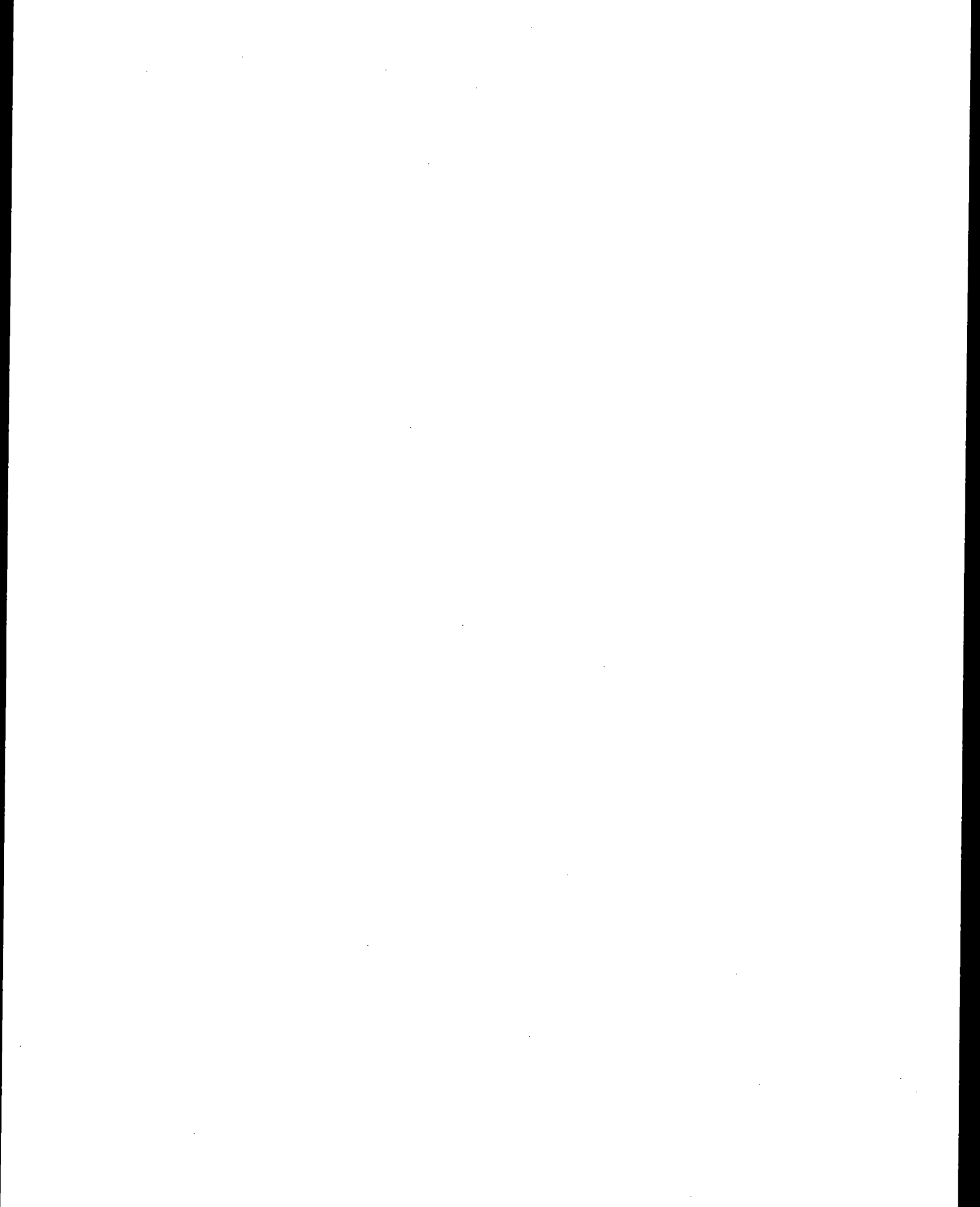
5.3 Sample Processing

Entropy, Inc. employs systems which ensure the integrity of an environmental sample from the time of acquisition, through analysis, and ultimately to proper disposal. These systems are necessary to allow valid conclusions to be drawn from analytical results separated in time and space from the sampling operation. In addition, these systems recognize that samples are occasionally of value even after analytical results have been reported.

Samples are collected, transported, and stored in clean containers which are constructed of materials inert to the analytical matrix. Containers are used which allow air tight seals. When necessary, containers are employed which prevent photochemical reactions. All sample containers are labeled with the following information:

- Unique source identifier
- Sample run identifier
- Analyte identifier
- Sample matrix identifier
- Sample analyst identifier

Additional information relating to the sample is recorded on the data sheet for the sampling run that afforded the subject sample. Accordingly, the sampling data sheet contains all the information listed above, plus the date and time the sample was acquired and supplemental information such as observations pertinent to the quality of the sample. For condensed samples, e.g., samples in liquid media, the sample levels are marked on the outside of the container; this mark is used to indicate sample loss, and as such, may serve as a reference in adjusting results accordingly.



For transport from the field to the laboratory, samples are stored in sealed containers and secured in a fashion which minimizes movement and thus prevents breakage of containers. Containers used for transporting glass are packed with foam. Samples which require chilling are kept cold until analyzed.

Samples remain in the custody of the sampler, from acquisition until conveyance to the sample custodian. All custody transfers are signed and documented on a record of custody form, which remains with the sample until turned over to the custodian.

Analytical data are identified in a manner identical to that of the sampling data. Accordingly, all data generated from the analysis of samples are documented with the following information:

- Source identifier
- Sample run identifier
- Analyte identifier
- Sample matrix identifier
- Analyst identifier
- Analysis date

Portions of samples remaining after analysis are returned to their original sample containers. These samples are stored in designated storage areas until their destruction is authorized.

5.4 Instrument Calibration

Instrument calibration is one of the most important functions in generating precise and accurate quality data. All of the contract laboratories involved in the analytical testing for the test program maintain rigorous QA programs for instrument calibration.

5.5 Blanks and Spikes

Field blanks, method blanks, trip blanks, lab-proof blanks and filter blanks are obtained, digested, and analyzed when applicable. The blanks reflect the background contamination obtained from the various sources during the sampling and analysis. Thus, data adjustment or correction can be made accordingly.

In most cases, it is not necessary to digest and analyze the method blanks, reagent blanks or the lab-proof blanks unless the field blank shows a high level of contamination. If a high level of contamination is present, it is imperative to individually analyze the above blanks to help determine the cause of contamination.

Spiked samples are used to check on the performance of a routine analysis or the recovery efficiency of a method. During spiking, a known amount of stock solutions of the substance of interest is added to the sample prior to sample extraction, digestion, and analysis.

5.6 Internal/External System Audit Checks

System and performance audits are routine elements of all Entropy QA/QC programs.

Internal Systems Audit: The following sampling equipment checks were conducted prior to sample collection.

- All sampling equipment was thoroughly checked to ensure clean and operable components.
- Equipment was inspected for possible damage from shipment.
- The oil manometers or Magnehelic gauges were leveled and zeroed.
- The temperature measurement systems were checked for damage and operability by measuring the ambient temperature.

Performance Audits: Performance audits of the laboratory are conducted prior to the processing of any compliance samples for analysis. Audit materials typically include samples available from the EPA prior to new source testing. Also, samples of known concentration are prepared in-house or obtained from the EPA for Internal QA checks.

External Systems Audits: Entropy is subject to a system audit each time a test is conducted for any Air Pollution Control agency. This procedure entails an EPA observer on-site to do qualitative evaluation of performance to demonstrate compliance with the applicable regulations.

5.7 Data Reduction and Validation

The test team leader is responsible for reviewing and validating data as they are acquired. Each team leader has extensive knowledge of sampling methodology and the characteristics of the process being measured and is capable of evaluating the accuracy, representativeness, and completeness of raw data on-site. Action to replace inadequate data can be taken immediately.

Data obtained during calibrations and test runs are recorded on standardized forms which are checked twice for completeness and accuracy by the QA Director or his designated representative. Data reduction and consistency are achieved by using the standardized forms and using Entropy's in-house computer facilities.

5.8 QA/QC Summary

All chemicals used were American Chemical Society (ACS), High Performance Liquid Chromatography (HPLC), or pesticide grade. The deionized, distilled water utilized met or exceeded the American Society for Testing and Materials (ASTM) specifications for Type-I reagent water. Pretest and posttest leak checks were conducted on each sampling train. Table 5-2 presents a summary of quality assurance/quality control requirements for each test method used in this test program.

TABLE 5-2
QUALITY ASSURANCE/QUALITY CONTROL CRITERIA
RTO NOS. 1, 2, AND 3
AUGUST 1996

Test Method	Parameter	QA/QC Criteria	QA/QC Status
EPA 3A, 7E, 10	Calibration Error	$\pm 2\%$	$\leq 2\%$
	Zero Drift	$\pm 3\%$	$\leq 3\%$
	Calibration Drift	$\pm 3\%$	$\leq 3\%$
	Sampling System Bias	$\pm 5\%$	$\leq 5\%$
EPA 25A	Calibration Error	$\pm 5\%$ of gas value	$\leq 5\%$
	Zero Drift	$\pm 3\%$	$\leq 3\%$
	Calibration Drift	$\pm 3\%$	$\leq 3\%$
EPA 5 (Particulate)	Constant weight	0.5 mg or 1% of the total weight less the tare weight; whichever is greater	≤ 0.5 mg
	Acetone blank	$\leq 0.001\%$ by weight	0.2 mg/250 mL ($< 0.001\%$)
EPA 202 (Particulate)	Constant weight	0.5 mg or 1% of the total weight less the tare weight; whichever is greater	≤ 0.5 mg
	DI water blank	$\leq 0.001\%$ by weight	2.1 mg/445 mL ($< 0.001\%$)
	MeC ₂ blank	$\leq 0.001\%$ by weight	0.2 mg/220 mL ($< 0.001\%$)

APPENDIX A. TEST RESULTS

1. RTO No. 1 Stack

a. Carbon Monoxide, Nitrogen Oxides and Total Hydrocarbons

FIELD DATA AND RESULTS TABULATION

PLANT: Louisiana Pacific Corp., Roxboro OSB Plant

SAMPLING LOCATION: RTO No. 1 Stack

OPERATOR: M.G. Worthy

	Test Date	<u>S1-CEM-1</u> 8/9/96	<u>S1-CEM-2</u> 8/9/96	<u>S1-CEM-3</u> 8/9/96
	Run Start Time	1720	1845	2020
	Run Finish Time	1826	1955	2125
Theta	Net Run Time, min	60	60	60
Pbar	Barometric Pressure, in Hg	29.5	29.5	29.5
Mfd	Dry Mole Fraction	0.770	0.793	0.797
%CO2	Carbon Dioxide, % by volume	3.93	3.76	3.73
%O2	Oxygen, % by volume	16.39	16.82	16.73
Pg	Flue Gas Static Pressure, in H2O	-0.38	-0.35	-0.35
ts	Flue Gas Temperature, °F	274	274	275
Qsd	Volumetric Flow Rate, dry SCFM*	74,132	73,687	75,094
<u>Carbon Monoxide</u>				
Fwt	Formula Weight, gm/gm-mole	28.01	28.01	28.01
ppmvd	Concentration, ppmvd	51.0	36.0	34.9
lb/hr	Emission Rate, lb/hr	16.5	11.6	11.4
<u>Nitrogen Oxides as NO2</u>				
Fwt	Formula Weight, gm/gm-mole	46.01	46.01	46.01
ppmvd	Concentration, ppmvd	31.8	30.4	34.7
lb/hr	Emission Rate, lb/hr	16.9	16.0	18.7
<u>THC as Carbon</u>				
Fwt	Formula Weight, gm/gm-mole	12.01	12.01	12.01
ppmvw	Concentration, ppmvw	13.5	12.1	12.6
ppmvd	Concentration, ppmvd	17.5	15.3	15.8
lb/hr	Emission Rate, lb/hr	2.43	2.10	2.22

* 68°F (20°C) – 29.92 inches of mercury

TOTAL HYDROCARBON MEASUREMENT RESULTS SUMMARY

PLANT NAME: LOUISIANA-PACIFIC - ROXBORO N.C.

TEST LOCATION: RTO NO. 1 STACK

TEST DATE: 08-09-96

OPERATOR: MIKE WORTHY

----- Pre-Test Calibration Error Check -----

SPAN VALUE: 100 (ppm as C)	CALIBRATION GAS VALUE (ppmC)*	SYSTEM CAL. ERROR RESPONSE	CAL. ERROR %
THC Zero Gas	0.0	0.5	0.50
Low-Level Gas	30.1	30.8	2.19
Mid-Level Gas	52.5	52.7	0.38
High-Level Gas	86.4	86.4	0.00

* ppmC values = ppmC3H8 values x 3

----- Drift Determinations -----

Run Number	1S-M25A-1	1S-M25A-2	1S-M25A-3
Zero Sys.Cal.Response	0.5	0.5	0.5
Zero Drift Response	0.9	0.6	0.8
Zero Drift	0.4	0.1	0.3
Upscale Sys.Cal.Resp.	30.8	30.8	30.8
Upscale Drift Response	30.6	30.3	30.6
Upscale Drift	-0.2	-0.5	-0.2

***** Test Results*****			
RUN NO.:	1S-M25A-1	1S-M25A-2	1S-M25A-3
RUN TIME:	1720-1826	1845-1955	2020-2125
THC (ppmC):	13.5	12.1	12.6
%H2O:	23.0	20.7	20.3
THC (ppmC):	17.5	15.3	15.8
DSCFM:	74,132	73,687	75,094
THC (lb/hr C):	2.43	2.10	2.22

$$\text{ppmC} = \text{ppm} / (1 - (\%H2O/100))$$

$$\text{lb/hr} = (\text{ppmC} \times \text{DSCFM} \times 60 \times \text{Mol.Wt.}) / 385.3 \text{ E06}$$

$$\text{Cal.Error} = \frac{\text{System Cal.Response} - \text{Cal.Gas Value}}{\text{** Cal.Gas Value}} \times 100$$

$$\text{Drift} = \frac{\text{Drift Response} - \text{System Cal.Response}}{\text{Span Value}} \times 100$$

** For zero gas calibration error use span value

CALCULATION OF AVERAGE NOx AND CO EMISSIONS

COMPANY: LOUISIANA-PACIFIC Roxboro, NC

SOURCE: RTO #1 STACK

RUN: 1 (17:20 - 18:26)

DATE: 8-9-96

GAS VALUE	INITIAL CAL	FINAL CAL	MEAN CAL
0.0 ppm NOx	1.5	1.7	1.6
26.0 ppm NOx	24.6	25.6	25.1
0.0 ppm CO	1.0	0.7	0.9
60.5 ppm CO	59.2	58.4	58.8
0.00 % Oxygen	0.14	0.38	0.26
12.05 % Oxygen	11.93	11.97	11.95
0.00 % CO2	0.11	0.07	0.09
11.02 % CO2	11.04	10.94	10.99
Uncorrected Data:			
	30.3 ppm NOx	16.16 % Oxygen	
	49.7 ppm CO	3.98 % CO2	
		74,132 DSCFM	

CORRECTED RESULTS

31.8 ppm NOx	16.9 lb/hr NOx
51.0 ppm CO	16.5 lb/hr CO
16.39 % Oxygen	
3.93 % CO2	

$$\text{Corrected Conc.} = \frac{C_m(\bar{C} - C_o)}{(C_m - C_o)}$$

Where: $\bar{C}$ = mean reference measurement

C_o = mean zero calibration response

C_m = mean mid or upscale calibration gas response

C_{ma} = actual mid or upscale calibration gas concentration

$$\text{lb/hr} = (60)(\text{ppm pollutant})(\text{Conv. Factor})(\text{DSCFM})$$

Where: NOx Conv. Factor = 1.194E-07 lb NO2/SCF - ppm NO2

CO Conv. Factor = 7.263E-08 lb CO/SCF - ppm CO

CALCULATION OF AVERAGE NOx AND CO EMISSIONS

COMPANY: LOUISIANA-PACIFIC Roxboro, NC

SOURCE: RTO #1 STACK

RUN: 2 (18:45 - 19:55)

DATE: 8-9-96

GAS VALUE	INITIAL CAL	FINAL CAL	MEAN CAL
0.0 ppm NOx	1.7	1.8	1.8
26.0 ppm NOx	25.6	24.9	25.3
0.0 ppm CO	0.7	0.8	0.8
60.5 ppm CO	58.4	59.1	58.8
0.00 % Oxygen	0.38	0.14	0.26
12.05 % Oxygen	11.97	12.11	12.04
0.00 % CO2	0.07	0.10	0.09
11.02 % CO2	10.94	11.08	11.01

Uncorrected Data: 29.3 ppm NOx 16.70 % Oxygen
35.3 ppm CO 3.82 % CO2
73,687 DSCFM

CORRECTED RESULTS

30.4 ppm NOx 16.0 lb/hr NOx
36.0 ppm CO 11.6 lb/hr CO
16.82 % Oxygen
3.76 % CO2

$$\text{Corrected Conc.} = C_{ma}(\bar{C} - C_o)/(C_m - C_o)$$

Where: $\bar{C}$ = mean reference measurement

C_o = mean zero calibration response

C_m = mean mid or upscale calibration gas response

C_{ma} = actual mid or upscale calibration gas concentration

$$\text{lb/hr} = (60)(\text{ppm pollutant})(\text{Conv. Factor})(\text{DSCFM})$$

Where: NOx Conv. Factor = 1.194E-07 lb NO2/SCF - ppm NO2

CO Conv. Factor = 7.263E-08 lb CO/SCF - ppm CO

CALCULATION OF AVERAGE NOx AND CO EMISSIONS

COMPANY: LOUISIANA-PACIFIC Roxboro, NC

SOURCE: RTO #1 STACK

RUN: 3 (20:20 - 21:25)

DATE: 8-9-96

GAS VALUE	INITIAL CAL	FINAL CAL	MEAN CAL
0.0 ppm NOx	1.8	1.3	1.6
26.0 ppm NOx	24.9	24.7	24.8
0.0 ppm CO	0.8	0.8	0.8
60.5 ppm CO	59.1	59.5	59.3
0.00 % Oxygen	0.14	0.15	0.15
12.05 % Oxygen	12.11	12.07	12.09
0.00 % CO2	0.10	0.08	0.09
11.02 % CO2	11.08	11.02	11.05
Uncorrected Data:			
	32.6 ppm NOx	16.73 % Oxygen	
	34.5 ppm CO	3.80 % CO2	
		75,094 DSCFM	

CORRECTED RESULTS

34.7 ppm NOx	18.7 lb/hr NOx
34.9 ppm CO	11.4 lb/hr CO
16.73 % Oxygen	
3.73 % CO2	

$$\text{Corrected Conc.} = C_{ma}(\bar{C} - C_o)/(C_m - C_o)$$

Where: $\bar{C}$ = mean reference measurement

C_o = mean zero calibration response

C_m = mean mid or upscale calibration gas response

C_{ma} = actual mid or upscale calibration gas concentration

$$\text{lb/hr} = (60)(\text{ppm pollutant})(\text{Conv. Factor})(\text{DSCFM})$$

Where: NOx Conv. Factor = 1.194E-07 lb NO2/SCF - ppm NO2
CO Conv. Factor = 7.263E-08 lb CO/SCF - ppm CO

SYSTEM CALIBRATION BIAS AND DRIFT CALCULATIONS

COMPANY: LOUISIANA-PACIFIC Roxboro, NC
SOURCE: RTO #1 STACK

TEST DATE: 8-9-96

RUN NUMBER: 1 (17:20 - 18:24)

SPAN VALUES:
100.0 ppm NOx
150.0 ppm CO
25.00 % Oxygen
20.00 % CO2

	—INITIAL VALUES—			—FINAL VALUES—		
	ANALYZER CAL RESPONSE	SYSTEM CAL RESPONSE	SYSTEM CAL BIAS (% OF SPAN)	SYSTEM CAL RESPONSE	SYSTEM CAL BIAS (% OF SPAN)	DRIFT (% OF SPAN)
NOx ZERO GAS	0.5	1.5	1.00	1.7	1.20	0.20
NOx UP-SCALE	26.3	24.6	-1.70	25.6	-0.70	1.00
CO ZERO GAS	0.9	1.0	0.07	0.7	-0.13	-0.20
CO UP-SCALE	59.5	59.2	-0.20	58.4	-0.73	-0.53
O2 ZERO GAS	0.03	0.14	0.44	0.38	1.40	0.96
O2 UP-SCALE	12.17	11.93	-0.96	11.97	-0.80	0.16
CO2 ZERO GAS	0.04	0.11	0.35	0.07	0.15	-0.20
CO2 UP-SCALE	11.10	11.04	-0.30	10.94	-0.80	-0.50

SYSTEM CAL BIAS = $\frac{\text{SYSTEM CAL RESPONSE} - \text{ANALYZER CAL RESPONSE}}{\text{SPAN}} \times 100$

DRIFT = $\frac{\text{FINAL SYSTEM CAL RESPONSE} - \text{INITIAL CAL RESPONSE}}{\text{SPAN}} \times 100$

SYSTEM CALIBRATION BIAS AND DRIFT CALCULATIONS

COMPANY: LOUISIANA-PACIFIC Roxboro, NC
SOURCE: RTO #1 STACK

TEST DATE: 8-9-86

RUN NUMBER: 2 (18:45 - 19:55)

SPAN VALUES: 100.0 ppm NOx
150.0 ppm CO
25.00 % Oxygen
20.00 % CO2

	INITIAL VALUES			FINAL VALUES		
	ANALYZER CAL RESPONSE	SYSTEM CAL RESPONSE	SYSTEM CAL BIAS (% OF SPAN)	SYSTEM CAL RESPONSE	SYSTEM CAL BIAS (% OF SPAN)	DRIFT (% OF SPAN)
NOx ZERO GAS	0.5	1.7	1.20	1.8	1.30	0.10
NOx UP-SCALE	26.3	25.6	-0.70	24.9	-1.40	-0.70
CO ZERO GAS	0.9	0.7	-0.13	0.8	-0.07	0.07
CO UP-SCALE	59.5	58.4	-0.73	59.1	-0.27	0.47
O2 ZERO GAS	0.03	0.38	1.40	0.14	0.44	-0.96
O2 UP-SCALE	12.17	11.97	-0.80	12.11	-0.24	0.56
CO2 ZERO GAS	0.04	0.07	0.15	0.10	0.30	0.15
CO2 UP-SCALE	11.10	10.94	-0.80	11.08	-0.10	0.70

SYSTEM CAL BIAS = $\frac{\text{SYSTEM CAL RESPONSE} - \text{ANALYZER CAL RESPONSE}}{\text{SPAN}} \times 100$

DRIFT = $\frac{\text{FINAL SYSTEM CAL RESPONSE} - \text{INITIAL CAL RESPONSE}}{\text{SPAN}} \times 100$

SYSTEM CALIBRATION BIAS AND DRIFT CALCULATIONS

COMPANY: LOUISIANA-PACIFIC Roxboro, NC
SOURCE: RTO #1 STACK

TEST DATE: 8-8-86

RUN NUMBER: 3 (20:20 - 21:25)

SPAN VALUES: 100.0 ppm NOx
150.0 ppm CO
25.00 % Oxygen
20.00 % CO2

	—INITIAL VALUES—			—FINAL VALUES—		
	ANALYZER CAL RESPONSE	SYSTEM CAL RESPONSE	SYSTEM CAL BIAS (% OF SPAN)	SYSTEM CAL RESPONSE	SYSTEM CAL BIAS (% OF SPAN)	DRIFT (% OF SPAN)
NOx ZERO GAS	0.5	1.8	1.30	1.3	0.80	-0.50
NOx UP-SCALE	26.3	24.9	-1.40	24.7	-1.60	-0.20
CO ZERO GAS	0.9	0.8	-0.07	0.8	-0.07	0.00
CO UP-SCALE	59.5	59.1	-0.27	59.5	0.00	0.27
O2 ZERO GAS	0.03	0.14	0.44	0.15	0.48	0.04
O2 UP-SCALE	12.17	12.11	-0.24	12.07	-0.40	-0.16
CO2 ZERO GAS	0.04	0.10	0.30	0.08	0.20	-0.10
CO2 UP-SCALE	11.10	11.08	-0.10	11.02	-0.40	-0.30

SYSTEM CAL BIAS = $\frac{\text{SYSTEM CAL RESPONSE} - \text{ANALYZER CAL RESPONSE}}{\text{SPAN}} \times 100$

DRIFT = $\frac{\text{FINAL SYSTEM CAL RESPONSE} - \text{INITIAL CAL RESPONSE}}{\text{SPAN}} \times 100$

APPENDIX A. TEST RESULTS

1. RTO No. 1 Stack

**b. Filterable and Condensible
Particulate**

FIELD DATA AND RESULTS TABULATION

PLANT: Roxboro OSB Plant, Roxboro, NC

LOCATION: RTO No. 1 Stack

RUN #	DATE	OPERATOR			
S1-M5/202-1	8/09/96	Jeff Kunstling			
S1-M5/202-2	8/09/96	Jeff Kunstling			
S1-M5/202-3	8/09/96	Jeff Kunstling			
			S1-M5/202-1	S1-M5/202-2	S1-M5/202-3
Run Start Time			1720	1845	2020
Run Finish Time			1825	1955	2125
Net Traversing Points			24	24	24
Theta	Net Run Time, Minutes		60.00	60.00	60.00
Dis	Nozzle Diameter, Inches		0.246	0.244	0.246
Cp	Pitot Tube Coefficient		0.840	0.840	0.840
Y	Dry Gas Meter Calibration Factor		0.9981	0.9981	0.9981
Pbar	Barometric Pressure, Inches Hg		29.50	29.50	29.50
Delta-H	Avg. Pressure Differential of Orifice Meter, Inches H ₂ O		1.52	1.39	1.49
Vm	Volume Of Metered Gas Sample, Dry ACF		41.856	40.255	41.015
tm	Dry Gas Meter Temperature, Degrees F		91	94	93
Vmstd	Volume Of Metered Gas Sample, Dry SCF*		39.608	37.898	38.669
Vlc	Total Volume of Liquid Collected in Impingers & Silica Gel, ml		251.5	210.3	208.9
Vmstd	Volume of Water Vapor, SCF*		11.838	9.899	9.833
XH ₂ O	Moisture Content, Percent by Volume		23.0	20.7	20.3
Mfd	Dry Mole Fraction		0.770	0.793	0.797
XCO ₂	Carbon Dioxide, Percent By Volume, Dry		3.9	3.8	3.7
XO ₂	Oxygen, Percent By Volume, Dry		16.4	16.8	16.7
Fo	Fuel Factor		1.154	1.079	1.135
Md	Gas Molecular Weight, lb/lb-Mole, Dry		29.28	29.28	29.26
Ms	Gas Molecular Weight, lb/lb-Mole, Wet		26.68	26.94	26.98
Pg	Flue Gas Static Pressure, Inches H ₂ O		-0.38	-0.35	-0.35
Ps	Absolute Flue Gas Pressure, Inches Hg		29.47	29.47	29.47
ts	Flue Gas Temperature, Degrees F		274	274	275
Delta-p	Average Velocity Head, Inches H ₂ O		0.6622	0.6236	0.6415
vs	Flue Gas Velocity, Feet/Second		56.44	54.54	55.28
A	Stack/Duct Area, Square Inches		5,775	5,775	5,775
Qsd	Volumetric Air Flow Rate, Dry SCFM*		74,132	73,687	75,094
Qaw	Volumetric Air Flow Rate, Wet ACFM		135,805	131,228	133,031
XI	Isokinetic Sampling Rate, Percent		108.2	105.9	104.3

* 68° F (20° C) -- 29.92 Inches of Mercury (Hg)

(Continued next page)

FIELD DATA AND RESULTS TABULATION
(Continued)

PLANT: Roxboro OSB Plant, Roxboro, NC

		S1-M5/202-1	S1-M5/202-2	S1-M5/202-3
	<u>Filterable Particulate</u>			
mg	Catch Weight, Milligrams	23.8	18.5	23.5
gr/DSCF	Concentration, grains/DSCF *	0.00927	0.00753	0.00938
lb/hr	Emission Rate, lb/hr	5.89	4.76	6.04
	<u>Inorganic (Aqueous) Condensable Part.</u>			
mg	Catch Weight, Milligrams	2.8	.6	11.4
gr/DSCF	Concentration, grains/DSCF *	1.09E-003	2.44E-004	4.55E-003
lb/hr	Emission Rate, lb/hr	0.693	0.154	2.93
	<u>Organic Condensable Particulate</u>			
mg	Catch Weight, Milligrams	13.1	5.1	6.6
gr/DSCF	Concentration, grains/DSCF *	0.00510	0.00208	0.00263
lb/hr	Emission Rate, lb/hr	3.24	1.31	1.70
	<u>Total Particulate</u>			
mg	Catch Weight, Milligrams	39.7	24.2	41.5
gr/DSCF	Concentration, grains/DSCF *	0.0155	0.00985	0.0166
lb/hr	Emission Rate, lb/hr	9.83	6.22	10.7

APPENDIX A. TEST RESULTS

2. RTO No. 2 Stack

**a. Carbon Monoxide, Nitrogen Oxides
and Total Hydrocarbons**

FIELD DATA AND RESULTS TABULATION

PLANT: Louisiana Pacific Corp., Roxboro OSB Plant

SAMPLING LOCATION: RTO No. 2 Stack

OPERATOR: L. Sherwood

	Test Date	<u>S2-CEM-1</u> 8/9/96	<u>S2-CEM-2</u> 8/9/96	<u>S2-CEM-3</u> 8/9/96
	Run Start Time	1720	1845	2020
	Run Finish Time	1825	1955	2125
Theta	Net Run Time, min	60	60	60
Pbar	Barometric Pressure, in Hg	29.5	29.5	29.5
Mfd	Dry Mole Fraction	0.760	0.778	0.843
%CO2	Carbon Dioxide, % by volume	4.00	3.82	3.49
%O2	Oxygen, % by volume	16.20	16.59	17.16
Pg	Flue Gas Static Pressure, in H2O	-0.32	-0.30	-0.31
ts	Flue Gas Temperature, °F	282	284	286
Qsd	Volumetric Flow Rate, dry SCFM*	67,277	67,904	72,564
	<u>Carbon Monoxide</u>			
Fwt	Formula Weight, gm/gm-mole	28.01	28.01	28.01
ppmvd	Concentration, ppmvd	64.7	43.8	32.2
lb/hr	Emission Rate, lb/hr	19.0	13.0	10.2
	<u>Nitrogen Oxides as NO2</u>			
Fwt	Formula Weight, gm/gm-mole	46.01	46.01	46.01
ppmvd	Concentration, ppmvd	38.6	34.9	37.2
lb/hr	Emission Rate, lb/hr	18.6	17.0	19.3
	<u>THC as Carbon</u>			
Fwt	Formula Weight, gm/gm-mole	12.01	12.01	12.01
ppmvw	Concentration, ppmvw	12.7	13.5	11.1
ppmvd	Concentration, ppmvd	16.7	17.4	13.2
lb/hr	Emission Rate, lb/hr	2.10	2.20	1.79

* 68°F (20°C) – 29.92 inches of mercury

TOTAL HYDROCARBON MEASUREMENT RESULTS SUMMARY

PLANT NAME: Louisiana-Pacific Corp. - Roxboro OGB

TEST LOCATION: RTO #2 Stack

TEST DATE: 8/9/96

OPERATOR: L. Sharwood

----- Pre-Test Calibration Error Check -----

SPAN VALUE: 100 (ppm as C)	CALIBRATION GAS VALUE (ppmC)*	SYSTEM CAL. ERROR RESPONSE	CAL. ERROR %
THC Zero Gas	0.0	0.5	0.50
Low-Level Gas	30.0	30.5	1.67
Mid-Level Gas	51.6	51.0	-1.16
High-Level Gas	82.6	82.9	0.36

* ppmC values = ppmC3H8 values x 3

----- Drift Determinations -----

Run Number	2-M25A-1	2-M25A-2	2-M25A-3
Zero Sys.Cal.Response	0.5	0.5	0.5
Zero Drift Response	1.7	4.5	2.7
Zero Drift	1.2	4.0	2.2
Upscale Sys.Cal.Resp.	30.0	32.4	33.3
Upscale Drift Response	32.4	33.3	31.2
Upscale Drift	2.4	0.9	-2.1

----- Test Results -----			
RUN NO.:	2-M25A-1	2-M25A-2	2-M25A-3
RUN TIME:	1720-1825	1845-1955	2020-2125
THC (ppmC):	12.7	13.5	11.1
H2O:	24.0	22.2	15.7
THC (ppmC):	16.7	17.4	13.2
DSCFM:	67,277	67,904	72,564
THC (lb/hr C):	2.10	2.20	1.79

$$\text{ppmC} = \text{ppmC} / (1 - (\text{H}_2\text{O}/100))$$

$$\text{lb/hr} = (\text{ppmC} \times \text{DSCFM} \times 60 \times \text{Mol.Wt.}) / 385.3 \text{ B06}$$

$$\text{Cal.Error} = \frac{\text{System Cal.Response} - \text{Cal.Gas Value}}{\text{Cal.Gas Value}} \times 100$$

$$\text{Drift} = \frac{\text{Drift Response} - \text{System Cal.Response}}{\text{Span Value}} \times 100$$

** For zero gas calibration error use span value

CALCULATION OF AVERAGE NOx AND CO EMISSIONS

COMPANY LOUISIANA-PACIFIC Roxboro, NC

SOURCE: RTO #2 STACK

RUN: 2-CEM-1(17:20-18:25)

DATE: 8-9-96

GAS VALUE	INITIAL CAL	FINAL CAL	MEAN CAL
0.0 ppm NOx	2.3	2.4	2.4
46.4 ppm NOx	45.6	47.8	46.7
0.0 ppm CO	0.5	0.8	0.7
60.6 ppm CO	60.4	60.4	60.4
0.00 % Oxygen	0.18	0.11	0.15
12.06 % Oxygen	11.93	11.83	11.88
0.00 % CO2	0.33	0.05	0.19
11.02 % CO2	10.81	10.85	10.83

Uncorrected Data: 39.3 ppm NOx 15.91 % Oxygen
 64.4 ppm CO 4.05 % CO2
 67,277 DSCFM

CORRECTED RESULTS

38.6 ppm NOx 18.6 lb/hr NOx
 64.7 ppm CO 19.0 lb/hr CO
 16.20 % Oxygen
 4.00 % CO2

$$\text{Corrected Conc.} = C_{ma}(\bar{C} - C_o)/(C_m - C_o)$$

Where: $\bar{C}$ = mean reference measurement

C_o = mean zero calibration response

C_m = mean mid or upscale calibration gas response

C_{ma} = actual mid or upscale calibration gas concentration

$$\text{lb/hr} = (60)(\text{ppm pollutant})(\text{Conv. Factor})(\text{DSCFM})$$

Where: NOx Conv. Factor = $1.194\text{E-}07$ lb NO2/SCF - ppm NO2

CO Conv. Factor = $7.263\text{E-}08$ lb CO/SCF - ppm CO

CALCULATION OF AVERAGE NOx AND CO EMISSIONS

COMPANY LOUISIANA-PACIFIC Roxboro, NC

SOURCE: RTO #2 STACK

RUN: 2-CEM-2(18:45-19:55)

DATE: 8-9-96

GAS VALUE	INITIAL CAL	FINAL CAL	MEAN CAL
0.0 ppm NOx	2.4	2.1	2.3
46.4 ppm NOx	47.8	48.4	48.1
0.0 ppm CO	0.8	1.0	0.9
60.6 ppm CO	60.4	60.4	60.4
0.00 % Oxygen	0.11	0.12	0.12
12.06 % Oxygen	11.83	11.81	11.82
0.00 % CO2	0.05	0.14	0.10
11.02 % CO2	10.85	10.82	10.84
Uncorrected Data:	36.7 ppm NOx	16.21 % Oxygen	
	44.0 ppm CO	3.82 % CO2	
		67,904 DSCFM	

CORRECTED RESULTS

34.9 ppm NOx	17.0 lb/hr NOx
43.8 ppm CO	13.0 lb/hr CO
16.59 % Oxygen	
3.82 % CO2	

$$\text{Corrected Conc.} = C_{ma}(\bar{C} - C_o)/(C_m - C_o)$$

Where: $\bar{C}$ = mean reference measurement

C_o = mean zero calibration response

C_m = mean mid or upscale calibration gas response

C_{ma} = actual mid or upscale calibration gas concentration

$$\text{lb/hr} = (60)(\text{ppm pollutant})(\text{Conv. Factor})(\text{DSCFM})$$

Where: NOx Conv. Factor = 1.194×10^{-7} lb NO2/SCF - ppm NO2

CO Conv. Factor = 7.263×10^{-8} lb CO/SCF - ppm CO

CALCULATION OF AVERAGE NOx AND CO EMISSIONS

COMPANY LOUISIANA-PACIFIC Roxboro, NC

SOURCE: RTO #2 STACK

RUN: 2-CEM-3(20:20-21:25)

DATE: 8-9-96

GAS VALUE	INITIAL CAL	FINAL CAL	MEAN CAL
0.0 ppm NOx	2.1	1.9	2.0
46.4 ppm NOx	48.4	47.8	48.1
0.0 ppm CO	1.0	0.5	0.8
60.6 ppm CO	60.4	60.4	60.4
0.00 % Oxygen	0.12	0.13	0.13
12.06 % Oxygen	11.81	11.91	11.86
0.00 % CO2	0.14	0.16	0.15
11.02 % CO2	10.82	11.14	10.98

Uncorrected Data: 39.0 ppm NOx 16.82 % Oxygen
32.5 ppm CO 3.58 % CO2
72,564 DSCFM

CORRECTED RESULTS

37.2 ppm NOx 19.3 lb/hr NOx
32.2 ppm CO 10.2 lb/hr CO
17.16 % Oxygen
3.49 % CO2

$$\text{Corrected Conc.} = C_{ma}(\bar{C} - C_o)/(C_m - C_o)$$

Where: $\bar{C}$ = mean reference measurement

C_o = mean zero calibration response

C_m = mean mid or upscale calibration gas response

C_{ma} = actual mid or upscale calibration gas concentration

$$\text{lb/hr} = (60)(\text{ppm pollutant})(\text{Conv. Factor})(\text{DSCFM})$$

Where: NOx Conv. Factor = 1.194E-07 lb NO2/SCF - ppm NO2

CO Conv. Factor = 7.263E-08 lb CO/SCF - ppm CO

SYSTEM CALIBRATION BIAS AND DRIFT CALCULATIONS

COMPANY: LOUISIANA-PACIFIC Roxboro, NC
SOURCE: RTO #2 STACK

TEST DATE: 8-8-86

RUN NUMBER: 2-CEM-1(17:20-18:25)

SPAN VALUES: 100.0 ppm NOx
500.0 ppm CO
25.00 % Oxygen
20.00 % CO2

	INITIAL VALUES			FINAL VALUES		
	ANALYZER CAL RESPONSE	SYSTEM CAL RESPONSE	SYSTEM CAL BIAS (% OF SPAN)	SYSTEM CAL RESPONSE	SYSTEM CAL BIAS (% OF SPAN)	DRIFT (% OF SPAN)
NOx ZERO GAS	0.3	2.3	2.00	2.4	2.10	0.10
NOx UP-SCALE	48.3	45.6	-0.70	47.8	1.50	2.20
CO ZERO GAS	0.1	0.5	0.08	0.8	0.14	0.06
CO UP-SCALE	61.1	60.4	-0.14	60.4	-0.14	0.00
O2 ZERO GAS	0.10	0.18	0.32	0.11	0.04	-0.28
O2 UP-SCALE	12.09	11.93	-0.64	11.83	-1.04	-0.40
CO2 ZERO GAS	0.10	0.33	1.15	0.05	-0.25	-1.40
CO2 UP-SCALE	11.00	10.81	-0.95	10.85	-0.75	0.20

$$\text{SYSTEM CAL BIAS} = \frac{\text{SYSTEM CAL RESPONSE} - \text{ANALYZER CAL RESPONSE}}{\text{SPAN}} \times 100$$

$$\text{DRIFT} = \frac{\text{FINAL SYSTEM CAL RESPONSE} - \text{INITIAL CAL RESPONSE}}{\text{SPAN}} \times 100$$

SYSTEM CALIBRATION BIAS AND DRIFT CALCULATIONS

COMPANY: LOUISIANA-PACIFIC Roxboro, NC
SOURCE: RTO #2 STACK

TEST DATE: 8-9-96

RUN NUMBER: 2-CEM-2(18:45-19:55)

SPAN VALUES: 100.0 ppm NOx
500.0 ppm CO
25.00 % Oxygen
20.00 % CO2

	ANALYZER CAL RESPONSE	INITIAL VALUES		FINAL VALUES		DRIFT (% OF SPAN)
		SYSTEM CAL RESPONSE	SYSTEM CAL BIAS (% OF SPAN)	SYSTEM CAL RESPONSE	SYSTEM CAL BIAS (% OF SPAN)	
NOx ZERO GAS	0.3	2.4	2.10	2.1	1.80	-0.30
NOx UP-SCALE	46.3	47.8	1.50	48.4	2.10	0.60
CO ZERO GAS	0.1	0.8	0.14	1.0	0.18	0.04
CO UP-SCALE	61.1	60.4	-0.14	60.4	-0.14	0.00
O2 ZERO GAS	0.10	0.11	0.04	0.12	0.08	0.04
O2 UP-SCALE	12.09	11.83	-1.04	11.81	-1.12	-0.08
CO2 ZERO GAS	0.10	0.05	-0.25	0.14	0.20	0.45
CO2 UP-SCALE	11.00	10.85	-0.75	10.82	-0.90	-0.15

$$\text{SYSTEM CAL BIAS} = \frac{\text{SYSTEM CAL RESPONSE} - \text{ANALYZER CAL RESPONSE}}{\text{SPAN}} \times 100$$

$$\text{DRIFT} = \frac{\text{FINAL SYSTEM CAL RESPONSE} - \text{INITIAL CAL RESPONSE}}{\text{SPAN}} \times 100$$

SYSTEM CALIBRATION BIAS AND DRIFT CALCULATIONS

COMPANY: LOUISIANA-PACIFIC Roxboro, NC
SOURCE: RTO #2 STACK

TEST DATE: 8-9-96

RUN NUMBER: 2-CEM-3(20:20-21:25)

SPAN VALUES: 100.0 ppm NOx
500.0 ppm CO
25.00 % Oxygen
20.00 % CO2

	INITIAL VALUES			FINAL VALUES		
	ANALYZER CAL RESPONSE	SYSTEM CAL RESPONSE	SYSTEM CAL BIAS (% OF SPAN)	SYSTEM CAL RESPONSE	SYSTEM CAL BIAS (% OF SPAN)	DRIFT (% OF SPAN)
NOx ZERO GAS	0.3	2.1	1.80	1.9	1.60	-0.20
NOx UP-SCALE	46.3	48.4	2.10	47.8	1.50	-0.60
CO ZERO GAS	0.8	1.0	0.04	0.5	-0.06	-0.10
CO UP-SCALE	60.4	60.4	0.00	60.4	0.00	0.00
O2 ZERO GAS	0.10	0.12	0.08	0.13	0.12	0.04
O2 UP-SCALE	12.09	11.81	-1.12	11.91	-0.72	0.40
CO2 ZERO GAS	0.10	0.14	0.20	0.16	0.30	0.10
CO2 UP-SCALE	11.00	10.82	-0.90	11.14	0.70	1.60

$$\text{SYSTEM CAL BIAS} = \frac{\text{SYSTEM CAL RESPONSE} - \text{ANALYZER CAL RESPONSE}}{\text{SPAN}} \times 100$$

$$\text{DRIFT} = \frac{\text{FINAL SYSTEM CAL RESPONSE} - \text{INITIAL CAL RESPONSE}}{\text{SPAN}} \times 100$$

APPENDIX A. TEST RESULTS

2. RTO No. 2 Stack

**b. Filterable and Condensible
Particulate**

FIELD DATA AND RESULTS TABULATION

PLANT: Roxboro OSB Plant, Roxboro, NC

LOCATION: RTO No. 2 Stack

RUN #	DATE	OPERATOR			
S2-M5/202-1	8/09/96	Dennis D. Holzschuh			
S2-M5/202-2	8/09/96	Dennis D. Holzschuh			
S2-M5/202-3	8/09/96	Dennis D. Holzschuh			
			S2-M5/202-1	S2-M5/202-2	S2-M5/202-3
	Run Start Time		1720	1845	2020
	Run Finish Time		1825	1955	2125
	Net Traversing Points		24	24	24
Theta	Net Run Time, Minutes		60.00	60.00	60.00
Dia	Nozzle Diameter, Inches		0.296	0.300	0.296
Cp	Pitot Tube Coefficient		0.840	0.840	0.840
Y	Dry Gas Meter Calibration Factor		0.9978	0.9978	0.9978
Pbar	Barometric Pressure, Inches Hg		29.50	29.50	29.50
Delta-H	Avg. Pressure Differential of Orifice Meter, Inches H ₂ O		2.82	2.90	2.74
Vm	Volume Of Metered Gas Sample, Dry ACF		54.830	55.145	54.860
tm	Dry Gas Meter Temperature, Degrees F		105	100	105
Vmstd	Volume Of Metered Gas Sample, Dry SCF*		50.778	51.479	50.788
Vlc	Total Volume of Liquid Collected in Impingers & Silica Gel, ml		341.6	312.8	200.5
Vmstd	Volume of Water Vapor, SCF*		16.079	14.723	9.438
XH ₂ O	Moisture Content, Percent by Volume		24.0	22.2	15.7
Mfd	Dry Mole Fraction		0.760	0.778	0.843
XCO ₂	Carbon Dioxide, Percent By Volume, Dry		4.0	3.8	3.5
XO ₂	Oxygen, Percent By Volume, Dry		16.2	16.6	17.2
Fo	Fuel Factor		1.175	1.132	1.057
Md	Gas Molecular Weight, lb/lb-Mole, Dry		29.29	29.27	29.25
Ms	Gas Molecular Weight, lb/lb-Mole, Wet		26.57	26.77	27.49
Pg	Flue Gas Static Pressure, Inches H ₂ O		-0.32	-0.30	-0.31
Ps	Absolute Flue Gas Pressure, Inches Hg		29.48	29.48	29.48
ts	Flue Gas Temperature, Degrees F		282	284	286
Delta-p	Average Velocity Head, Inches H ₂ O		0.5646	0.5543	0.5535
vs	Flue Gas Velocity, Feet/Second		52.53	51.93	51.25
A	Stack/Duct Area, Square Inches		5,775	5,775	5,775
Qsd	Volumetric Air Flow Rate, Dry SCFM*		67,277	67,904	72,564
Qsw	Volumetric Air Flow Rate, Wet ACFM		126,391	124,965	123,319
XI	Isokinetic Sampling Rate, Percent		105.6	103.2	97.9

* 68° F (20° C) -- 29.92 Inches of Mercury (Hg)

(Continued next page)

FIELD DATA AND RESULTS TABULATION
(Continued)

PLANT: Roxboro OSB Plant, Roxboro, NC

		S2-M5/202-1	S2-M5/202-2	S2-M5/202-3
	<u>Filterable Particulate</u>			
mg	Catch Weight, Milligrams	39.9	29.1	19.9
gr/DSCF	Concentration, grains/DSCF *	0.0121	0.00872	0.00605
lb/hr	Emission Rate, lb/hr	6.99	5.08	3.76
	<u>Inorganic (Aqueous) Condensible Part.</u>			
mg	Catch Weight, Milligrams	11.3	1.8	3.8
gr/DSCF	Concentration, grains/DSCF *	3.43E-003	5.40E-004	1.15E-003
lb/hr	Emission Rate, lb/hr	1.98	0.314	0.718
	<u>Organic Condensible Particulate</u>			
mg	Catch Weight, Milligrams	9.2	4.9	2.3
gr/DSCF	Concentration, grains/DSCF *	2.80E-003	1.47E-003	6.99E-004
lb/hr	Emission Rate, lb/hr	1.61	0.855	0.435
	<u>Total Particulate</u>			
mg	Catch Weight, Milligrams	60.5	35.8	26
gr/DSCF	Concentration, grains/DSCF *	0.0184	0.0107	0.00790
lb/hr	Emission Rate, lb/hr	10.6	6.25	4.91

APPENDIX A. TEST RESULTS

3. RTO No. 3 Stack

**a. Carbon Monoxide, Nitrogen Oxides
and Total Hydrocarbons**

FIELD DATA AND RESULTS TABULATION

PLANT: Louisiana Pacific Corp., Roxboro OSB Plant

SAMPLING LOCATION: RTO No. 3 Stack

OPERATOR: S.B. Wieber

		<u>S3-CEM-1</u>	<u>S3-CEM-2</u>	<u>S3-CEM-3</u>
	Test Date	8/6/96	8/6/96	8/6/96
	Run Start Time	1125	1345	1530
	Run Finish Time	1305	1503	1630
Theta	Net Run Time, min	60	60	60
Pbar	Barometric Pressure, in Hg	29.85	29.85	29.85
Mfd	Dry Mole Fraction	0.966	0.976	0.983
%CO2	Carbon Dioxide, % by volume	0.37	0.38	0.38
%O2	Oxygen, % by volume	20.45	20.58	20.60
Pg	Flue Gas Static Pressure, in H2O	-0.67	-0.62	-0.65
ts	Flue Gas Temperature, °F	232	234	233
Qsd	Volumetric Flow Rate, dry SCFM*	118,228	118,966	116,038
	<u>Carbon Monoxide</u>			
Fwt	Formula Weight, gm/gm-mole	28.01	28.01	28.01
ppmvd	Concentration, ppmvd	5.6	4.1	4.4
lb/hr	Emission Rate, lb/hr	2.89	2.13	2.23
	<u>Nitrogen Oxides as NO2</u>			
Fwt	Formula Weight, gm/gm-mole	46.01	46.01	46.01
ppmvd	Concentration, ppmvd	3.4	3.7	3.6
lb/hr	Emission Rate, lb/hr	2.88	3.15	2.99
	<u>THC as Carbon</u>			
Fwt	Formula Weight, gm/gm-mole	12.01	12.01	12.01
ppmvw	Concentration, ppmvw	7.5	8.1	8.0
ppmvd	Concentration, ppmvd	7.76	8.30	8.14
lb/hr	Emission Rate, lb/hr	1.72	1.85	1.77

TOTAL HYDROCARBON MEASUREMENT RESULTS SUMMARY

PLANT NAME: LOUISIANA PACIFIC - ROXBORO, NC.

TEST LOCATION: RTO #3 - STACK

TEST DATE: 08-06-96

OPERATOR: SBW

----- Pre-Test Calibration Error Check -----

SPAN VALUE: 100 (ppm as C)	CALIBRATION GAS VALUE (ppmC)*	SYSTEM CAL. ERROR RESPONSE	CAL. ERROR %
THC Zero Gas	0.0	0.5	0.50
Low-Level Gas	30.1	30.7	1.99
Mid-Level Gas	51.2	52.8	3.12
High-Level Gas	84.3	84.6	0.36

* ppmC values = ppmC3H8 values x 3

----- Drift Determinations -----

Run Number	S3-M25A-1	S3-M25A-2	S3-M25A-3
Zero Sys.Cal.Response	0.5	0.5	0.5
Zero Drift Response	0.3	0.1	0.4
Zero Drift	-0.2	-0.4	-0.1
Upscale Sys.Cal.Resp.	29.3	29.3	29.3
Upscale Drift Response	29.3	29.9	28.5
Upscale Drift	0.0	0.6	-0.8

----- Test Results-----			
RUN NO.:	S3-M25A-1	S3-M25A-2	S3-M25A-3
RUN TIME:	1125-1305	1345-1503	1530-1630
THC (ppmC):	7.5	8.1	8.0
XH2O:	3.40	2.40	1.70
THC (ppmC):	7.8	8.3	8.1
DSCFM:	118,228	118,966	116,038
THC (lb/hr C):	1.72	1.85	1.77

$$\text{ppmd} = \text{ppm} / (1 - (\text{XH}_2\text{O}/100))$$

$$\text{lb/hr} = (\text{ppmd} \times \text{DSCFM} \times 60 \times \text{Mol.Wt.}) / 385.3 \text{ E06}$$

$$\text{where: Mol.Wt. Carbon} = 12.01 \text{ lb/lb mole}$$

$$\text{Cal.Error} = \frac{\text{System Cal.Response} - \text{Cal.Gas Value}}{\text{** Cal.Gas Value}} \times 100$$

$$\text{Drift} = \frac{\text{Drift Response} - \text{System Cal.Response}}{\text{Span Value}} \times 100$$

** For zero gas calibration error use span value

CALCULATION OF AVERAGE NOx AND CO EMISSIONS

COMPAN LOUISIANA-PACIFIC Roxboro, NC

SOURCE: RTO #3 STACK

RUN: 1 (11:25 - 13:05)

DATE: 8-6-96

GAS VALUE	INITIAL CAL	FINAL CAL	MEAN CA
0.0 ppm NOx	0.1	0.1	0.1
47.1 ppm NOx	45.5	45.4	45.5
0.0 ppm CO	-0.1	-0.6	-0.4
30.1 ppm CO	27.4	27.4	27.4
0.00 % Oxygen	0.17	0.15	0.16
12.26 % Oxygen	12.22	12.12	12.17
0.00 % CO2	0.03	0.01	0.02
11.03 % CO2	10.85	10.96	10.91

Uncorrected Data: 3.4 ppm NOx 20.19 % Oxygen
4.8 ppm CO 0.39 % CO2
118,228 DSCFM

CORRECTED RESULTS

3.4 ppm NOx 2.9 lb/hr NOx
5.6 ppm CO 2.9 lb/hr CO
20.45 % Oxygen
0.37 % CO2

$$\text{Corrected Conc.} = \frac{\bar{C} - C_o}{C_m - C_o} C_{ma}$$

Where: $\bar{C}$ = mean reference measurement

C_o = mean zero calibration response

C_m = mean mid or upscale calibration gas response

C_{ma} = actual mid or upscale calibration gas concentration

$$\text{lb/hr} = (60)(\text{ppm pollutant})(\text{Conv. Factor})(\text{DSCFM})$$

Where: NOx Conv. Factor = $1.19\text{E-}07$ lb NO2/SCF - ppm NO2

CO Conv. Factor = $7.26\text{E-}08$ lb CO/SCF - ppm CO

CALCULATION OF AVERAGE NOx AND CO EMISSIONS

COMPAN LOUISIANA-PACIFIC Roxboro, NC

SOURCE: RTO #3 STACK

RUN: 2 (13:45 - 15:03)

DATE: 8-6-86

GAS VALUE	INITIAL CAL	FINAL CAL	MEAN CA
0.0 ppm NOx	0.1	0.0	0.1
47.1 ppm NOx	45.4	46.0	45.7
0.0 ppm CO	-0.6	0.1	-0.3
30.1 ppm CO	27.4	27.7	27.6
0.00 % Oxygen	0.15	0.25	0.20
12.26 % Oxygen	12.12	12.00	12.06
0.00 % CO2	0.01	0.00	0.01
11.03 % CO2	10.96	10.80	10.88

Uncorrected Data: 3.7 ppm NOx 20.11 % Oxygen
3.5 ppm CO 0.38 % CO2
118,966 DSCFM

CORRECTED RESULTS

3.7 ppm NOx 3.2 lb/hr NOx
4.1 ppm CO 2.1 lb/hr CO
20.58 % Oxygen
0.38 % CO2

$$\text{Corrected Conc.} = \frac{C_m(C - C_o)}{(C_m - C_o)}$$

Where: $\bar{C}$ = mean reference measurement

C_o = mean zero calibration response

C_m = mean mid or upscale calibration gas response

C_{ma} = actual mid or upscale calibration gas concentration

$$\text{lb/hr} = (60)(\text{ppm pollutant})(\text{Conv. Factor})(\text{DSCFM})$$

Where: NOx Conv. Factor = 1.19E-07 lb NO2/SCF - ppm NO2

CO Conv. Factor = 7.26E-08 lb CO/SCF - ppm CO

CALCULATION OF AVERAGE NOx AND CO EMISSIONS

COMPANY LOUISIANA-PACIFIC Roxboro, NC

SOURCE: RTO #3 STACK

RUN: 3 (15:30 - 16:30)

DATE: 8-6-96

GAS VALUE	INITIAL CAL	FINAL CAL	MEAN CAL
0.0 ppm NOx	0.0	0.1	0.1
47.1 ppm NOx	46.0	46.5	46.3
0.0 ppm CO	0.1	-0.6	-0.3
30.1 ppm CO	27.7	26.9	27.3
0.00 % Oxygen	0.25	0.17	0.21
12.26 % Oxygen	12.00	12.09	12.05
0.00 % CO2	0.00	0.01	0.01
11.03 % CO2	10.80	10.81	10.81

Uncorrected Data: 3.6 ppm NOx 20.10 % Oxygen
 3.7 ppm CO 0.38 % CO2
 116,038 DSCFM

CORRECTED RESULTS

3.6 ppm NOx 3.0 lb/hr NOx
 4.4 ppm CO 2.2 lb/hr CO
 20.60 % Oxygen
 0.38 % CO2

$$\text{Corrected Conc.} = C_{ma}(\bar{C} - C_o)/(C_m - C_o)$$

Where: $\bar{C}$ = mean reference measurement

C_o = mean zero calibration response

C_m = mean mid or upscale calibration gas response

C_{ma} = actual mid or upscale calibration gas concentration

$$\text{lb/hr} = (60)(\text{ppm pollutant})(\text{Conv. Factor})(\text{DSCFM})$$

Where: NOx Conv. Factor = 1.194E-07 lb NO2/SCF - ppm NO2

CO Conv. Factor = 7.263E-08 lb CO/SCF - ppm CO

SYSTEM CALIBRATION BIAS AND DRIFT CALCULATIONS

COMPANY: LOUISIANA-PACIFIC Rosboro, NC
SOURCE: RTO #3 STACK

TEST DATE: 8-8-88

RUN NUMBER: 1 (11:25 - 13:05)

SPAN VALUES: 100.0 ppm NOx
100.0 ppm CO
25.00 % Oxygen
20.00 % CO2

	INITIAL VALUES			FINAL VALUES		DRIFT (% OF SPAN)
	ANALYZER CAL RESPONSE	SYSTEM CAL RESPONSE	SYSTEM CAL BIAS (% OF SPAN)	SYSTEM CAL RESPONSE	SYSTEM CAL BIAS (% OF SPAN)	
NOx ZERO GAS	0.4	0.1	-0.30	0.1	-0.30	0.00
NOx UP-SCALE	47.0	45.5	-1.50	45.4	-1.60	-0.10
CO ZERO GAS	-0.1	-0.1	0.00	-0.6	-0.50	-0.50
CO UP-SCALE	28.2	27.4	-0.80	27.4	-0.80	0.00
O2 ZERO GAS	0.13	0.17	0.16	0.15	0.08	-0.08
O2 UP-SCALE	12.38	12.22	-0.64	12.12	-1.04	-0.40
CO2 ZERO GAS	0.03	0.03	0.00	0.01	-0.10	-0.10
CO2 UP-SCALE	11.02	10.85	-0.65	10.98	-0.30	0.55

$$\text{SYSTEM CAL BIAS} = \frac{\text{SYSTEM CAL RESPONSE} - \text{ANALYZER CAL RESPONSE}}{\text{SPAN}} \times 100$$

$$\text{DRIFT} = \frac{\text{FINAL SYSTEM CAL RESPONSE} - \text{INITIAL CAL RESPONSE}}{\text{SPAN}} \times 100$$

SYSTEM CALIBRATION BIAS AND DRIFT CALCULATIONS

COMPANY: LOUISIANA-PACIFIC Roanoke, NC
SOURCE: RTO #3 STACK

TEST DATE: 8-8-86

RUN NUMBER: 2 (13:45 - 15:03)

SPAN VALUES:
100.0 ppm NOx
100.0 ppm CO
25.00 % Oxygen
20.00 % CO2

	INITIAL VALUES			FINAL VALUES		
	ANALYZER CAL RESPONSE	SYSTEM CAL RESPONSE	SYSTEM CAL BIAS (% OF SPAN)	SYSTEM CAL RESPONSE	SYSTEM CAL BIAS (% OF SPAN)	DRIFT (% OF SPAN)
NOx ZERO GAS	0.4	0.1	-0.30	0.0	-0.40	-0.10
NOx UP-SCALE	47.0	45.4	-1.60	46.0	-1.00	0.60
CO ZERO GAS	-0.1	-0.6	-0.50	0.1	0.20	0.70
CO UP-SCALE	26.2	27.4	-6.80	27.7	-0.50	0.30
O2 ZERO GAS	0.13	0.15	0.08	0.25	0.46	0.40
O2 UP-SCALE	12.36	12.12	-1.04	12.00	-1.52	-0.48
CO2 ZERO GAS	0.03	0.01	-0.10	0.00	-0.15	-0.05
CO2 UP-SCALE	11.02	10.96	-0.30	10.60	-1.10	-0.80

$$\text{SYSTEM CAL BIAS} = \frac{\text{SYSTEM CAL RESPONSE} - \text{ANALYZER CAL RESPONSE}}{\text{SPAN}} \times 100$$

$$\text{DRIFT} = \frac{\text{FINAL SYSTEM CAL RESPONSE} - \text{INITIAL CAL RESPONSE}}{\text{SPAN}} \times 100$$

SYSTEM CALIBRATION BIAS AND DRIFT CALCULATIONS

COMPANY: LOUISIANA-PACIFIC Roxboro, NC
SOURCE: RTO #3 STACK

TEST DATE: 8-6-98

RUN NUMBER: 3 (15:30 - 16:30)

SPAN VALUES:
100.0 ppm NOx
100.0 ppm CO
25.00 % Oxygen
20.00 % CO2

	INITIAL VALUES			FINAL VALUES		
	ANALYZER CAL. RESPONSE	SYSTEM CAL. RESPONSE	SYSTEM CAL. BIAS (% OF SPAN)	SYSTEM CAL. RESPONSE	SYSTEM CAL. BIAS (% OF SPAN)	DRIFT (% OF SPAN)
NOx ZERO GAS	0.4	0.0	-0.40	0.1	-0.30	0.10
NOx UP-SCALE	47.0	48.0	-1.00	48.5	-0.50	0.50
CO ZERO GAS	-0.1	0.1	0.20	-0.6	-0.50	-0.70
CO UP-SCALE	28.2	27.7	-0.30	28.9	-1.30	-0.80
O2 ZERO GAS	0.13	0.25	0.48	0.17	0.16	-0.32
O2 UP-SCALE	12.38	12.00	-1.52	12.08	-1.16	0.36
CO2 ZERO GAS	0.03	0.00	-0.15	0.01	-0.10	0.05
CO2 UP-SCALE	11.02	10.80	-1.10	10.81	-1.05	0.05

SYSTEM CAL. BIAS = $\frac{\text{SYSTEM CAL. RESPONSE} - \text{ANALYZER CAL. RESPONSE}}{\text{SPAN}} \times 100$

DRIFT = $\frac{\text{FINAL SYSTEM CAL. RESPONSE} - \text{INITIAL CAL. RESPONSE}}{\text{SPAN}} \times 100$

APPENDIX A. TEST RESULTS

3. RTO No. 3 Stack

**b. Filterable and Condensible
Particulate**

FIELD DATA AND RESULTS TABULATION

PLANT: Roxboro OSB Plant, Roxboro, NC

LOCATION: RTO No. 3 Stack

RUN #	DATE	OPERATOR			
S3-M5/202-1	8/06/96	Danny L. Speer			
S3-M5/202-2	8/06/96	Danny L. Speer			
S3-M5/202-3	8/06/96	Danny L. Speer			
			S3-M5/202-1	S3-M5/202-2	S3-M5/202-3
	Run Start Time		1125	1345	1530
	Run Finish Time		1302	1508	1634
	Net Traversing Points		24	24	24
Theta	Net Run Time, Minutes		60.00	60.00	60.00
Dia	Nozzle Diameter, Inches		0.235	0.208	0.209
Cp	Pitot Tube Coefficient		0.840	0.840	0.840
Y	Dry Gas Meter Calibration Factor		0.9854	0.9854	0.9854
Pbar	Barometric Pressure, Inches Hg		29.80	29.80	29.80
Delta-H	Avg. Pressure Differential of Orifice Meter, Inches H ₂ O		2.48	1.60	1.56
Vm	Volume Of Metered Gas Sample, Dry ACF		55.321	45.363	45.013
tm	Dry Gas Meter Temperature, Degrees F		98	104	104
Vmstd	Volume Of Metered Gas Sample, Dry SCF*		51.702	41.813	41.548
Vlc	Total Volume of Liquid Collected in Impingers & Silica Gel, ml		39.2	21.4	15.2
Vwstd	Volume of Water Vapor, SCF*		1.845	1.007	0.715
XH ₂ O	Moisture Content, Percent by Volume		3.4	2.4	1.7
Mfd	Dry Mole Fraction		0.966	0.976	0.983
XCO ₂	Carbon Dioxide, Percent By Volume, Dry		.4	.4	.4
XO ₂	Oxygen, Percent By Volume, Dry		20.4	20.6	20.6
Fo	Fuel Factor		1.250	0.750	0.750
Md	Gas Molecular Weight, lb/lb-Mole, Dry		28.88	28.89	28.89
Ms	Gas Molecular Weight, lb/lb-Mole, Wet		28.51	28.63	28.70
Pg	Flue Gas Static Pressure, Inches H ₂ O		-0.67	-0.62	-0.65
Ps	Absolute Flue Gas Pressure, Inches Hg		29.75	29.75	29.75
ts	Flue Gas Temperature, Degrees F		232	234	233
Delta-p	Average Velocity Head, Inches H ₂ O		1.0697	1.0658	1.0012
vs	Flue Gas Velocity, Feet/Second		67.11	66.91	64.71
A	Stack/Duct Area, Square Inches		5,775	5,775	5,775
Qsd	Volumetric Air Flow Rate, Dry SCFM*		118,228	118,966	116,038
Qaw	Volumetric Air Flow Rate, Wet ACFM		161,490	160,998	155,712
%I	Isokinetic Sampling Rate, Percent		97.0	99.6	100.5

* 68° F (20° C) -- 29.92 Inches of Mercury (Hg)

FIELD DATA AND RESULTS TABULATION
(Continued)

PLANT: Roxboro OSB Plant, Roxboro, NC

		S3-M5/202-1	S3-M5/202-2	S3-M5/202-3
	<u>Filterable Particulate</u>			
mg	Catch Weight, Milligrams	1.5	1.4	3.4
gr/DSCF	Concentration, grains/DSCF *	4.48E-004	5.17E-004	1.26E-003
lb/hr	Emission Rate, lb/hr	0.454	0.527	1.26
	<u>Inorganic (Aqueous) Condensible Part.</u>			
mg	Catch Weight, Milligrams	3.8	1.2	.5
gr/DSCF	Concentration, grains/DSCF *	1.13E-003	4.43E-004	1.86E-004
lb/hr	Emission Rate, lb/hr	1.15	0.452	0.185
	<u>Organic Condensible Particulate</u>			
mg	Catch Weight, Milligrams	1.7	0	1.2
gr/DSCF	Concentration, grains/DSCF *	5.07E-004	0.0	4.46E-004
lb/hr	Emission Rate, lb/hr	0.514	0.0	0.443
	<u>Total Particulate</u>			
mg	Catch Weight, Milligrams	7	2.6	5.1
gr/DSCF	Concentration, grains/DSCF *	2.09E-003	9.60E-004	1.89E-003
lb/hr	Emission Rate, lb/hr	2.12	0.979	1.88

797

1.66

.00209

.000960

.00189

$\bar{x} = .0016$

APPENDIX A. TEST RESULTS

4. Example Calculations

NOTE

The example values shown in these calculations have been rounded for presentation purposes. Any hand calculations conducted using these example values may produce slightly different results than those presented.

CONSTANTS, DEFINITIONS, NOMENCLATURE, AND UNITS

460	0 degrees Fahrenheit in degrees Rankin. The sum of 460 and the standard temperature (60, 68, 77, etc. in °F) gives Tstd in degrees Rankin.
273	0 degrees Celsius in degrees Kelvin. The sum of 273 and the standard temperature (18, 20, 25, etc. in °C) gives Tstd in degrees Kelvin.
29.92	Standard absolute pressure (Pstd), inches of mercury. English unit.
760	Standard absolute pressure (Pstd), millimeters of mercury. Metric unit.
24.056*	Liters per gram-mole at standard conditions.
385.3*	Molar volume cubic feet/pound-mole at standard conditions.
0.04707*	Standard cubic feet per gram or mL of H2O at standard conditions.
7000	Grains per pound.
453.592	Grams per pound.
0.02832	Cubic meters per cubic foot.
28.32	Liters per cubic foot.
0.03531	Cubic feet per liter.
35.31	Cubic feet per cubic meter.
1000	Conversion from milligrams to grams, milliliters to liters, and liters to cubic meters.
10 ⁶	Conversion factor for decimal fraction to parts per million.
144	Square inches per square foot.
60	Minutes per hour and seconds per minute.
13.6	Specific gravity of mercury (1 inch of mercury = 13.6 inches of H2O).
20.9	Percent O2 by volume (dry basis) in ambient air.

85.49 Pitot tube constant (Kp):
$$\frac{\text{feet}}{\text{second}} \sqrt{\frac{(\text{lb} / \text{lb} - \text{mole}) * (\text{inches Mercury})}{(\text{degrees Rankin}) * (\text{inches H2O})}}$$

A Stack cross-sectional area, square inches.

* Where applicable, these constants must be corrected (if the standard temperature is not 68°F) by multiplying them by the ratio of the standard temperatures. For example to convert to 77° F: $(460 + 77) / (460 + 68)$

EXAMPLE TEST CALCULATIONS RUN S1-M5/202-1

RTO No. 1 Stack

VOLUME OF DRY GAS SAMPLED AT STANDARD CONDITIONS

$$Vmstd = Y * Vm * \frac{Pbar + (\Delta H/13.6)}{(460 + tm)} * \frac{460 + tstd}{Pstd}$$

$$Vmstd = 0.9981 * 41.856 * \frac{29.50 + (1.520/13.6)}{(460 + 91)} * \frac{460 + 68}{29.92} = 39.608 \text{ DSCF}$$

VOLUME OF WATER VAPOR AT STANDARD CONDITIONS

$$Vwstd = 0.04707 * Vlc * (460 + tstd)/528$$

$$Vwstd = 0.04707 * 251.5 * (460 + 68)/528 = 11.838 \text{ SCF}$$

PERCENT MOISTURE, BY VOLUME, AS MEASURED IN FLUE GAS

$$\%H_2O = 100 * Vwstd / (Vwstd + Vmstd)$$

$$\%H_2O = \frac{11.838}{11.838 + 39.608} * 100 = 23.0 \%$$

ABSOLUTE FLUE GAS PRESSURE

$$Ps = Pbar + (Pg / 13.6)$$

$$Ps = 29.50 + (-0.38/13.6) = 29.47 \text{ inches Hg}$$

DRY MOLE FRACTION OF FLUE GAS

$$Mfd = 1 - \%H_2O / 100$$

$$Mfd = 1 - 23.0/100 = 0.770$$

DRY MOLECULAR WEIGHT OF FLUE GAS

$$Md = (\%CO_2/100 * 44) + (\%O_2/100 * 32) + ((100 - \%CO_2 - \%O_2)/100 * 28)$$

$$Md = (3.9/100 * 44) + (16.4/100 * 32) + ((100 - 3.9 - 16.4)/100 * 28)$$

$$Md = 29.28 \text{ lb/lb-Mole}$$

WET MOLECULAR WEIGHT OF FLUE GAS

$$Ms = (Md * Mfd) + (0.18 * \%H_2O)$$

$$Ms = (29.28 * 0.770) + (0.18 * 23.0) = 26.68 \text{ lb/lb-Mole}$$

AVERAGE FLUE GAS VELOCITY [Note: (Delta p)avg is square of average square root]

$$v_s = 85.49 * C_p * \left[\frac{(\Delta P)_{avg} * (460 + t_s)}{P_s * M_s} \right]^{\frac{1}{2}}$$

$$v_s = 85.49 * 0.840 * \left[\frac{0.6622 * (460 + 274)}{29.47 * 26.68} \right]^{\frac{1}{2}} = 56.44 \text{ ft/sec}$$

DRY VOLUMETRIC FLUE GAS FLOW RATE AT STANDARD CONDITIONS

$$Q_{sd} = \frac{60}{144} * M_{fd} * v_s * A * \frac{460 + t_{std}}{460 + t_s} * \frac{P_s}{P_{std}}$$

$$Q_{sd} = \frac{60}{144} * 0.770 * 56.44 * 5,775.1 * \frac{460 + 68}{460 + 274} * \frac{29.47}{29.92}$$

$$Q_{sd} = 74,132 \text{ DSCFM}$$

WET VOLUMETRIC FLUE GAS FLOW RATE AT ACTUAL CONDITIONS

$$Q_{aw} = 60 / 144 * v_s * A$$

$$Q_{aw} = 60 / 144 * 56.44 * 5,775.1 = 135,805 \text{ ACFM}$$

PERCENT ISOKINETIC OF SAMPLING RATE

$$\%I = \frac{P_{std}}{460 + t_{std}} * \frac{100}{60} * \frac{(t_s + 460) * V_{mstd}}{P_s * v_s * M_{fd} * \Theta * (\pi * (\text{NozzleDia}/2)^2 / 144)}$$

$$\%I = \frac{29.92}{460 + 68} * \frac{100}{60} * \frac{(274 + 460) * 39.608}{29.47 * 56.44 * 0.770 * 60.00 * (\pi * (0.246/2)^2 / 144)}$$

$$\%I = 108.2 \%$$

CONCENTRATION, GRAINS PER DRY STANDARD CUBIC FOOT, FILTERABLE PARTICULATE

$$\text{gr/DSCF} = \frac{7,000}{453.592} * \frac{(\text{mg} / 10^3)}{V_{mstd}}$$

$$\text{gr/DSCF} = \frac{7,000}{453.592} * \frac{(23.8/10^3)}{39.608} = 0.00927 \text{ gr/DSCF}$$

EMISSION RATE, POUNDS PER HOUR, FILTERABLE PARTICULATE

$$\text{lb/hr} = \frac{60}{453.592} * \frac{(\text{mg} / 10^3)}{\text{V}_{\text{mstd}}} * \text{Q}_{\text{sd}}$$

$$\text{lb/hr} = \frac{60}{453.592} * \frac{(23.8/10^3)}{39.608} * 74,132 = 5.89 \text{ lb/hr}$$

EXAMPLE TEST CALCULATIONS

RTO No. 1 Stack

RUN NUMBER: S1-CEM-1

EMISSION RATE, CARBON MONOXIDE, lb/hr

$$\text{lb/hr} = (60 * \text{ppm}_{\text{vd}} * \text{fwl} * Q_{\text{sd}}) / (385.3 * (460 + t_{\text{std}}) / 528 * 10^6)$$

$$\text{lb/hr} = (60 * 51.00 * 28.01 * 74,132) / (385.3 * (460 + 68) / 528 * 10^6)$$

$$\text{lb/hr} = 16.49 \text{ lb/hr}$$

CONCENTRATION, THC AS CARBON, PPMVD

$$\text{ppm}_{\text{vd}} = (\text{ppm}_{\text{vw}} / \text{Mfid})$$

$$\text{ppm}_{\text{vd}} = (13.5 / 0.77)$$

$$\text{ppm}_{\text{vd}} = 17.5 \text{ ppmvd}$$

APPENDIX B. FIELD DATA

1. RTO No. 1 Stack

**a. Carbon Monoxide, Nitrogen Oxides,
and Total Hydrocarbons**

CALIBRATION SUMMARY

SOURCE: Louisiana-Pacific Corp - Roxboro OSB

REASON: DIRECT CALIBRATION

DATE : 08-09-1996 TIME: 07:17 - 07:31

A/D CHAN	MONITOR DESCRIPTION	UNITS	GAS VALUE	MONITOR RESPONSE
3	RTOS-1	ppmNOx	0.0	0.5
3	RTOS-1	ppmNOx	26.0	26.3
3	RTOS-1	ppmNOx	44.0	44.4
3	RTOS-1	ppmNOx	80.2	80.0
2	RTOS-1	ppm CO	0.0	0.9
2	RTOS-1	ppm CO	60.5	59.5
2	RTOS-1	ppm CO	90.1	90.8
2	RTOS-1	ppm CO	150.6	149.7
4	RTOS-1	% O2	0.00	0.03
4	RTOS-1	% O2	12.05	12.17
4	RTOS-1	% O2	20.34	19.85
1	RTOS-1	% CO2	0.00	0.04
1	RTOS-1	% CO2	11.02	11.10
1	RTOS-1	% CO2	17.21 17.20	17.23

CALIBRATION SUMMARY

SOURCE: LOUISIANA-PACIFIC - ROXBORO OSB

REASON: SYSTEM BIAS CHECK - PRE RUN 1

DATE : 08-09-1996 TIME: 15:50 - 16:00

A/D CHAN	MONITOR DESCRIPTION	UNITS	GAS VALUE	MONITOR RESPONSE
3	RTOS-1	ppmNOx	0.0	1.5
3	RTOS-1	ppmNOx	26.0	24.6
2	RTOS-1	ppm CO	0.0	1.0
2	RTOS-1	ppm CO	60.5	59.2
4	RTOS-1	% O2	0.00	0.14
4	RTOS-1	% O2	12.05	11.93
1	RTOS-1	% CO2	0.00	0.11
1	RTOS-1	% CO2	11.02	11.04
6	RTOS-1	ppm C	0.0	0.5
6	RTOS-1	ppm C	30.1	30.8
6	RTOS-1	ppm C	52.5	52.7
6	RTOS-1	ppm C	86.4	86.4

LOUISIANA-PACIFIC - ROXBORO OSB 08-09-1996

	CHAN 3	CHAN 2	CHAN 4	CHAN 1	CHAN 6
	RTOS-1	RTOS-1	RTOS-1	RTOS-1	RTOS-1
TIME	ppm NOx	ppm CO	% O2	% CO2	ppm C
17:21	29.8	105.3	15.74	4.41	13.3
17:22	29.9	99.8	15.78	4.38	14.4
17:23	30.1	68.0	15.84	4.32	11.9
17:24	29.7	32.4	15.89	4.23	13.2
17:25	29.8	31.1	15.91	4.20	15.1
17:26	28.9	91.4	15.91	4.20	16.0
17:27	28.6	75.3	16.01	4.14	14.6
17:28	29.5	74.3	16.06	4.11	11.8
17:29	29.7	22.3	16.04	4.11	13.3
17:30	30.2	32.0	16.06	4.09	11.6
17:31	29.3	69.8	16.05	4.10	18.0
17:32	29.5	71.1	16.07	4.09	15.7
17:33	29.7	83.0	16.09	4.09	11.5
17:34	30.0	21.2	15.99	4.17	12.9
17:35	30.6	40.5	15.92	4.21	12.3
17:36	29.1	58.9	15.92	4.20	18.2
17:37	29.2	101.7	15.92	4.20	15.6
17:38	29.2	95.7	15.93	4.21	14.3
17:39	30.3	32.4	15.85	4.29	11.9
17:40	30.3	40.9	15.84	4.31	13.8
17:41	30.6	35.3	15.80	4.35	17.9
17:42	30.0	97.2	15.83	4.31	13.9
17:43	29.7	99.7	15.85	4.31	15.2
17:44	31.1	50.1	15.78	4.38	12.1
17:45	31.1	31.9	15.74	4.41	14.0
17:46	31.4	30.9	15.77	4.37	16.6
17:47	30.5	94.1	15.77	4.37	15.2
17:48	29.9	76.8	15.97	4.18	14.6
17:49	30.8	70.2	15.99	4.16	13.0
17:50	30.7	20.6	15.98	4.15	14.1

AVERAGE VALUES FOR THE LAST 30 MINUTES

17:50	30.0	61.8	15.91	4.23	14.2
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COMMENTS: ~~END OF~~ RUN 1
 COMPLIANCE
 RTOS-1
 PORT CHANGE

LOUISIANA-PACIFIC - ROXBORO OSB 08-09-1996

	CHAN 3	CHAN 2	CHAN 4	CHAN 1	CHAN 6
	RTOS-1	RTOS-1	RTOS-1	RTOS-1	RTOS-1
TIME	ppmNOx	ppm CO	% O2	% CO2	ppm C
17:57	30.3	26.9	16.33	3.77	16.0
17:58	30.7	67.2	16.37	3.76	14.2
17:59	31.0	70.9	16.38	3.75	12.8
18:00	31.9	25.5	16.39	3.75	11.4
18:01	31.4	23.7	16.37	3.76	12.9
18:02	31.3	18.3	16.34	3.77	15.6
18:03	30.2	65.5	16.33	3.79	12.7
18:04	29.5	63.2	16.32	3.81	13.3
18:05	30.3	44.3	16.28	3.85	11.4
18:06	29.9	16.7	16.22	3.88	12.6
18:07	30.3	22.3	16.19	3.91	15.0
18:08	29.4	70.1	16.16	3.93	14.0
18:09	29.4	51.3	16.17	3.91	13.5
18:10	30.1	61.5	16.15	3.95	11.7
18:11	30.0	12.7	16.12	3.95	12.7
18:12	30.1	24.2	16.15	3.94	11.4
18:13	29.4	47.0	16.16	3.91	15.5
18:14	29.2	54.2	16.20	3.89	13.9
18:15	29.7	65.5	16.31	3.79	11.2
18:16	30.1	12.5	16.39	3.71	12.1
18:17	30.6	18.5	16.48	3.65	11.7
18:18	30.7	18.8	16.57	3.57	14.0
18:19	31.2	48.6	16.63	3.54	12.8
18:20	31.9	43.4	16.72	3.47	11.3
18:21	32.3	14.0	16.69	3.49	10.8
18:22	32.5	12.5	16.68	3.48	12.1
18:23	31.9	12.1	16.70	3.47	13.8
18:24	31.3	47.7	16.71	3.46	11.8
18:25	30.5	43.0	16.70	3.48	12.2
18:26	30.6	26.4	16.68	3.51	10.8

AVERAGE VALUES FOR THE LAST 30 MINUTES

18:26	30.6	37.6	16.40	3.73	12.8
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COMMENTS: END OF RUN 1
COMPLIANCE
RTOS-1

CALIBRATION SUMMARY

SOURCE: LOUISIANA-PACIFIC - ROXBORO OSB

REASON: SYSTEM BIAS CHECK - POST RUN 1

DATE : 08-09-1996 TIME: 18:26 - 18:35

A/D CHAN	MONITOR DESCRIPTION	UNITS	GAS VALUE	MONITOR RESPONSE
3	RTOS-1	ppmNOx	0.0	1.7
3	RTOS-1	ppmNOx	26.0	25.6
2	RTOS-1	ppm CO	0.0	0.7
2	RTOS-1	ppm CO	60.5	58.4
4	RTOS-1	% O2	0.00	0.38
4	RTOS-1	% O2	12.05	11.97
1	RTOS-1	% CO2	0.00	0.07
1	RTOS-1	% CO2	11.02	10.94
6	RTOS-1	ppm C	0.0	0.9
6	RTOS-1	ppm C	30.1	30.6

LOUISIANA-PACIFIC - ROXBORO OSB 08-09-1996

	CHAN 3	CHAN 2	CHAN 4	CHAN 1	CHAN 6
	RTOS-1	RTOS-1	RTOS-1	RTOS-1	RTOS-1
TIME	ppmNOx	ppm CO	% O2	% CO2	ppm C
18:46	30.9	40.8	17.12	3.44	10.8
18:47	30.6	20.3	17.08	3.48	9.5
18:48	29.9	10.9	17.00	3.54	10.3
18:49	29.4	12.4	16.93	3.59	12.4
18:50	28.7	51.6	16.93	3.59	10.5
18:51	28.1	46.0	16.90	3.63	11.0
18:52	28.2	42.4	16.76	3.74	9.7
18:53	28.0	11.3	16.63	3.82	10.2
18:54	28.0	17.2	16.59	3.85	10.2
18:55	27.2	77.0	16.61	3.83	14.4
18:56	27.7	46.8	16.65	3.82	12.2
18:57	28.4	61.0	16.53	3.91	10.0
18:58	29.0	17.2	16.43	3.96	11.0
18:59	28.9	21.2	16.48	3.92	10.2
19:00	27.9	54.8	16.54	3.88	13.6
19:01	28.1	54.2	16.61	3.84	13.3
19:02	28.2	68.8	16.65	3.80	10.6
19:03	29.0	18.9	16.62	3.80	10.2
19:04	29.5	15.5	16.72	3.73	11.0
19:05	29.2	18.4	16.81	3.67	13.1
19:06	29.7	52.4	16.90	3.61	11.0
19:07	30.0	53.1	16.96	3.58	11.5
19:08	31.1	20.5	16.89	3.61	9.8
19:09	31.4	11.0	16.90	3.59	10.9
19:10	31.1	11.7	16.91	3.59	12.8
19:11	30.5	48.0	16.98	3.54	11.1
19:12	29.9	41.7	16.95	3.59	11.1
19:13	30.4	35.9	16.84	3.67	10.5
19:14	30.1	8.4	16.78	3.69	10.7
19:15	29.6	14.0	16.71	3.74	11.0

AVERAGE VALUES FOR THE LAST 30 MINUTES

19:15	29.3	33.4	16.78	3.70	11.2
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COMMENTS: PORT CHANGE

COMPLIANCE

RTOS-~~1~~ 1

LOUISIANA-PACIFIC - ROXBORO OSB 08-09-1996

	CHAN 3	CHAN 2	CHAN 4	CHAN 1	CHAN 6
	RTOS-1	RTOS-1	RTOS-1	RTOS-1	RTOS-1
TIME	ppmNOx	ppm CO	% O2	% CO2	ppm C
19:26	29.3	30.9	16.49	4.02	14.4
19:27	29.2	64.3	16.59	3.95	12.6
19:28	29.6	63.1	16.66	3.90	12.4
19:29	30.3	20.0	16.64	3.89	11.0
19:30	30.2	16.8	16.70	3.84	12.6
19:31	30.4	15.2	16.83	3.74	15.6
19:32	30.2	53.6	16.92	3.69	12.1
19:33	30.6	45.1	16.94	3.68	12.6
19:34	30.8	36.9	16.83	3.75	11.6
19:35	30.7	12.0	16.83	3.74	12.1
19:36	30.4	11.3	16.84	3.73	13.3
19:37	29.2	53.1	16.82	3.76	14.2
19:38	28.8	40.9	16.82	3.77	13.0
19:39	29.4	45.5	16.70	3.87	11.5
19:40	29.1	9.3	16.57	3.95	11.9
19:41	29.0	15.1	16.54	3.98	11.1
19:42	27.6	54.8	16.55	3.99	15.6
19:43	28.0	50.7	16.59	3.96	13.9
19:44	28.8	62.8	16.46	4.06	11.7
19:45	29.3	13.6	16.38	4.09	11.9
19:46	29.3	17.4	16.31	4.15	12.4
19:47	28.1	33.9	16.30	4.18	15.4
19:48	28.3	62.1	16.38	4.13	13.8
19:49	28.5	69.5	16.39	4.12	14.2
19:50	29.4	24.1	16.33	4.15	11.7
19:51	29.4	19.5	16.41	4.09	13.2
19:52	28.5	17.3	16.53	4.00	15.6
19:53	28.0	62.3	16.63	3.94	12.9
19:54	28.5	61.0	16.73	3.87	13.9
19:55	29.7	29.6	16.70	3.88	12.2

AVERAGE VALUES FOR THE LAST 30 MINUTES

19:55	29.3	37.1	16.61	3.93	13.0
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COMMENTS: END OF RUN 2
COMPLIANCE
RTOS-1

CALIBRATION SUMMARY

SOURCE: LOUISIANA-PACIFIC - ROXBORO OSB

REASON: SYSTEM BIAS CHECK - POST RUN 2 PRE 3

DATE : 08-09-1996 TIME: 19:56 - 20:02

A/D CHAN	MONITOR DESCRIPTION	UNITS	GAS VALUE	MONITOR RESPONSE
3	RTOS-1	ppmNOx	0.0	1.8
3	RTOS-1	ppmNOx	26.0	24.9
2	RTOS-1	ppm CO	0.0	0.8
2	RTOS-1	ppm CO	60.5	59.1
4	RTOS-1	% O2	0.00	0.14
4	RTOS-1	% O2	12.05	12.11
1	RTOS-1	% CO2	0.00	0.10
1	RTOS-1	% CO2	11.02	11.08
6	RTOS-1	ppm C	0.0	0.6
6	RTOS-1	ppm C	30.1	30.3

LOUISIANA-PACIFIC - ROXBORO OSB 08-09-1996

	CHAN 3	CHAN 2	CHAN 4	CHAN 1	CHAN 6
	RTOS-1	RTOS-1	RTOS-1	RTOS-1	RTOS-1
TIME	ppmNOx	ppm CO	% O2	% CO2	ppm C
20:21	30.7	34.5	16.64	3.85	11.7
20:22	30.9	8.4	16.66	3.82	12.4
20:23	30.8	13.4	16.63	3.85	11.7
20:24	30.0	46.9	16.65	3.85	14.7
20:25	29.6	39.2	16.70	3.82	13.6
20:26	30.7	53.4	16.57	3.92	11.7
20:27	31.1	11.6	16.48	3.96	12.6
20:28	31.1	20.9	16.45	3.99	12.3
20:29	30.3	34.1	16.50	3.96	14.4
20:30	30.2	52.4	16.54	3.97	14.2
20:31	30.9	73.8	16.44	4.04	12.9
20:32	32.0	29.2	16.28	4.13	11.1
20:33	32.2	25.4	16.33	4.10	12.4
20:34	31.8	20.1	16.33	4.10	14.2
20:35	31.5	64.6	16.43	4.05	12.5
20:36	31.7	73.5	16.46	4.03	14.5
20:37	32.8	35.4	16.37	4.08	12.0
20:38	33.3	21.9	16.39	4.05	13.2
20:39	33.0	17.0	16.47	4.00	14.6
20:40	31.8	61.4	16.60	3.92	13.1
20:41	31.8	59.0	16.70	3.86	12.9
20:42	33.1	45.1	16.65	3.89	12.3
20:43	33.1	14.8	16.63	3.87	13.1
20:44	33.0	19.4	16.71	3.83	11.9
20:45	32.5	54.5	16.73	3.82	16.2
20:46	32.6	43.7	16.84	3.76	13.4
20:47	33.7	51.3	16.87	3.73	11.6
20:48	34.0	12.0	16.82	3.75	12.8
20:49	34.0	21.0	16.78	3.79	11.8
20:50	32.8	36.9	16.76	3.81	15.2

AVERAGE VALUES FOR THE LAST 30 MINUTES

20:50	31.9	36.5	16.58	3.92	13.0
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COMMENTS: PORT CHANGE

COMPLIANCE

RTOS-~~761~~

LOUISIANA-PACIFIC - ROXBORO OSB 08-09-1996

	CHAN 3	CHAN 2	CHAN 4	CHAN 1	CHAN 6
	RTOS-1	RTOS-1	RTOS-1	RTOS-1	RTOS-1
TIME	ppmNOx	ppm CO	% O2	% CO2	ppm C
20:56	32.6	58.7	17.97	2.80	11.5
20:57	32.4	59.8	16.74	3.85	12.3
20:58	33.6	29.5	16.53	3.97	11.0
20:59	33.1	20.1	16.52	3.99	12.5
21:00	33.0	16.8	16.54	3.98	14.0
21:01	32.1	59.4	16.66	3.90	12.3
21:02	32.3	60.8	16.79	3.81	12.7
21:03	33.5	42.6	16.73	3.82	11.5
21:04	33.4	12.5	16.76	3.79	12.6
21:05	34.2	17.9	16.76	3.79	11.6
21:06	33.1	50.3	16.90	3.68	15.0
21:07	33.1	37.8	17.01	3.62	12.7
21:08	34.4	50.6	16.95	3.65	11.2
21:09	34.6	9.7	16.93	3.62	12.4
21:10	34.8	15.6	16.93	3.62	11.6
21:11	33.6	31.2	16.93	3.63	14.0
21:12	33.8	39.7	17.02	3.58	13.2
21:13	33.8	54.4	17.02	3.58	11.4
21:14	34.6	16.3	16.93	3.62	10.7
21:15	35.0	17.1	16.89	3.65	11.7
21:16	33.7	15.6	16.90	3.63	12.9
21:17	33.0	45.0	16.95	3.61	11.6
21:18	32.9	50.7	16.99	3.59	11.9
21:19	33.1	17.3	16.83	3.68	11.1
21:20	32.9	13.2	16.84	3.67	12.3
21:21	32.1	11.4	16.80	3.70	13.6
21:22	31.7	43.9	16.89	3.65	12.1
21:23	31.4	43.3	16.94	3.63	12.0
21:24	32.8	26.4	16.84	3.68	11.5
21:25	33.0	6.8	16.85	3.65	12.3

AVERAGE VALUES FOR THE LAST 30 MINUTES

21:25	33.3	32.5	16.88	3.68	12.2
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COMMENTS: END OF RUN 3
COMPLIANCE
RTOS-1

CALIBRATION SUMMARY

SOURCE: LOUISIANA-PACIFIC - ROXBORO OSB

REASON: SYSTEM BIAS CHECK - POST RUN 3

DATE : 08-09-1996 TIME: 21:25 - 21:31

A/D CHAN	MONITOR DESCRIPTION	UNITS	GAS VALUE	MONITOR RESPONSE
3	RTOS-1	ppmNOx	0.0	1.3
3	RTOS-1	ppmNOx	26.0	24.7
2	RTOS-1	ppm CO	0.0	0.8
2	RTOS-1	ppm CO	60.5	59.5
4	RTOS-1	% O2	0.00	0.15
4	RTOS-1	% O2	12.05	12.07
1	RTOS-1	% CO2	0.00	0.08
1	RTOS-1	% CO2	11.05	11.02
6	RTOS-1	ppm C	0.0	0.8
6	RTOS-1	ppm C	30.1	30.6

YES

NO

YES

88

64

APPENDIX B. FIELD DATA

1. RTO No. 1 Stack

**b. Filterable and Condensible
Particulate**

SAMPLING DATA - METHOD(S) M5/202

CLIENT LOUISIANA-PACIFIC
 PLANT ROXBORO OSR Plant
 CITY/STATE ROXBORO, NC
 SAMPLING LOC. RTO #1 Stack
 BAROMETRIC PRESSURE, IN. HG 29.5 STATIC PRESSURE, IN. H₂O -0.38
 LEAK J, VACUUM IN. HG 15 12
 LEAK RATE, CFM 0.000 0.000
 RUN NO. 51-M5/202-1
 JOB NO. 15575 DATE 8-9-96
 TIME START 1720
 TIME FINISH 1825
 TEST PERSONNEL JDK/PFD
 POSTTEST POS PRESS LEAK / OK?

• CONDUCT POSTTEST POSITIVE PRESSURE LEAK CHECK FOLLOWING THE LAST RUN PER LOCATION. FOR OTHER RUNS, ENTER "N/A".

EQUIPMENT CHECKS		EQUIPMENT I.D. NUMBERS		LEAK CHECKS		
☒ PITOT, PRETEST	REAGENT BOX <u>626</u>	METER BOX <u>N-20</u>	V <u>0.5581</u>	B <u></u>	B <u></u>	
☒ PITOT, POSTTEST	PITOT <u>APT-122</u>	CP <u>54</u>	NOZ'L <u>1815</u>	DIA. <u>0.246</u>	E <u></u>	
☒ NOZZLE, PRE/POST	TC READOUT <u>E-93</u>	TC PROBE <u>R-455</u>	UMBILICAL <u>U-8</u>	B <u></u>	B <u></u>	
☒ TC <u>22</u> °F PRE	SAMPL'G BOX <u>125</u>	ORSAT PUMP <u>B</u>	TEDLAR BAG <u>N/A</u>	E <u></u>	E <u></u>	
☒ TC <u>25</u> °F POST					B <u></u>	B <u></u>
☒ ORSAT SYSTEM					E <u></u>	E <u></u>
		HOMOGRAPH DATA		Fyrites, %		
FILTER/XAD	TARE WT.	DELTA-HG	METER TEMP.	EST. XH ₂ O	TCB	
<u>76F-425</u>	<u>0.4882</u>	<u>1.779</u>	<u>95</u>	<u>15</u>	<u>1.001</u>	
		°C FACTOR	STACK TEMP.	REF DELTA-P	±5% OF CAL'D T7	
		<u>0.838</u>	<u>275</u>	<u>0.815</u>	(Y) ☒ (N) <u></u>	
		"K" FACTOR				
		<u>2.258</u>				

LINE	SAMPLE POINT	CLOCK TIME, MINUTES	DRY GAS METER READING, CUBIC FEET	PITOT READING, IN. H ₂ O	GAS METER TEMP., °F	STACK TEMP., °F	ORIFICE SETTING, IN. H ₂ O		GAUGE VACUUM, IN. HG	GAS TEMPERATURES, °F			PRIME OR COND. EXIT
							ACTUAL	IDEAL		FILTER	IMPING. EXIT	OR COND. EXIT	
1	B-1	0/00	289.302	0.47	84	264	1.06	1.06	3	247	66	N/A	
2	2	2 1/2	290.76	0.44	84	274	0.97	0.97	3	251	62		
3	J	5	292.20	0.39	84	267	0.87	0.87	3	252	60		
4	Y	7 1/2	293.55	0.38	85	279	0.84	0.84	3	252	59		
5	5	10	294.88	0.43	85	269	0.96	0.96	3	252	59		
6	6	12 1/2	296.28	0.48	86	278	1.06	1.06	3	252	58		
7	7	15	297.76	0.77	87	269	1.73	1.73	3	252	58		
8	8	17 1/2	299.57	0.85	88	280	1.88	1.88	3	255	57		
9	9	20	301.54	0.84	90	270	1.89	1.89	3	255	55		
10	10	22 1/2	303.49	0.94	92	281	2.09	2.09	4	255	55		
11	11	25	305.54	1.03	93	269	2.33	2.33	5	250	59		
12	12	27 1/2	307.66	0.96	94	277	2.15	2.15	4	250	59		
13	A-1	30	309.745	0.58	91	270	1.30	1.30	3	250	65		
14	2	32 1/2	311.41	0.57	92	274	1.28	1.28	3	245	60		
15	3	35	313.04	0.55	93	268	1.25	1.25	3	245	60		
16	Y	37 1/2	314.62	0.53	94	282	1.18	1.18	3	245	57		
17	5	40	316.21	0.48	95	265	1.09	1.09	3	245	56		
18	6	42 1/2	317.72	0.65	95	280	1.46	1.46	3	245	56		
19	7	45	319.48	0.62	95	270	1.41	1.41	3	245	56		
20	8	47 1/2	321.21	0.75	95	278	1.68	1.68	3	245	57		
21	9	50	323.04	0.84	96	272	1.90	1.90	5	245	57		
22	10	52 1/2	325.02	0.92	96	279	2.06	2.06	5	245	58		
23	11	55	327.03	0.89	97	271	2.02	2.02	5	245	58		
24	12	57 1/2	329.08	0.91	97	275	2.06	2.06	5	245	58		
25		60/00	331.158										

FINAL

* FILTER EXIT for NJ Method 1. FILTER BOX for all others.
 ** PROBE EXIT & J (probe & filter heat off) apply to NJ Method 1. COND EXIT applies if sampling train has a condenser.

60 41.856 6.1622 91.2 293.5 1.52
 Min. (θ) Vm (√ΔP)² Tm Ts ΔH

67

SAMPLING DATA - METHOD(S) M5/202

CLIENT LOUISIANA - PACIFIC
 PLANT ROXBORO CSR PLANT
 CITY/STATE ROXBORO, NC RUN NO. 51-M5/202-2
 SAMPLING LOC. RTO #1 STACK JOB NO. 15575 DATE 29-96
 BAROMETRIC PRESSURE, IN. HG 29.5 (29.5) STATIC PRESSURE, IN. H₂O -1.35 TIME START 1845
 LEAK J, VACUUM IN. HG 16 13 TIME FINISH 1955
 LEAK RATE, CFM 0.000 0.000 TEST PERSONNEL DDK, PFD
 POSTTEST POS PRESS LEAK J OK? •

* CONDUCT POSTTEST POSITIVE PRESSURE LEAK CHECK FOLLOWING THE LAST RUN PER LOCATION. FOR OTHER RUNS, ENTER "N/A".									
EQUIPMENT CHECKS		EQUIPMENT I.D. NUMBERS						LEAK CHECKS	
PITOT, PRETEST		REAGENT BOX <u>626</u>	METER BOX <u>N20</u>	<u>0.9981</u>		B _____		B _____	
PITOT, POSTTEST		PITOT <u>15.83</u>	CP <u>84</u>	NOZ'L <u>1811</u>	DIA. <u>0.244</u>	E _____		E _____	
NOZZLE, PRE/POST		TC READOUT <u>1.23</u>	TC PROBE <u>2-197</u>	UMBILICAL <u>1-3</u>		B _____		B _____	
TC <u>25</u> °F PRE		SAMPL'G BOX <u>83</u>	ORSAT PUMP <u>8</u>	TEDLAR BAG <u>N/A</u>		E _____		E _____	
TC <u>74</u> °F POST									
N/A ORSAT SYSTEM		MONOGRAPH DATA							
FILTER/XAD		DELTA-HG <u>1.779</u>					B _____		
TARE WT. <u>0.4875</u>		METER TEMP. <u>95</u>					E _____		
		EST. XH ₂ O <u>15</u>					B _____		
		"C" FACTOR <u>0.823</u>					E _____		
		STACK TEMP. <u>275</u>					Fyrites, %		
		REF DELTA-P <u>0.842</u>					Y ₉₀ <u>0.492</u>		
		"K" FACTOR <u>2.185</u>					**5% OF CAL'D Y ₉₀ (Y) (N) <u>✓</u>		

LINE	SAMPLE POINT	CLOCK TIME, MINUTES	DRY GAS METER READING, CUBIC FEET	PITOT READING, IN. H ₂ O	GAS METER TEMP., °F	STACK TEMP., °F	ORIFICE SETTING, IN. H ₂ O		GAUGE VACUUM, IN. HG	GAS TEMPERATURES, °F			PROBE OR COND EXIT**	J
							ACTUAL	IDEAL		FILTER *	IMPING. EXIT	OR COND EXIT**		
1	A-1	0/0	331.570	0.61	92	266	1.34	1.34	3	240	65	N/A		
2		2 1/2	333.24	0.59	97	271	1.29	1.29	3	240	60			
3		5	334.86	0.48	92	279	1.04	1.04	3	240	60			
4		7 1/2	336.33	0.48	93	267	1.06	1.06	3	240	55			
5		10	337.78	0.45	91	273	0.98	0.98	3	240	57			
6		12 1/2	339.23	0.58	93	270	1.27	1.27	4	242	57			
7		15	340.82	0.59	93	289	1.28	1.28	4	242	57			
8		17 1/2	342.45	0.68	94	276	1.48	1.48	4	242	57			
9		20	344.17	0.71	94	275	1.55	1.55	4	242	56			
10		22 1/2	345.87	0.77	95	276	1.68	1.68	4	243	56			
11		25	347.78	0.80	95	279	1.74	1.74	5	243	56			
12		27 1/2	349.63	0.76	96	273	1.62	1.62	5	243	56			
13	B-1	30	351.520	0.41	92	268	0.90	0.90	3	243	64			
14		32 1/2	352.92	0.38	93	280	0.82	0.82	3	245	63			
15		35	354.25	0.42	93	269	0.92	0.92	3	245	63			
16		37 1/2	355.68	0.37	93	281	0.80	0.80	3	245	62			
17		40	356.92	0.39	93	268	0.86	0.86	3	242	58			
18		42 1/2	358.27	0.48	93	279	1.04	1.04	3	242	58			
19		45	359.75	0.69	94	272	1.51	1.51	4	242	58			
20		47 1/2	361.51	0.93	95	282	2.01	2.01	5	242	56			
21		50	363.41	0.87	95	268	1.92	1.92	5	245	56			
22		52 1/2	365.42	0.98	96	281	2.13	2.13	5	245	56			
23		55	367.49	1.03	96	277	2.24	2.24	5	245	58			
24		57 1/2	369.65	0.89	97	278	1.94	1.94	5	244	58			
25		60/00	371.825											

FINAL

* FILTER EXIT for NJ Method 1. FILTER BOX for all others.
 ** PROBE EXIT & J (probe & filter heat off) apply to NJ Method 1. COND EXIT applies if sampling train has a condenser.

60 40.255 0.6236 93.8 274.5 1.39
 Min. (θ) Vm (√ΔP)² Tm Ts ΔH

68

SAMPLING DATA - METHOD(S) M5/202

CLIENT LOUISIANA - PACIFIC RUN NO. 51-M5/202-3
 PLANT ROXBORO OSB Plant JOB NO. 15575 DATE 8-9-96
 CITY/STATE ROXBORO, NC TIME START 2020
 SAMPLING LOC. RTD #1 STACK TIME FINISH 2125
 BAROMETRIC PRESSURE, IN. HG 29.6 STATIC PRESSURE, IN. H₂O -1.35
 LEAK J, VACUUM IN. HG 15 TEST PERSONNEL JDE, PFDITCH
 LEAK RATE, CFM 0.000 POSTTEST POS PRESS LEAK J OK?

• CONDUCT POSTTEST POSITIVE PRESSURE LEAK CHECK FOLLOWING THE LAST RUN PER LOCATION. FOR OTHER RUNS, ENTER "N/A".

EQUIPMENT CHECKS		EQUIPMENT I.D. NUMBERS		LEAK CHECKS	
☒ PITOT, PRETEST	REAGENT BOX <u>626</u>	METER BOX <u>N-20</u>	<u>0.9981</u>	B	
☒ PITOT, POSTTEST	PITOT <u>PPT-122</u>	NOZ'L <u>1813</u>	DIA. <u>0.246</u>	E	
☒ NOZZLE, PRE/POST	TC READOUT <u>P23</u>	TC PROBE <u>B-455</u>	UNBILICAL <u>U-48</u>	B	
☒ TC <u>23</u> °F PRE	SAMPL'G BOX <u>125</u>	ORSAT PUMP <u>8</u>	TEDLAR BAG <u>N/A</u>	E	
☒ TC <u></u> °F POST				B	
☒ ORSAT SYSTEM				E	
		NOMOGRAPH DATA			
FILTER/XAD	TARE WT.	DELTA-HG	<u>1.779</u>		
<u>B3215</u>	<u>1.4753</u>	METER TEMP.	<u>75</u>		
		EST. XH ₂ O	<u>15</u>		
		"C" FACTOR	<u>0.823</u>		
		STACK TEMP.	<u>275</u>		
		REF DELTA-P	<u>0.815</u>		
		"K" FACTOR	<u>2.257</u>		
				Fyrites, %	Tga
				≤5% OF CAL'D T7 (Y) (N)	

L I N E	SAMPLE POINT	CLOCK TIME, MINUTES	DRY GAS METER READING, CUBIC FEET	PITOT READING, IN. H ₂ O	GAS METER TEMP., °F	STACK TEMP., °F	ORIFICE SETTING, IN. H ₂ O ACTUAL IDEAL	GAUGE VACUUM, IN. HG	GAS TEMPERATURES, °F FILTER * IMPING. EXIT	PRIME OR COND EXIT**	J
1	B-1	0/00	372.153	0.38	89	265	0.86 0.86	3	240 64	N/A	
2	2	2 1/2	373.42	0.41	89	262	0.93 0.93	3	240 62		
3	2	5	374.85	0.39	89	279	0.87 0.87	3	245 60		
4	7	7 1/2	376.22	0.42	90	270	0.95 0.95	3	245 60		
5	5	10	377.61	0.46	90	281	1.02 1.02	3	245 58		
6	6	12 1/2	379.04	0.43	91	273	0.92 0.92	3	245 57		
7	7	15	380.47	0.98	92	281	2.18 2.18	2	245 57		
8	8	17 1/2	382.4	0.95	92	275	2.13 2.13	3	245 57		
9	9	20	384.47	0.95	93	273	2.14 2.14	3	245 56		
10	10	22 1/2	386.40	0.90	94	280	2.01 2.01	3	245 57		
11	11	25	388.43	0.97	95	270	2.2 2.2	4	245 56		
12	12	27 1/2	390.60	0.94	95	282	2.1 2.1	3.5	245 57		
13	A-1	30	392.648	0.45	93	263	1.03 1.03	3	245 57		
14	2	32 1/2	394.3	0.43	93	274	0.97 0.97	2	247 56		
15	3	35	395.60	0.55	93	267	1.25 1.25	3	247 57		
16	7	37 1/2	397.27	0.56	93	285	1.24 1.24	2	250 55		
17	5	40	398.76	0.44	94	270	1.0 1.0	2	250 56		
18	6	42 1/2	400.21	0.45	94	285	1.0 1.0	2	248 57		
19	7	45	401.64	0.57	95	271	1.29 1.29	3	249 57		
20	8	47 1/2	403.27	0.75	95	284	1.67 1.67	3	245 58		
21	9	50	405.12	0.82	96	271	1.86 1.86	4	246 57		
22	10	52 1/2	407.15	0.83	96	283	1.85 1.85	4	245 56		
23	11	55	409.15	0.90	97	269	2.05 2.05	4	246 57		
24	12	57 1/2	411.19	0.96	98	278	2.16 2.16	4	247 58		
25		60/00	413.168								

FINAL

* FILTER EXIT for MJ Method 1. FILTER BOX for all others.
 ** PROBE EXIT & J (probe & filter heat off) apply to MJ Method 1. COND EXIT applies if sampling train has a condenser.

60 41.015 2.6415 43.2 274.6 1.49 69
 Min. (8) Vm (ΔP)² cm ts ΔH

MOISTURE ANALYTICAL RESULTS

client LA. PACIFIC

Plant Name ROXBORO OSB

Job No. 15575

City/State ROXBORO, N.C.

Sampling Loc. RTO #1 OUTLET

Run Number

SI-M5/202-1

SI-M5/202-2

SI-M5/202-3

Sampling Date

8/9/96

8/9/96

8/9/96

Analysis Date

8/9/96

8/12/96

8/12/96

Analyst

ASL

ASL, TCM, LAS

ASL, TCM, LAS

Reagent 1 (<u>D₂O</u>)			
Final Weight, g	<u>1036.0</u>	<u>1000.0</u>	<u>988.5</u>
Tared Weight, g	<u>795.9</u>	<u>800.0</u>	<u>1098.0 TCM</u>
Water Catch, g	<u>240.1</u>	<u>200.0</u>	<u>796.8</u>
Reagent 2 (_____)			
Final Weight, g	_____	_____	_____
Tared Weight, g	_____	_____	_____
Water Catch, g	_____	_____	_____
Reagent 3 (_____)			
Final Weight, g	_____	_____	_____
Tared Weight, g	_____	_____	_____
Water Catch, g	_____	_____	_____
CONDENSED WATER, g	<u>240.1</u>		

Silica Gel			
Final Weight, g	<u>209.0</u>	<u>206.0</u>	<u>216.5</u>
Tared Weight, g	<u>197.6</u>	<u>195.7</u>	<u>199.3</u>
ADSORBED WATER, g	<u>11.4</u>	<u>10.3</u>	<u>17.2</u>

TOTAL WATER COLLECTED, g	<u>251.5</u>	<u>210.3</u>	<u>208.9</u>
--------------------------	--------------	--------------	--------------

Balance No. 56 Type ☒ Triple Beam ☒ Electronic Reagent Box No. 626

Balance located in stable, draft-free area ☒ Yes ☐ No (If "No", explain below.)

Comments 70

RECORD OF CUSTODY, CONTAINER No. 626

Client LA. PACIFIC

Job No. 15575

Plant Name ROXBORO OSB

City/State ROXBORO, N.C.

Sampling Method(s) 5/202

(EPA, NIOSH, etc.)

Container Type (v) Reagent Box ☒ Cooler ☐ Other (specify) ☐

Seal No. or "PC"	Date	Time	*	Full Signature	Reason for Breaking Seal**
1046	7/31	1101	S	<i>[Signature]</i>	
	8/5	1340	B		LABEL
3534	8/12	1105	S	<i>[Signature]</i>	
			B		
			S		
			B		
			S		
			B		
			S		
			B		
			S		
			B		
			S		
			B		

PC = Personal Custody

* S = Sealed By; B = Broken By

** Use "REMARKS" Section if more space needed.

Container Received by Entropy Sample Custodian			Seal Intact? **
<i>[Signature]</i>	8/12/96	1350	Yes ☒ No ☐ NA ☐
Signature	Date	Time	

As Applicable:

All liquid levels at mark (✓) YES ☐ NO ☐ (Estimate loss if not at mark; describe in "REMARKS")

As Applicable:

TUBE SAMPLES put in freezer by _____ Date _____ Time _____

CONDENSATE SAMPLES put in refrige. by _____ Date _____ Time _____

REMARKS

FIELD SAMPLE RECOVERY QUALITY CONTROL

Box No. 626 Assembly Date 7-31-96 Assembled By JUS
 Client LA. PACIFIC Job No. 15575
 Plant ROXBORO O&B City/State ROXBORO, N.C.
 Sampling Loc. RTD #1 OUTLET Method 5/202
 Individual Tare Of Reagent 300 (Ml) (gm) Of DI H₂O
 Individual Tare Of Reagent _____ (Ml) (gm) Of _____
 Individual Tare Of Reagent _____ (Ml) (gm) Of _____
 Individual Tare Of Sil. Gel ~200 Gm _____

other (specify)

Run Number	Run Date	<u>Filter or XAD</u> Number	Tare, grams	Liquid Tare at Mark? @	Init.	Sample Recov. Date	%Sil. Gel Spent	Liquid Level Marked?	Init.
SI-M5/202-1	8/9	TGF425	0.4882	✓	gsc	8/9	30	✓	gsc
				Filter Appearance* <u>Brown</u>					
				Reagents Appearance* <u>CLEAR</u>					
SI-M5/202-2	8/9	TGF424	0.4875	✓	gsc	8/12	30	✓	gsc
				Filter Appearance* <u>Brown</u>					
				Reagents Appearance* <u>Clear</u>					
SI-M5/202-3	8/9	E3215	0.4753	✓	gsc	8/12	30	✓	gsc
				Filter Appearance* <u>Brown</u>					
				Reagents Appearance* <u>Clear</u>					
				Filter Appearance* _____					
				Reagents Appearance* _____					

* Use "REMARKS" section if needed.

@ All liquid levels at mark? (check) YES ☒ NO ☐ (estimate loss if not at mark; use "REMARKS" section).

REMARKS _____

RECORD OF CUSTODY, CONTAINER No. 629

Client LA. PACIFIC

Job No. 15575

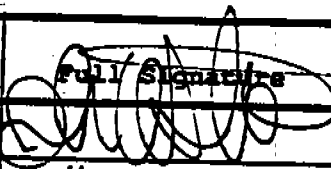
Plant Name Roxboro O&B

City/State Roxboro, N.C.

Sampling Method(s) 5/202

(EPA, NIOSH, etc.)

Container Type (v) Reagent Box ☒ Cooler ☐ Other (specify) ☐

Seal No. or "PC"	Date	Time	*	Full Signature	Reason for Breaking Seal**
1629	7/31	1101	S		
	8/6	1200	B	Jeffrey S. Corbett	LABEL
3771	8/12	1110	S	John E. Mink	
			B		
			S		
			B		
			S		
			B		
			S		
			B		
			S		
			B		
			S		
			B		

PC = Personal Custody

* S = Sealed By; B = Broken By

** Use "REMARKS" Section if more space needed.

Container Received by Entropy Sample Custodian

Sam Oley
Signature

8/14/96
Date

1400
Time

Seal Intact? **

Yes ☒ No ☐ NA ☐

As Applicable:

All liquid levels at mark (✓) YES ☐ NO ☐ (Estimate loss if not at mark; describe in "REMARKS")

As Applicable:

TUBE SAMPLES put in freezer by _____ Date _____ Time _____

CONDENSATE SAMPLES put in refrige. by _____ Date _____ Time _____

REMARKS

73

FIELD SAMPLE RECOVERY QUALITY CONTROL

Box No. 629 Assembly Date 7-31-96 Assembled By JUS
 Client LA. PACIFIC Job No. 15575
 Plant ROXBORO OSB City/State ROXBORO, N.C.
 Sampling Loc. N/A Method 5/202
 Individual Tare Of Reagent 300 (Ml) (~~gm~~) Of DI H₂O
 Individual Tare Of Reagent _____ (Ml) (gm) Of _____
 Individual Tare Of Reagent _____ (Ml) (gm) Of _____
 Individual Tare Of Sil. Gel ~200 Gm _____

other (specify) _____

Run Number	Run Date	Filter or XAD		Liquid Tare at Mark? @	Init.	Sample Recov. Date	%Sil. Gel Spent	Liquid Level Marked?	Init.
		Number	Tare, grams						
REAGENT BLANKS	8/6	—	—	✓	gsc	8/6	—	✓	gsc
				Filter Appearance*					
				Reagents Appearance*					
				Filter Appearance*					
				Reagents Appearance*					
				Filter Appearance*					
				Reagents Appearance*					
				Filter Appearance*					
				Reagents Appearance*					

* Use "REMARKS" section if needed.

@ All liquid levels at mark? (check) YES ___ NO ___ (estimate loss if not at mark; use "REMARKS" section).

REMARKS _____

APPENDIX B. FIELD DATA

2. RTO No. 2 Stack

**a. Carbon Monoxide, Nitrogen Oxides,
and Total Hydrocarbons**

CALIBRATION SUMMARY

SOURCE: Louisiana-Pacific Corp - Roxboro OSB Plant

REASON: direct calibration error check

DATE : 08-09-1996 TIME: 07:21 - 07:41

A/D CHAN	MONITOR DESCRIPTION	UNITS	GAS VALUE	MONITOR RESPONSE
7	RTO-2S	ppmNOx	0.0	0.3
7	RTO-2S	ppmNOx	46.4	46.3
7	RTO-2S	ppmNOx	82.7	84.2
4	RTO-2S	ppm CO	0.0	0.1
4	RTO-2S	ppm CO	60.6	61.1
4	RTO-2S	ppm CO	150.7	150.0
4	RTO-2S	ppm CO	301.4	295.0
4	RTO-2S	ppm CO	448.0	451.1
5	RTO-2S	% O2	0.00	0.10
5	RTO-2S	% O2	12.06	12.09
5	RTO-2S	% O2	20.22	19.85
1	RTO-2S	% CO2	0.00	0.10
1	RTO-2S	% CO2	11.02	11.00
1	RTO-2S	% CO2	16.92	16.73

CALIBRATION SUMMARY

SOURCE: Louisiana-Pacific Corp - Roxboro OSB Plant

REASON: pre run 1 system bias check

DATE : 08-09-1996 TIME: 10:43 - 10:50

A/D CHAN	MONITOR DESCRIPTION	UNITS	GAS VALUE	MONITOR RESPONSE
7	RTO-2S	ppmNOx	0.0	1.4
7	RTO-2S	ppmNOx	46.4	47.5
4	RTO-2S	ppm CO	0.0	1.0
4	RTO-2S	ppm CO	60.6	59.9
5	RTO-2S	% O2	0.00	0.12
5	RTO-2S	% O2	12.06	11.88
1	RTO-2S	% CO2	0.00	0.08
1	RTO-2S	% CO2	11.02	10.90
3	RTO-2S	ppm C	0.0	0.5
3	RTO-2S	ppm C	30.0	30.5
3	RTO-2S	ppm C	52.6 51.6	51.0
3	RTO-2S	ppm C	82.6	82.9

CALIBRATION SUMMARY

SOURCE: Louisiana-Pacific Corp - Roxboro OSB Plant

REASON: ^{Calibration and} POST RUN 3 PRE RUN 4 SYSTEM BIAS CHECK

DATE : 08-09-1996 TIME: 15:51 - 15:58

A/D CHAN	MONITOR DESCRIPTION	UNITS	GAS VALUE	MONITOR RESPONSE
7	RTOS-2	ppmNOx	0.0	2.3
7	RTOS-2	ppmNOx	46.4	45.6
4	RTOS-2	ppm CO	0.0	0.5
4	RTOS-2	ppm CO	60.6	60.4
5	RTOS-2	% O2	0.00	0.18
5	RTOS-2	% O2	12.06	11.93
1	RTOS-2	% CO2	0.00	0.33
1	RTOS-2	% CO2	11.02	10.81
3	RTOS-2	ppm C	0.0	1.0
3	RTOS-2	ppm C	30.0	30.0

Louisiana-Pacific Corp - Roxboro OSB Plant 08-09-1996

	CHAN 7	CHAN 4	CHAN 5	CHAN 1	CHAN 3
	RTOS-2	RTOS-2	RTOS-2	RTOS-2	RTOS-2
TIME	ppmNOx	ppm CO	% O2	% CO2	ppm C
17:21	39.0	139.1	16.06	3.92	18.7
17:22	40.4	92.5	16.00	3.97	11.9
17:23	39.9	22.7	15.99	3.98	10.4
17:24	39.9	42.2	15.96	4.00	9.6
17:25	39.1	48.8	15.91	4.03	11.4
17:26	37.9	99.5	15.89	4.05	19.7
17:27	39.0	135.3	15.91	4.05	12.2
17:28	39.9	39.5	15.86	4.08	9.4
17:29	39.8	36.0	15.85	4.09	11.5
17:30	39.6	44.4	15.74	4.18	11.1
17:31	39.0	81.2	15.72	4.19	13.6
17:32	38.5	157.7	15.80	4.13	19.2
17:33	40.2	54.9	15.74	4.18	9.7
17:34	40.0	33.1	15.72	4.22	12.4
17:35	39.7	42.1	15.70	4.22	14.2
17:36	38.0	67.2	15.75	4.17	14.3
17:37	38.5	156.1	15.77	4.15	20.0
17:38	39.8	96.7	15.77	4.15	12.6
17:39	40.4	24.7	15.78	4.13	11.7
17:40	40.1	45.1	15.83	4.10	11.0
17:41	39.9	51.0	15.77	4.19	13.5
17:42	38.5	116.0	15.48	4.48	21.6
17:43	40.4	149.0	15.50	4.47	12.7
17:44	41.4	40.4	15.55	4.39	10.9
17:45	40.4	46.3	15.59	4.35	11.8
17:46	39.8	49.0	15.70	4.20	10.7
17:47	39.8	65.4	16.09	3.90	13.3
17:48	39.9	126.9	16.14	3.89	15.5
17:49	40.5	41.8	16.08	3.92	9.1
17:50	40.6	28.2	16.04	3.95	11.5

AVERAGE VALUES FOR THE LAST 30 MINUTES

17:50	39.7	72.4	15.82	4.12	13.2
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COMMENTS: END PART 1 COMPLIANCE RUN 1

Louisiana-Pacific Corp - Roxboro OSB Plant 08-09-1996

	CHAN 7	CHAN 4	CHAN 5	CHAN 1	CHAN 3
	RTOS-2	RTOS-2	RTOS-2	RTOS-2	RTOS-2
TIME	ppmNOx	ppm CO	% O2	% CO2	ppm C
17:56	39.7	41.3	15.97	3.99	10.7
17:57	39.6	41.5	15.90	4.04	12.2
17:58	38.3	93.0	15.91	4.04	18.9
17:59	40.1	111.7	15.91	4.04	10.9
18:00	39.5	26.3	15.87	4.06	10.9
18:01	39.6	39.4	15.86	4.07	11.1
18:02	38.8	39.7	15.87	4.07	10.6
18:03	38.5	63.6	15.91	4.04	15.2
18:04	38.4	125.3	15.96	4.02	14.7
18:05	39.9	41.9	15.87	4.08	8.4
18:06	39.8	31.4	15.91	4.05	11.1
18:07	39.8	30.8	15.88	4.06	10.8
18:08	38.9	46.0	15.84	4.09	11.3
18:09	38.6	128.4	15.88	4.06	17.7
18:10	39.3	61.3	15.91	4.04	10.4
18:11	39.2	21.1	15.94	4.02	10.8
18:12	39.5	38.0	15.87	4.07	10.5
18:13	38.7	38.6	15.84	4.08	12.4
18:14	37.6	91.3	15.92	4.02	18.0
18:15	38.7	102.4	15.93	4.02	10.7
18:16	38.9	23.1	16.02	3.95	10.6
18:17	38.7	34.1	16.03	3.95	9.9
18:18	38.6	37.1	16.03	3.94	10.1
18:19	37.2	57.6	16.07	3.91	16.4
18:20	38.3	117.7	16.15	3.86	12.8
18:21	38.8	28.7	16.23	3.80	9.2
18:22	38.7	23.0	16.24	3.79	11.4
18:23	38.4	23.1	16.30	3.73	11.1
18:24	37.7	35.5	16.40	3.67	10.7
18:25	37.4	100.6	16.42	3.66	17.2

AVERAGE VALUES FOR THE LAST 30 MINUTES

18:25	38.8	56.4	16.00	3.97	12.2
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COMMENTS: END COMPLIANCE RUN 1
RTOS-2

CALIBRATION SUMMARY

SOURCE: Louisiana-Pacific Corp - Roxboro OSB Plant

REASON: POST COMPLIANCE RUN 1 (RUN 4) SYSTEM BIAS CHECK

DATE : 08-09-1996 TIME: 18:25 - 18:29

A/D CHAN	MONITOR DESCRIPTION	UNITS	GAS VALUE	MONITOR RESPONSE
7	RTOS-2	ppmNOx	0.0	2.4
7	RTOS-2	ppmNOx	46.4	47.8
4	RTOS-2	ppm CO	0.0	0.8
4	RTOS-2	ppm CO	60.6	60.4
5	RTOS-2	% O2	0.00	0.11
5	RTOS-2	% O2	12.06	11.83
1	RTOS-2	% CO2	0.00	0.05
1	RTOS-2	% CO2	11.02	10.85
3	RTOS-2	ppm C	0.0	1.7
3	RTOS-2	ppm C	30.0	32.4

Louisiana-Pacific Corp - Roxboro OSB Plant 08-09-1996

	CHAN 7	CHAN 4	CHAN 5	CHAN 1	CHAN 3
	RTOS-2	RTOS-2	RTOS-2	RTOS-2	RTOS-2
TIME	ppmNOx	ppm CO	% O2	% CO2	ppm C
18:46	36.5	83.8	16.33	3.72	15.0
18:47	37.7	70.9	16.37	3.69	9.4
18:48	37.7	15.2	16.30	3.73	10.0
18:49	37.8	29.0	16.31	3.73	9.5
18:50	37.6	26.2	16.29	3.74	10.4
18:51	36.6	55.3	16.32	3.73	17.8
18:52	37.6	93.4	16.34	3.71	11.6
18:53	38.0	25.8	16.29	3.75	9.4
18:54	37.9	23.7	16.32	3.73	12.1
18:55	38.3	20.4	16.22	3.81	10.6
18:56	37.3	43.3	16.18	3.82	12.3
18:57	37.2	108.4	16.14	3.86	18.1
18:58	37.5	39.8	16.12	3.87	10.5
18:59	37.8	21.7	16.12	3.88	12.3
19:00	37.8	29.1	16.07	3.91	12.3
19:01	37.0	34.1	16.09	3.89	13.1
19:02	36.2	99.0	16.11	3.88	17.9
19:03	37.8	69.4	16.10	3.89	11.0
19:04	37.2	16.7	16.07	3.91	12.9
19:05	37.4	34.5	16.09	3.90	11.5
19:06	37.1	29.7	16.02	3.94	12.5
19:07	35.8	62.7	16.05	3.92	19.1
19:08	37.3	97.6	16.16	3.85	12.8
19:09	37.6	26.9	16.18	3.83	11.3
19:10	37.7	26.6	16.20	3.82	13.3
19:11	37.3	22.0	16.08	3.90	12.3
19:12	36.8	43.8	16.12	3.87	13.9
19:13	36.7	95.0	16.21	3.83	17.5
19:14	37.6	37.0	16.14	3.87	11.9
19:15	37.0	23.7	16.13	3.88	13.8

AVERAGE VALUES FOR THE LAST 30 MINUTES

19:15	37.3	46.8	16.18	3.83	12.9
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COMMENTS: END PART 1 COMPLIANCE RUN 2
RTOS-2

Louisiana-Pacific Corp - Roxboro OSB Plant 08-09-1996

	CHAN 7	CHAN 4	CHAN 5	CHAN 1	CHAN 3
	RTOS-2	RTOS-2	RTOS-2	RTOS-2	RTOS-2
TIME	ppmNOx	ppm CO	% O2	% CO2	ppm C
19:26	37.2	27.7	16.22	3.81	13.4
19:27	36.7	23.4	16.21	3.83	12.9
19:28	35.8	46.5	16.19	3.84	14.5
19:29	36.0	99.8	16.24	3.80	18.3
19:30	36.8	36.5	16.21	3.82	12.1
19:31	36.9	21.9	16.23	3.80	13.7
19:32	37.0	23.0	16.19	3.84	13.7
19:33	35.9	34.2	16.17	3.85	13.8
19:34	35.3	87.3	16.23	3.81	18.0
19:35	36.0	60.9	16.18	3.85	13.7
19:36	36.2	14.9	16.15	3.87	13.2
19:37	36.2	27.6	16.12	3.89	12.6
19:38	35.8	26.1	16.12	3.89	13.9
19:39	34.5	57.1	16.15	3.86	18.3
19:40	35.4	89.8	16.14	3.88	13.9
19:41	35.6	25.1	16.17	3.85	12.9
19:42	35.7	24.8	16.22	3.81	12.8
19:43	35.8	22.4	16.16	3.85	12.7
19:44	35.3	40.2	16.22	3.80	15.3
19:45	35.6	97.3	16.25	3.80	16.9
19:46	36.3	33.0	16.23	3.81	11.6
19:47	36.8	19.4	16.27	3.77	13.2
19:48	37.0	17.4	16.24	3.79	13.2
19:49	36.4	28.8	16.29	3.76	12.9
19:50	36.0	84.7	16.35	3.72	17.2
19:51	36.4	51.2	16.33	3.74	12.1
19:52	36.4	13.3	16.34	3.73	12.2
19:53	36.3	23.2	16.35	3.71	11.6
19:54	35.5	23.3	16.39	3.69	12.9
19:55	34.5	52.1	16.44	3.66	16.9

AVERAGE VALUES FOR THE LAST 30 MINUTES

19:55	36.0	41.1	16.23	3.80	14.0
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COMMENTS: END COMPLIANCE RUN 2
RTOS-2

CALIBRATION SUMMARY

SOURCE: Louisiana-Pacific Corp - Roxboro OSB Plant

REASON: POST COMPLIANCE RUN 2 (RUN 5) SYSTEM BIAS CHECK

DATE : 08-09-1996 TIME: 19:55 - 20:00

A/D CHAN	MONITOR DESCRIPTION	UNITS	GAS VALUE	MONITOR RESPONSE
7	RTOS-2	ppmNOx	0.0	2.1
7	RTOS-2	ppmNOx	46.4	48.4
4	RTOS-2	ppm CO	0.0	1.0
4	RTOS-2	ppm CO	60.6	60.4
5	RTOS-2	% O2	0.00	0.12
5	RTOS-2	% O2	12.06	11.81
1	RTOS-2	% CO2	0.00	0.14
1	RTOS-2	% CO2	11.02	10.82
3	RTOS-2	ppm C	0.0	4.5
3	RTOS-2	ppm C	30.0	33.3

Louisiana-Pacific Corp - Roxboro OSB Plant 08-09-1996

	CHAN 7	CHAN 4	CHAN 5	CHAN 1	CHAN 3
	RTOS-2	RTOS-2	RTOS-2	RTOS-2	RTOS-2
TIME	ppmNOx	ppm CO	% O2	% CO2	ppm C
20:21	37.4	21.6	16.76	3.60	10.6
20:22	37.3	75.9	16.79	3.59	14.6
20:23	38.2	28.6	16.80	3.58	9.6
20:24	37.9	9.6	16.83	3.55	10.1
20:25	38.6	14.8	16.80	3.57	10.2
20:26	37.4	15.3	16.80	3.58	10.3
20:27	36.5	56.3	16.79	3.57	14.2
20:28	37.8	59.5	16.81	3.57	9.8
20:29	38.0	8.8	16.72	3.63	9.7
20:30	38.4	18.6	16.71	3.65	9.4
20:31	37.9	16.5	16.66	3.68	9.1
20:32	37.1	36.3	16.65	3.70	15.6
20:33	38.4	97.0	16.62	3.74	11.4
20:34	39.5	25.2	16.58	3.75	8.4
20:35	39.3	19.6	16.59	3.74	10.8
20:36	39.3	16.7	16.62	3.72	10.0
20:37	38.4	30.2	16.67	3.68	10.4
20:38	38.3	94.0	16.79	3.60	15.4
20:39	39.3	35.6	16.75	3.62	9.9
20:40	39.9	13.0	16.77	3.60	10.4
20:41	40.1	20.9	16.81	3.58	10.4
20:42	39.3	18.5	16.85	3.54	10.3
20:43	38.7	65.6	16.89	3.51	14.5
20:44	40.4	62.2	16.85	3.54	10.2
20:45	40.1	9.6	16.86	3.53	10.2
20:46	40.1	20.8	16.90	3.50	9.9
20:47	39.5	17.1	16.83	3.56	9.4
20:48	38.7	35.5	16.84	3.55	14.8
20:49	39.8	80.7	16.83	3.57	10.4
20:50	40.2	17.3	16.77	3.61	9.2

AVERAGE VALUES FOR THE LAST 30 MINUTES

20:50	38.7	34.7	16.76	3.61	11.0
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COMMENTS: END PART 1 COMPLIANCE RUN 3
RTOS-2

Louisiana-Pacific Corp - Roxboro OSB Plant 08-09-1996

	CHAN 7	CHAN 4	CHAN 5	CHAN 1	CHAN 3
	RTOS-2	RTOS-2	RTOS-2	RTOS-2	RTOS-2
TIME	ppmNOx	ppm CO	% O2	% CO2	ppm C
20:56	40.4	11.7	16.76	3.62	9.8
20:57	40.3	16.8	16.75	3.63	10.1
20:58	39.0	18.9	16.76	3.63	10.3
20:59	38.9	71.6	16.84	3.57	14.3
21:00	40.6	58.2	16.80	3.60	10.4
21:01	40.9	8.6	16.81	3.57	10.4
21:02	41.0	19.6	16.87	3.54	10.1
21:03	40.9	15.7	16.86	3.55	10.1
21:04	39.5	42.2	16.80	3.60	15.9
21:05	39.7	88.9	16.80	3.61	11.7
21:06	41.2	18.8	16.75	3.63	10.1
21:07	40.1	17.3	16.78	3.62	11.1
21:08	39.8	14.2	16.76	3.63	10.1
21:09	38.7	32.4	16.71	3.67	11.6
21:10	38.7	96.3	16.70	3.68	16.1
21:11	39.2	31.0	16.69	3.68	10.1
21:12	39.5	12.2	16.70	3.67	10.8
21:13	39.6	13.7	16.73	3.66	10.8
21:14	39.3	20.3	16.70	3.67	11.2
21:15	38.5	78.1	16.76	3.63	14.3
21:16	39.1	50.1	16.80	3.60	10.8
21:17	39.0	6.5	16.92	3.50	10.5
21:18	38.5	14.9	17.06	3.40	9.9
21:19	37.7	10.3	17.07	3.39	10.1
21:20	36.8	32.2	17.10	3.37	14.2
21:21	38.4	63.3	17.20	3.30	9.5
21:22	38.5	8.7	17.19	3.29	9.5
21:23	38.1	11.7	17.22	3.28	9.7
21:24	37.4	6.4	17.21	3.28	9.3
21:25	36.8	19.8	17.17	3.32	10.7

AVERAGE VALUES FOR THE LAST 30 MINUTES

21:25	39.2	30.3	16.88	3.54	11.1
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COMMENTS: END COMPLIANCE RUN 3

CALIBRATION SUMMARY

SOURCE: Louisiana-Pacific Corp - Roxboro OSB Plant

REASON: POST COMPLIANCE RUN 3 RTOS-2

DATE : 08-09-1996 TIME: 21:25 - 21:29

A/D CHAN	MONITOR DESCRIPTION	UNITS	GAS VALUE	MONITOR RESPONSE
7	RTOS-2	ppmNOx	0.0	1.9
7	RTOS-2	ppmNOx	46.4	47.8
4	RTOS-2	ppm CO	0.0	0.5
4	RTOS-2	ppm CO	60.6	60.4
5	RTOS-2	% O2	0.00	0.13
5	RTOS-2	% O2	12.06	11.91
1	RTOS-2	% CO2	0.00	0.16
1	RTOS-2	% CO2	11.02	11.14
3	RTOS-2	ppm C	0.0	2.7
3	RTOS-2	ppm C	30.0	31.2

APPENDIX B. FIELD DATA

2. RTO No. 2 Stack

**b. Filterable and Condensible
Particulate**

SAMPLING DATA - METHOD(S) 5

CLIENT Louisiana - Pacific
 PLANT Louisiana - Pacific
 CITY/STATE Roxboro NC
 SAMPLING LOC. RTO - #2
 BAROMETRIC PRESSURE, IN. HG 29.80 STATIC PRESSURE, IN. H₂O -.32
 LEAK J, VACUUM IN. HG 15" 10"
 LEAK RATE, CFM 0.000 0.000
 RUN NO. 52-MS/200-1
 DATE 8-9-96
 TIME START 1720
 TIME FINISH 1825
 TEST PERSONNEL DDH, WGM
 POSTTEST POS PRESS LEAK / X? 0

* CONDUCT POSTTEST POSITIVE PRESSURE LEAK CHECK FOLLOWING THE LAST RUN PER LOCATION. FOR OTHER RUNS, ENTER "N/A".

EQUIPMENT CHECKS		EQUIPMENT I.D. NUMBERS		LEAK CHECKS	
☒ PITOT, PRETEST	REAGENT BOX <u>628</u>	METER BOX <u>N-24</u>	<u>.9978</u>	B	B
☒ PITOT, POSTTEST	PITOT <u>9-13</u>	TC <u>.84</u>	NOZ'L <u>1812</u>	E	E
☒ NOZZLE, PRE/POST	TC READOUT <u>F122</u>	TC PROBE <u>Q133</u>	UNBILICAL <u>01560</u>	B	B
☒ TC <u>68</u> °F PRE	SAMPL'G BOX <u>109</u>	ORSAT PUMP <u>24</u>	TEDLAR BAG <u>N/A</u>	E	E
☒ TC <u>69</u> °F POST				B	B
☒ ORSAT SYSTEM				E	E
		MONOGRAPH DATA			
FILTER/XAD	TARE WT.	DELTA-H ₂		Fvites, %	
<u>18</u>		<u>1.839</u>		<u>1031</u>	
<u>E 3216</u>	<u>.4781</u>	METER TEMP.	<u>100</u>	YGR	
		EST. H ₂ O	<u>15</u>	<u>1031</u>	
		"C" FACTOR	<u>0.858</u>	*5% OF CAL'D T?	
		STACK TEMP.	<u>260</u>	(Y) (N)	
		REF DELTA-P	<u>0.365</u>		
		"K" FACTOR	<u>5.039</u>		

LINE	SAMPLE POINT	CLOCK TIME, MINUTES	DRY GAS METER READING, CUBIC FEET	PITOT READING, IN. H ₂ O	GAS METER TEMP., °F	STACK TEMP., °F	ORIFICE SETTING, IN. H ₂ O		GAUGE VACUUM, IN. HG	GAS TEMPERATURES, °F		
							ACTUAL	IDEAL		FILTER *	IMPING. EXIT	PROBE OR COND. EXIT**
1	A 1	0	494.800	.35	90	227	1.83	1.83	2	230	48	N/A
2	2	2 1/2	496.515	.42	100	277	2.07	2.07	3	260	49	
3	3	5	498.410	.43	100	277	2.11	2.11	3	260	50	
4	4	7 1/2	500.265	.35	102	281	1.72	1.72	4	260	50	
5	5	10	502.170	.38	104	282	1.87	1.87	4	260	50	
6	6	12 1/2	504.010	.47	105	286	2.30	2.30	4	260	51	
7	7	15	506.030	.48	105	287	2.35	2.35	4	260	50	
8	8	17 1/2	508.100	.50	106	290	2.44	2.44	4	260	51	
9	9	20	510.320	.75	106	290	3.66	3.66	4	260	51	
10	10	22 1/2	512.750	.70	106	290	3.40	3.40	5	260	51	
11	11	25	515.470	.70	106	283	3.44	3.44	5	260	51	
12	12	27 1/2	518.110	.75	108	286	3.68	3.68	5	260	49	
13	13	30	520.710	.50	109	287	2.45	2.45	4	260	49	
14	14	32 1/2	523.21	.55	109	281	2.73	2.73	4	260	49	
15	3	35	525.210	.50	106	270	2.50	2.50	5	260	50	
16	4	37 1/2	527.450	.45	106	265	2.27	2.27	5	260	49	
17	5	40	529.640	.48	106	283	2.36	2.36	5	260	48	
18	6	42 1/2	531.650	.65	106	286	3.19	3.19	4	260	49	
19	7	45	534.000	.70	106	281	3.45	3.45	5	260	50	
20	8	47 1/2	536.545	.70	106	283	3.44	3.44	5	260	51	
21	9	50	539.030	.70	106	286	3.42	3.42	5	260	50	
22	10	52 1/2	541.910	.75	106	281	3.69	3.69	5	260	50	
23	11	55	544.210	.75	106	282	3.69	3.69	5	260	51	
24	12	57 1/2	547.075	.76	106	282	3.72	3.72	5	260	50	
25		60	549.630									
FINAL												

FINAL

* FILTER EXIT for NJ Method 1. FILTER BOX for all others.
 ** PROBE EXIT & / (probe & filter heat off) apply to NJ Method 1. COND EXIT applies if sampling train has a condenser.

60 54.830 .5616 1048 2822 28183
 Min. (θ) v_m (√ΔP)² t_m t_s ΔH

SAMPLING DATA - METHOD(S) 5

CLIENT Louisiana - Pacific Corporation

PLANT Louisiana - Pacific

CITY/STATE Roxboro, North Carolina

RUN NO. 52-MS/202-2

JOB NO. 15575

DATE 8-9-96

SAMPLING LOC. RTO #2

TIME START 1845

BAROMETRIC PRESSURE, IN. HG 29.50

STATIC PRESSURE, IN. H₂O - .30

TIME FINISH 1955

LEAK J, VACUUM IN. HG 15" 10"

TEST PERSONNEL DDH, CCH, WIEH

LEAK RATE, CFM 0.000 0.000

POSTTEST POS PRESS LEAK / OK?

• CONDUCT POSTTEST POSITIVE PRESSURE LEAK CHECK FOLLOWING THE LAST RUN PER LOCATION. FOR OTHER RUNS, ENTER "N/A".

EQUIPMENT CHECKS		EQUIPMENT I.D. NUMBERS		LEAK CHECKS	
☒ PITOT, PRETEST	REAGENT BOX <u>628</u>	METER BOX <u>N-24</u>	<u>.9978</u>	B	B
☒ PITOT, POSTTEST	PITOT <u>9-9</u>	NOZ'L <u>1808</u>	DIA. <u>.208</u>	E	E
☒ NOZZLE, PRE/POST	TC READOUT <u>F122</u>	TC PROBE <u>R447</u>	UNBILICAL <u>0.126</u>	B	B
☒ TC <u>71</u> °F PRE	SAMPL'G BOX <u>212</u>	ORSAT PUMP <u>N/A</u>	TEDLAR BAG <u>2119</u>	E	E
☒ TC <u>71</u> °F POST				B	B
☒ ORSAT SYSTEM				E	E
		MONOGRAPH DATA			
FILTER/XAD	TARE WT.	DELTA-H ₂	<u>1.839</u>		
<u>F3217</u>	<u>.4783</u>	METER TEMP.	<u>100</u>		
		EST. 2H ₂ O	<u>15</u>		
		"C" FACTOR	<u>858</u>		
		STACK TEMP.	<u>260</u>		
		REF DELTA-P	<u>0.346</u>		
		"K" FACTOR	<u>5.317</u>		
		Fyrites, %	<u>1.034</u>		
		Y _{CO}	<u>1.034</u>		
		% OF CAL'D Y?	<u>(Y) (N)</u>		

L I N E	SAMPLE POINT	CLOCK TIME, MINUTES	DRY GAS METER READING, CUBIC FEET	PITOT READING, IN. H ₂ O	GAS METER TEMP., °F	STACK TEMP., °F	ORIFICE SETTING, IN. H ₂ O		GAUGE VACUUM, IN. HG	FILTER °	IMPING EXIT	GAS TEMPERATURES, °F		PROBE OR COND EXIT**	J
							ACTUAL	IDEAL				IMPING.	PROBE		
1	A 1	0	549.735	.48	98	279	2.48	2.48	2	250	49	N/A			
2	2	25	552.000	.50	99	279	2.58	2.58	2	260	50				
3	3	5	554.210	.42	98	278	2.16	2.16	2	260	50				
4	4	75	556.342	.47	96	287	2.39	2.39	2	260	50				
5	5	10	558.900	.49	96	280	2.51	2.51	6	260	51				
6	6	125	560.653	.49	96	280	2.48	2.48	10	260	51				
7	7	15	562.520	.60	96	290	3.03	3.03	12	260	50				
8	8	175	563.926	.64	98	286	3.26	3.26	12	260	51				
9	9	20	566.410	.75	99	286	3.82	3.82	10	260	51				
10	10	225	569.460	.70	102	284	3.59	3.59	8	260	51				
11	11	25	571.950	.70	102	287	3.58	3.58	8	260	51				
12	12	275	574.910	.70	103	287	3.59	3.59	8	260	51				
13	B 1	306	577.349	.37	100	287	1.89	1.89	6	260	51				
14	2	325	579.455	.37	100	287	1.89	1.89	6	260	51				
15	3	35	581.410	.38	100	274	1.98	1.98	5	260	51				
16	4	375	583.415	.45	102	280	2.33	2.33	5	260	50				
17	5	40	585.515	.30	102	283	1.55	1.55	5	260	50				
18	6	425	587.430	.40	102	287	2.06	2.06	5	260	51				
19	7	45	589.530	.65	103	286	3.35	3.35	5	260	51				
20	8	475	591.480	.68	103	283	3.51	3.51	6	260	50				
21	9	50	594.300	.75	104	288	3.85	3.85	6	260	51				
22	10	525	596.575	.76	104	288	3.89	3.89	8	260	51				
23	11	55	599.895	.75	104	285	3.86	3.86	8	260	51				
24	12	575	602.500	.75	104	285	3.86	3.86	8	260	52				
25		60	604.880												

FINAL

* FILTER EXIT for NJ Method 1. FILTER BOX for all others.

** PROBE EXIT & / (probe & filter heat off) apply to NJ Method 1. COND EXIT applies if sampling train has a condenser.

60 55.145 5543 100.5 284.4 2.895 92
Min. (8) Vm (ΔP)² tm ts ΔH

SAMPLING DATA - METHOD(S) 5/202

CLIENT Louisiana-Pacific

PLANT Louisiana-Pacific

CITY/STATE Boxboro, North Carolina

SAMPLING LOC. RTO #2

BAROMETRIC PRESSURE, IN. HG 29.50

STATIC PRESSURE, IN. H₂O -.31

LEAK V, VACUUM IN. HG 15" 1011

LEAK RATE, CFM 0.000 0.000

RUN NO. 52-M5/202-3

JOB NO. 15575 DATE 8-9-96

TIME START 2020

TIME FINISH 2125

TEST PERSONNEL DDH, WEM

POSTTEST POS PRESS LEAK / OK? ✓

• CONDUCT POSTTEST POSITIVE PRESSURE LEAK CHECK FOLLOWING THE LAST RUN PER LOCATION. FOR OTHER RUNS, ENTER "N/A".

EQUIPMENT CHECKS		EQUIPMENT I.D. NUMBERS		LEAK CHECKS	
☒ PITOT, PRETEST	REAGENT BOX <u>628</u>	METER BOX <u>N24</u>	V <u>.9978</u>	B	B
☒ PITOT, POSTTEST	PITOT <u>9-15</u>	NOZ'L <u>1814</u>	DIA. <u>.286</u>	E	E
☒ NOZZLE, PRE/POST	TC READOUT <u>F122</u>	TC PROBE <u>0137</u>	UMBILICAL <u>U126</u>	B	B
☒ TC <u>70</u> °F PRE	SAMPL'G BOX <u>109</u>	ORSAT PUMP <u>N/A</u>	TEDLAR BAG <u>N/A</u>	E	E
☒ TC <u>70</u> °F POST				B	B
☒ N/A ORSAT SYSTEM				E	E
		MONOGRAPH DATA			
FILTER/XAD	TARE WT.	DELTA-H ₂	METER TEMP.		
		<u>1.839</u>	<u>100</u>		
		EST. XH ₂ O	"C" FACTOR		
		<u>15</u>	<u>0.858</u>		
		STACK TEMP.	REF DELTA-P		
		<u>260</u>	<u>0.305</u>		
		"K" FACTOR			
		<u>5.039</u>			
				Evapites, %	Y ₀₂
					<u>1.010</u>
				±5% OF CAL'D Y ₇	
				(Y) ✓ (N) _____	

L I N E	SAMPLE POINT	CLOCK TIME, MINUTES	DRY GAS METER READING, CUBIC FEET	PITOT READING, IN. H ₂ O	GAS METER TEMP., °F	STACK TEMP., °F	ORIFICE SETTING, IN. H ₂ O ACTUAL IDEAL	GAUGE VACUUM, IN. HG	GAS TEMPERATURES, °F FILTER * IMPIG. OR COND EXIT **			✓
1	A1	0	605.035	.41	100	277	2.02 2.02	2	250	49	N/A	
2	2	2 1/2	606.840	.40	100	278	1.96 1.96	4	255	50		
3	3	5	608.955	.40	102	278	1.97 1.97	4	260	49		
4	4	7 1/2	610.940	.40	102	285	1.95 1.95	4	260	51		
5	5	10	612.940	.35	104	290	1.70 1.70	4	260	50		
6	6	12 1/2	614.938	.45	104	286	2.20 2.20	4	260	49		
7	7	15	616.825	.45	104	288	2.19 2.19	5	260	50		
8	8	17 1/2	618.841	.65	104	285	3.18 3.18	5	260	51		
9	9	20	621.180	.68	104	291	3.28 3.28	6	260	51		
10	10	22 1/2	623.765	.70	106	283	3.44 3.44	6	260	50		
11	11	25	626.390	.64	106	293	3.10 3.10	6	260	51		
12	12	27 1/2	629.180	.64	106	293	3.10 3.10	6	260	51		
13	B1	30/0	631.511	.48	104	284	2.20 2.20	6	260	50		
14	2	32 1/2	633.640	.49	105	280	2.42 2.42	6	260	50		
15	3	35	635.720	.60	105	293	2.91 2.91	6	260	51		
16	4	37 1/2	638.020	.50	106	280	2.47 2.47	6	260	50		
17	5	40	640.275	.60	106	292	2.92 2.92	6	260	51		
18	6	42 1/2	642.600	.60	106	280	2.96 2.96	6	260	50		
19	7	45	645.065	.60	106	286	2.94 2.94	6	260	50		
20	8	47 1/2	647.378	.66	107	284	3.25 3.25	6	260	48		
21	9	50	649.790	.67	107	282	3.30 3.30	6	260	49		
22	10	52 1/2	652.170	.70	108	294	3.4 3.4	6	260	50		
23	11	55	654.730	.70	108	282	3.45 3.45	6	260	51		
24	12	57 1/2	657.453	.70	108	285	3.44 3.44	6	260	51		
25		60	659.88									

FINAL

** PROBE EXIT & / (probe & filter heat off) apply to NJ Method 1. FILTER BOX for all others.

60 54.860 .5535 104.9 2855 2.7396 93

Min. (θ) Vm (√ΔP)² tm ts ΔH

MOISTURE ANALYTICAL RESULTS

Client LA. PACIFIC

Plant Name ROXBORO OSB

Job No. 15575

City/State ROXBORO, N.C.

Sampling Loc. RTO # 2 OUTLET

Run Number

52-MS/202-1

52-MS/202-2

52-MS/202-3

Sampling Date

8/9/96

8/9/96

8/9/96

Analysis Date

8/9/96

8/12/96

8/12/96

Analyst

JSK

JSK, TCM, LAS

JSK, TCM, LAS

Reagent 1 <u>(D₁ H₂O)</u>			
Final Weight, g	<u>1119.0</u>	<u>1098.0</u>	<u>983.5</u>
Tared Weight, g	<u>795.9</u>	<u>800.5</u>	<u>798.6</u>
Water Catch, g	<u>323.1</u>	<u>297.5</u>	<u>184.9</u>
Reagent 2 <u>()</u>			
Final Weight, g			
Tared Weight, g			
Water Catch, g			
Reagent 3 <u>()</u>			
Final Weight, g			
Tared Weight, g			
Water Catch, g			
CONDENSED WATER, g	<u>323.1</u>	<u>297.5</u>	<u>184.9</u>
Silica Gel			
Final Weight, g	<u>219.0</u>	<u>218.5</u>	<u>215.0</u>
Tared Weight, g	<u>200.5</u>	<u>203.2</u>	<u>199.4</u>
ADSORBED WATER, g	<u>18.5</u>	<u>15.3</u>	<u>15.6</u>
TOTAL WATER COLLECTED, g	<u>341.6</u>	<u>312.8</u>	<u>200.5</u>

Balance No. 56

Type ☒ Triple Beam

☐ Electronic

Reagent Box No. 628

Balance located in stable, draft-free area ☒ Yes ☐ No (If "No", explain below.)

Comments _____

94

RECORD OF CUSTODY, CONTAINER No. 628

Client LA. PACIFIC

Job No. 15575

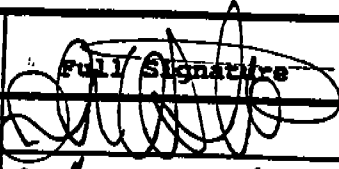
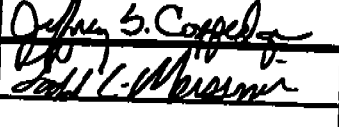
Plant Name ROXBORO OSB

City/State ROXBORO N.C.

Sampling Method(s) 5/202

(EPA, NIOSH, etc.)

Container Type (v) Reagent Box ☒ Cooler ☐ Other (specify) ☐

Seal No. or "PC"	Date	Time	*	Full Signature	Reason for Breaking Seal**
1845	7/31	1101	S		
	8/5	1350	B		
3707	8/12	1100	S		LABEL
			B		
			S		
			B		
			S		
			B		
			S		
			B		
			S		
			B		
			S		
			B		

PC = Personal Custody

* S = Sealed By; B = Broken By

** Use "REMARKS" Section if more space needed.

Container Received by Entropy Sample Custodian			Seal Intact?*	
<u>Sam Odey</u> Signature	<u>8/12/96</u> Date	<u>1355</u> Time	Yes ☒	No ☐ NA ☐

As Applicable:

All liquid levels at mark (✓) YES ☐ NO ☐ (Estimate loss if not at mark; describe in "REMARKS")

As Applicable:

TUBE SAMPLES put in freezer by _____ Date _____ Time _____

CONDENSATE SAMPLES put in refrige. by _____ Date _____ Time _____

REMARKS

FIELD SAMPLE RECOVERY QUALITY CONTROL

Box No. 628 Assembly Date 7-31-96 Assembled By JUS
 Client LA. PACIFIC Job No. 15575
 Plant ROXBORO OSB City/State ROXBORO, N.C.
 Sampling Loc. RTO #2 OUTLET Method 5/202
 Individual Tare Of Reagent 300 (Ml) (gm) Of D1 H₂O
 Individual Tare Of Reagent _____ (Ml) (gm) Of _____
 Individual Tare Of Reagent _____ (Ml) (gm) Of _____
 Individual Tare Of Sil. Gel ~200 Gm _____
 other (specify) _____

Run Number	Run Date	Filter or XAD Number	Tare, grams	Liquid Tare at Mark? @	Init.	Sample Recov. Date	%Sil. Gel Spent	Liquid Level Marked?	Init.
52-MS/202-1	8/9	E3216	0.4781	✓	gsc	8/9	30	✓	gsc
				Filter Appearance*					
				<u>Brown</u>					
				Reagents Appearance*					
				<u>CLEAR</u>					
52-MS/202-2	8/9	E3217	0.4783	✓	gsc	8/12	30	✓	gsc
				Filter Appearance*					
				<u>Dirty Brown</u>					
				Reagents Appearance*					
				<u>clear</u>					
52-MS/202-3	8/9	OE161	0.4846	✓	gsc	8/12	30	✓	gsc
				Filter Appearance*					
				<u>Brown</u>					
				Reagents Appearance*					
				<u>clear</u>					
				Filter Appearance*					
				Reagents Appearance*					

* Use "REMARKS" section if needed.

@ All liquid levels at mark? (check) YES _____ NO _____ (estimate loss if not at mark; use "REMARKS" section).

REMARKS _____

APPENDIX B. FIELD DATA

3. RTO No. 3 Stack

**a. Carbon Monoxide, Nitrogen Oxides,
and Total Hydrocarbons**

7E

98

CALIBRATION SUMMARY

SOURCE: LOUISIANA PACIFIC

REASON: CALIBRATION ERROR CHECK

DATE : 08-06-1996 TIME: 08:29 - 08:46

A/D CHAN	MONITOR DESCRIPTION	UNITS	GAS VALUE	MONITOR RESPONSE
9	STACK	ppmNOX	0.0	0.4
9	STACK	ppmNOX	47.1	47.0
9	STACK	ppmNOX	82.2	83.4
10	STACK	ppmCO	0.0	-0.1
10	STACK	ppmCO	30.1	28.2
10	STACK	ppmCO	59.4	57.9
10	STACK	ppmCO	90.1	91.0
11	STACK	%O2	0.00	0.13
11	STACK	%O2	12.26	12.38
11	STACK	%O2	21.30	21.31
12	STACK	%CO2	0.00	0.03
12	STACK	%CO2	11.03	11.02
12	STACK	%CO2	17.40	17.61

SGH
8/6/96

CALIBRATION SUMMARY

SOURCE: LOUISIANA PACIFIC

REASON: PRE RUN 1 SYSTEM CAL

DATE : 08-06-1996 TIME: 09:18 - 10:01

A/D CHAN	MONITOR DESCRIPTION	UNITS	GAS VALUE	MONITOR RESPONSE
9	STACK	ppmNOX	0.0	0.1
9	STACK	ppmNOX	47.1	45.5
10	STACK	ppmCO	0.0	-0.1
10	STACK	ppmCO	30.1	27.4
11	STACK	%O2	0.00	0.17
11	STACK	%O2	12.26	12.22
12	STACK	%CO2	0.00	0.03
12	STACK	%CO2	11.03	10.85
7	STACK	ppmTHC	0.0	0.5
7	STACK	ppmTHC	30.1	30.7
7	STACK	ppmTHC	51.2	52.8
7	STACK	ppmTHC	84.3	84.6
14	INLET	ppmTHC	296.0	292.4

Salt
8/6/96

CALIBRATION SUMMARY

SOURCE: LOUISIANA PACIFIC

REASON: PRE RUN 1 SYSTEM CAL

DATE : 08-06-1996 TIME: 10:27 - 10:32

A/D CHAN	MONITOR DESCRIPTION	UNITS	GAS VALUE	MONITOR RESPONSE
14	INLET	ppmTHC	0.0	0.6
14	INLET	ppmTHC	296.0	295.2
14	INLET	ppmTHC	518.4	518.4
14	INLET	ppmTHC	841.8	842.3

501 101

SGA
8/6/96

LOUISIANA PACIFIC

08-06-1996

	CHAN 9 STACK	CHAN10 STACK	CHAN11 STACK	CHAN12 STACK	CHAN 7 STACK	CHAN14 INLET
TIME	ppmNOX	ppmCO	%O2	%CO2	ppmTHC	ppmTHC
11:26	1.9	2.0	20.31	0.35	3.0	157.5
11:27	2.7	6.7	20.24	0.42	10.8	169.1
11:28	5.3	5.5	20.18	0.48	11.6	225.7
11:29	6.4	2.7	20.22	0.42	7.6	243.4
11:30	3.1	1.3	20.28	0.35	3.7	225.7
11:31	1.9	1.0	20.30	0.34	3.0	197.8
11:32	2.2	4.7	20.24	0.40	9.2	190.5
11:33	3.1	7.8	20.20	0.44	12.1	206.9
11:34	6.5	3.3	20.18	0.47	10.3	262.2
11:35	4.7	0.9	20.26	0.37	3.5	241.3
11:36	2.4	0.9	20.29	0.34	3.5	212.7
11:37	2.0	3.6	20.28	0.35	6.6	191.5
11:38	2.6	7.3	20.21	0.42	11.3	193.0
11:39	4.5	6.8	20.19	0.45	11.3	230.8
11:40	7.4	1.4	20.21	0.42	4.5	251.3

AVERAGE VALUES FOR THE LAST 15 MINUTES

11:40	3.8	3.7	20.24	0.40	7.5	213.3
11:41	3.6	0.6	20.28	0.34	3.3	226.7
11:42	2.1	3.8	20.29	0.34	5.0	201.6
11:43	2.1	8.9	20.25	0.38	12.0	187.4
11:44	2.9	7.2	20.20	0.44	12.2	193.0
11:45	5.1	4.5	20.19	0.45	5.7	238.0

COMMENTS: INTERRUPT FOR PLANT PROBLEMS

LOUISIANA PACIFIC

08-06-1996

TIME	CHAN 9 STACK ppmNOX	CHAN10 STACK ppmCO	CHAN11 STACK %O2	CHAN12 STACK %CO2	CHAN 7 STACK ppmTHC	CHAN14 INLET ppmTHC
13:46	2.5	3.8	20.21	0.33	4.4	96.8
13:47	2.5	0.8	20.21	0.34	3.0	99.6
13:48	3.5	1.4	20.16	0.39	3.6	107.5
13:49	5.1	4.3	20.10	0.45	10.5	142.2
13:50	6.3	3.8	20.10	0.42	12.7	121.3
13:51	3.3	5.5	20.18	0.34	6.6	109.2
13:52	2.2	0.9	20.20	0.32	4.3	104.4
13:53	2.5	0.9	20.18	0.35	3.7	108.3
13:54	3.4	5.1	20.12	0.42	11.7	118.9
13:55	6.6	2.7	20.06	0.47	12.8	156.5
13:56	5.6	3.3	20.13	0.38	8.9	122.3
13:57	2.9	1.6	20.19	0.33	4.7	117.2
13:58	2.3	0.6	20.20	0.32	4.1	112.9
13:59	2.8	3.5	20.16	0.37	9.2	117.5
14:00	3.8	7.0	20.10	0.43	12.4	132.3

AVERAGE VALUES FOR THE LAST 15 MINUTES

14:00	3.7	3.0	20.15	0.38	7.5	117.8
14:01	7.2	2.8	20.07	0.46	11.3	155.6
14:02	5.1	0.7	20.15	0.36	4.4	128.2
14:03	2.7	0.7	20.19	0.33	4.3	121.1
14:04	2.4	3.2	20.18	0.34	7.1	119.1
14:05	3.0	6.2	20.12	0.41	12.5	123.2
14:06	4.5	7.6	20.09	0.44	12.1	156.2
14:07	8.0	1.5	20.09	0.43	5.8	145.3
14:08	4.0	0.2	20.17	0.34	4.2	130.3
14:09	2.4	2.6	20.18	0.33	5.2	139.7
14:10	2.3	8.3	20.15	0.35	12.3	157.4
14:11	3.0	6.7	20.10	0.41	12.4	185.4
14:12	4.3	4.0	20.10	0.43	6.5	239.9

COMMENTS: INTERRUPT FOR PLANT PROBLEMS

LOUISIANA PACIFIC

08-06-1996

	CHAN 9	CHAN10	CHAN11	CHAN12	CHAN 7	CHAN14
	STACK	STACK	STACK	STACK	STACK	INLET
TIME	ppmNOX	ppmCO	%O2	%CO2	ppmTHC	ppmTHC
12:21	2.8	12.2	20.18	0.42	10.9	134.2
12:22	4.0	3.2	20.17	0.44	4.7	166.2
12:23	6.1	0.3	20.17	0.41	3.5	168.6
12:24	3.0	3.4	20.22	0.35	5.2	156.3
12:25	1.8	10.9	20.21	0.35	12.7	149.4
12:26	1.6	11.7	20.19	0.37	12.2	145.2
12:27	2.5	8.1	20.19	0.39	5.6	148.0
12:28	2.8	1.0	20.18	0.41	3.6	161.3
12:29	4.9	1.1	20.14	0.44	3.2	186.5
12:30	3.5	8.8	20.17	0.38	12.3	166.8
12:31	1.9	10.5	20.19	0.36	12.0	161.0
12:32	2.0	10.7	20.20	0.36	7.8	159.7
12:33	3.0	2.7	20.20	0.39	3.5	167.1
12:34	3.6	0.6	20.17	0.41	3.1	193.7
12:35	5.2	3.0	20.14	0.42	9.2	189.9

AVERAGE VALUES FOR THE LAST 15 MINUTES

12:35	3.3	5.9	20.18	0.39	7.3	163.6
12:36	2.7	11.4	20.17	0.38	13.4	176.1
12:37	1.8	11.9	20.19	0.36	10.4	170.7
12:38	2.1	3.0	20.19	0.36	3.3	171.8
12:39	3.0	0.8	20.17	0.41	3.4	175.8
12:40	4.7	2.0	20.12	0.45	6.8	217.3
12:41	4.5	6.2	20.14	0.40	12.6	192.9
12:42	2.3	13.2	20.18	0.36	11.7	185.1
12:43	1.9	5.5	20.21	0.34	5.1	181.0
12:44	2.5	0.9	20.20	0.37	3.3	185.7
12:45	3.3	1.8	20.17	0.41	4.2	205.0
12:46	5.8	3.1	20.10	0.46	12.9	223.1
12:47	3.5	7.7	20.16	0.39	13.2	198.7
12:48	2.1	8.5	20.21	0.34	6.1	189.4
12:49	2.0	1.5	20.21	0.35	3.6	189.1
12:50	2.5	1.1	20.18	0.39	3.0	191.4

AVERAGE VALUES FOR THE LAST 15 MINUTES

12:50	3.0	5.3	20.17	0.39	7.5	190.2
12:51	4.0	5.8	20.12	0.45	11.6	222.9
12:52	5.6	5.2	20.11	0.43	13.4	208.4
12:53	2.8	8.0	20.19	0.36	8.5	196.9
12:54	2.0	2.7	20.22	0.34	3.7	192.8
12:55	2.4	0.8	20.20	0.37	3.0	197.7
12:56	3.0	3.9	20.14	0.43	8.8	204.1
12:57	5.9	6.0	20.09	0.47	12.2	239.7
12:58	4.9	6.7	20.15	0.39	10.6	209.5
12:59	2.3	2.6	20.21	0.34	3.3	201.2
13:00	2.1	0.9	20.22	0.34	3.3	198.7
13:01	2.7	2.1	20.18	0.40	6.2	203.8
13:02	3.3	6.1	20.14	0.45	11.5	228.1
13:03	7.6	7.7	20.11	0.46	11.0	231.9

SGH
8/6/96

LOUISIANA PACIFIC

08-06-1996

	CHAN 9	CHAN10	CHAN11	CHAN12	CHAN 7	CHAN14
	STACK	STACK	STACK	STACK	STACK	INLET
TIME	ppmNOX	ppmCO	%O2	%CO2	ppmTHC	ppmTHC
13:04	3.9	3.0	20.21	0.36	5.0	212.1
13:05	2.1	0.9	20.25	0.34	3.3	205.1

AVERAGE VALUES FOR THE LAST 15 MINUTES

13:05	3.6	4.2	20.17	0.40	7.7	210.2
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COMMENTS: END RUN 1

1125 -1140

1220 - 1305

SGH
8/6/96

LOUISIANA PACIFIC

08-06-1996

TIME	CHAN 9 STACK ppmNOX	CHAN10 STACK ppmCO	CHAN11 STACK %O2	CHAN12 STACK %CO2	CHAN 7 STACK ppmTHC	CHAN14 INLET ppmTHC
14:31	2.2	8.8	20.15	0.33	12.5	248.4
14:32	1.9	9.5	20.13	0.34	12.4	208.9
14:33	2.3	8.9	20.14	0.34	6.4	180.2
14:34	2.4	1.1	20.13	0.36	4.2	175.1
14:35	2.5	0.5	20.11	0.40	3.7	202.8
14:36	4.4	2.0	20.04	0.46	11.6	307.7
14:37	5.0	3.6	20.07	0.40	13.5	309.8
14:38	2.9	6.4	20.14	0.33	8.8	247.7
14:39	2.3	2.0	20.16	0.31	4.5	197.2
14:40	2.5	0.5	20.15	0.33	3.9	177.1
14:41	3.0	2.6	20.09	0.40	9.5	200.9
14:42	5.4	4.6	20.01	0.47	12.8	323.4
14:43	6.1	3.1	20.06	0.41	11.7	330.0
14:44	3.2	1.3	20.13	0.33	4.4	253.2
14:45	2.4	0.5	20.15	0.32	4.2	193.2

AVERAGE VALUES FOR THE LAST 15 MINUTES

14:45	3.2	3.7	20.11	0.37	8.3	237.0
14:46	2.7	2.1	20.12	0.35	7.0	182.5
14:47	3.2	5.2	20.06	0.41	12.4	221.5
14:48	6.0	5.6	20.01	0.46	12.1	341.7
14:49	5.4	0.9	20.08	0.37	5.8	305.6
14:50	2.6	0.2	20.13	0.32	4.1	216.3
14:51	2.3	2.6	20.12	0.32	4.9	160.3
14:52	2.8	6.0	20.07	0.38	12.6	165.3
14:53	3.5	5.3	20.03	0.43	12.7	245.1
14:54	8.2	3.8	20.00	0.45	7.1	375.6
14:55	4.7	0.3	20.08	0.35	4.4	284.3
14:56	2.4	0.7	20.11	0.32	3.8	194.5
14:57	2.5	8.5	20.07	0.34	11.5	153.3
14:58	3.2	6.6	20.02	0.40	12.0	187.2
14:59	4.5	4.2	20.00	0.43	9.2	296.7
15:00	7.3	-0.0	20.00	0.41	4.5	350.3

AVERAGE VALUES FOR THE LAST 15 MINUTES

15:00	4.1	3.5	20.06	0.38	8.3	245.4
15:01	3.6	0.2	20.06	0.33	3.9	236.6
15:02	2.2	4.1	20.06	0.33	9.3	159.1
15:03	2.7	10.6	20.02	0.37	12.2	136.0

COMMENTS: END RUN 2

1345 - 1503

CALIBRATION SUMMARY

SOURCE: LOUISIANA PACIFIC

REASON: POST RUN 2 PRE RUN 3 SYSTEM BIAS CHECK

DATE : 08-06-1996 TIME: 15:04 - 15:16

A/D CHAN	MONITOR DESCRIPTION	UNITS	GAS VALUE	MONITOR RESPONSE
9	STACK	ppmNOX	0.0	0.0
9	STACK	ppmNOX	47.1	46.0
10	STACK	ppmCO	0.0	0.1
10	STACK	ppmCO	30.1	27.7
11	STACK	%O2	0.00	0.25
11	STACK	%O2	12.26	12.00
12	STACK	%CO2	0.00	0.00
12	STACK	%CO2	11.03	10.80
7	STACK	ppmTHC	0.0	0.1
7	STACK	ppmTHC	30.1	29.9
14	INLET	ppmTHC	0.0	1.1
14	INLET	ppmTHC	296.0	289.2

LOUISIANA PACIFIC

08-06-1996

	CHAN 9	CHAN10	CHAN11	CHAN12	CHAN 7	CHAN14
	STACK	STACK	STACK	STACK	STACK	INLET
TIME	DDMNOX	DDMCO	%O2	%CO2	DDMTHC	DDMTHC
15:31	2.7	3.5	20.11	0.32	5.7	159.4
15:32	2.6	0.5	20.11	0.32	4.2	125.1
15:33	2.7	2.9	20.09	0.34	5.5	102.5
15:34	2.2	8.9	20.06	0.36	14.1	89.6
15:35	1.7	9.7	20.04	0.37	13.5	84.4
15:36	2.4	7.0	20.05	0.39	6.7	126.5
15:37	3.0	0.5	20.04	0.41	4.3	215.5
15:38	5.4	0.2	20.02	0.44	3.8	404.0
15:39	5.1	4.4	20.06	0.38	11.5	292.4
15:40	2.6	7.5	20.10	0.34	12.3	179.9
15:41	2.1	8.4	20.12	0.33	8.5	138.6
15:42	3.2	1.8	20.11	0.36	4.2	185.5
15:43	3.7	0.2	20.09	0.39	3.8	295.9
15:44	6.5	0.4	20.02	0.45	8.9	404.4
15:45	4.0	7.3	20.06	0.39	13.0	258.6

AVERAGE VALUES FOR THE LAST 15 MINUTES

15:45	3.3	4.2	20.07	0.37	8.0	204.1
15:46	2.4	8.5	20.10	0.35	11.7	165.1
15:47	2.4	2.0	20.13	0.34	4.3	144.0
15:48	3.3	0.5	20.11	0.38	4.2	197.2
15:49	5.0	1.3	20.05	0.44	7.0	389.8
15:50	6.6	1.9	20.04	0.44	11.7	387.4
15:51	3.5	7.6	20.10	0.37	10.5	238.1
15:52	2.5	3.7	20.14	0.33	6.0	165.5
15:53	2.9	0.4	20.14	0.35	4.3	188.6
15:54	3.8	1.0	20.10	0.40	4.6	269.5
15:55	5.9	1.3	20.03	0.45	13.5	411.3
15:56	4.6	4.1	20.07	0.39	13.9	292.1
15:57	2.9	6.2	20.13	0.35	7.2	188.2
15:58	2.5	0.9	20.14	0.34	4.6	145.5
15:59	2.8	0.6	20.13	0.37	3.9	188.4
16:00	3.8	4.3	20.07	0.43	11.8	319.3

AVERAGE VALUES FOR THE LAST 15 MINUTES

16:00	3.7	3.0	20.10	0.38	8.0	246.0
16:01	7.0	2.9	20.02	0.47	13.0	426.1
16:02	4.2	4.3	20.12	0.37	9.5	267.2
16:03	2.5	1.2	20.17	0.33	4.6	171.7
16:04	2.3	0.5	20.17	0.32	3.9	131.7
16:05	2.7	3.3	20.13	0.37	9.2	169.7
16:06	3.4	7.1	20.07	0.43	12.5	275.4
16:07	7.0	2.5	20.03	0.47	11.6	431.1
16:08	4.4	0.3	20.13	0.37	4.4	278.6
16:09	2.6	0.5	20.16	0.33	4.3	179.2
16:10	2.4	2.8	20.15	0.34	7.0	144.3
16:11	2.9	6.7	20.09	0.40	12.4	200.7
16:12	4.6	6.8	20.05	0.45	11.9	349.0
16:13	7.2	1.2	20.07	0.43	5.9	400.9

LOUISIANA PACIFIC

08-06-1996

	CHAN 9 STACK ppmNOX	CHAN10 STACK ppmCO	CHAN11 STACK %O2	CHAN12 STACK %CO2	CHAN 7 STACK ppmTHC	CHAN14 INLET ppmTHC
16:14	3.8	0.2	20.14	0.34	4.2	244.7
16:15	2.3	2.3	20.16	0.33	5.0	160.5

AVERAGE VALUES FOR THE LAST 15 MINUTES

16:15	4.0	2.8	20.11	0.38	8.0	255.4
16:16	2.3	8.5	20.13	0.36	12.5	131.1
16:17	2.8	7.8	20.09	0.41	12.3	183.0
16:18	3.8	4.2	20.10	0.42	6.7	291.0
16:19	6.8	0.2	20.08	0.44	4.2	406.8
16:20	3.8	0.5	20.15	0.35	3.7	252.6
16:21	2.4	7.6	20.15	0.35	11.3	164.3
16:22	2.4	9.4	20.13	0.36	12.1	136.6
16:23	3.1	6.6	20.12	0.39	8.6	187.7
16:24	4.5	0.9	20.12	0.42	4.3	336.0
16:25	7.0	0.2	20.09	0.43	3.8	404.6
16:26	3.7	2.9	20.14	0.36	8.9	241.5
16:27	2.3	11.1	20.13	0.36	12.7	155.7
16:28	2.4	9.3	20.14	0.36	11.0	131.0
16:29	3.2	1.7	20.13	0.38	3.9	183.4
16:30	4.2	0.5	20.10	0.42	4.0	330.1

AVERAGE VALUES FOR THE LAST 15 MINUTES

16:30	3.6	4.8	20.12	0.39	8.0	235.7
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AVERAGE VALUES FOR THE LAST HOUR: 60 MINUTES OF VALID DATA

16:30	3.6	3.7	20.10	0.38	8.0	235.3
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COMMENTS: END RUN 3

1530 - 1630

CALIBRATION SUMMARY

SOURCE: LOUISIANA PACIFIC

REASON: POST RUN 3 SYSTEM BIAS CHECK

DATE : 08-06-1996 TIME: 16:30 - 16:47

A/D CHAN	MONITOR DESCRIPTION	UNITS	GAS VALUE	MONITOR RESPONSE
9	STACK	ppmNOX	0.0	0.1
9	STACK	ppmNOX	47.1	46.5
10	STACK	ppmCO	0.0	-0.6
10	STACK	ppmCO	30.1	26.9
11	STACK	%O2	0.00	0.17
11	STACK	%O2	12.26	12.09
12	STACK	%CO2	0.00	0.01
12	STACK	%CO2	11.03	10.81
7	STACK	ppmTHC	0.0	0.4
7	STACK	ppmTHC	30.1	28.5
14	INLET	ppmTHC	0.0	0.1
14	INLET	ppmTHC	296.0	296.0

APPENDIX B. FIELD DATA

3. RTO No. 3 Stack

**b. Filterable and Condensible
Particulate**

SAMPLING DATA - METHOD(S) EPA 5/202

CLIENT LOUISIANA PACIFIC CORP.

PLANT ROXBORO OSA PLANT

CITY/STATE ROXBORO, NC.

SAMPLING LOC. RTA #3 OUTLET

BAROMETRIC PRESSURE, IN. HG 29.80

STATIC PRESSURE, IN. H₂O -0.67

LEAK /, VACUUM IN. HG 5

LEAK RATE, CFM .003

RUN NO. 53-M5/202-1

JOB NO. 15575

DATE 8-06-96

TIME START 1125

TIME FINISH 1302

TEST PERSONNEL DLS

POSTTEST POS PRESS LEAK / OK? N/A

• CONDUCT POSTTEST POSITIVE PRESSURE LEAK CHECK FOLLOWING THE LAST RUN PER LOCATION. FOR OTHER RUNS, ENTER "N/A".

EQUIPMENT CHECKS		EQUIPMENT I.D. NUMBERS				LEAK CHECKS	
☒	PITOT, PRETEST	REAGENT BOX <u>616</u>	METER BOX <u>N25</u>	Y <u>0.9854</u>	B	B	
☒	PITOT, POSTTEST	PITOT <u>9-13</u>	NOZ. <u>1812</u>	DIA. <u>235</u>	E	E	
☒	NOZZLE, PRE/POST	TC READOUT <u>F63</u>	TC PROBE <u>R133</u>	UMBILICAL <u>U98</u>	B	B	
☒	TC <u>90</u> °F PRE	SAMPL'G BOX <u>109</u>	ORSAT PUMP <u>N/A</u>	TEDLAR BAG <u>N/A</u>	E	E	
☒	TC <u>98</u> °F POST					B	B
☒	ORSAT SYSTEM					E	E
		MONOGRAPH DATA					
DELTA-H ₂ O <u>1.721</u>							
METER TEMP. <u>100</u>							
EST. XH ₂ O <u>6.0</u>							
°C FACTOR <u>0.947</u>							
STACK TEMP. <u>225</u>							
REF DELTA-P <u>0.792</u>							
°C FACTOR <u>2.322</u>							
FVITES, Z							
YOB							
0.992							
5% OF CAL'D Y?							
(Y) ☒ (N) ☐							

LINE	SAMPLE POINT	CLOCK TIME, MINUTES	DRY GAS METER READING, CUBIC FEET	PITOT READING, IN. H ₂ O	GAS METER TEMP., °F	STACK TEMP., °F	ORIFICE SETTING, IN. H ₂ O		GAUGE VACUUM, IN. HG	GAS TEMPERATURES, °F		
							ACTUAL	IDEAL		FILTER	IMPING. EXIT	PROBE OR COND. EXIT
1	B 1	0	916.537	0.82	87	233	1.84	1.84	2	255	47	N/A
2	2	2 1/2	918.55	0.81	88	233	1.81	1.81	2	254	47	
3	3	5	920.56	0.73	89	230	1.65	1.65	2	254	46	
4	4	7 1/2	922.53	0.77	90	233	1.73	1.73	2	254	46	
5	5	10	924.45	0.70	91	230	1.58	1.58	2	254	46	
6	6	12 1/2	926.34	0.73	93	233	1.65	1.65	2	254	46	
7	7	15	928.28	0.94	94	231	2.14	2.14	2	254	46	
8	8	17 1/2	930.36	0.86	95	234	1.95	1.95	2	254	46	
9	9	20	932.47	1.16	97	231	2.65	2.65	3	254	46	
10	10	22 1/2	934.84	1.65	91	232	3.71	3.71	4	254	46	
11	11	25	937.67	1.82	93	238	4.06	4.06	4	254	48	
12	12	27 1/2	940.67	1.77	95	231	4.00	4.00	4	254	48	
13	B 1	30	943.64	1.06	96	228	2.41	2.41	3	252	49	
14	2	32 1/2	945.95	1.32	97	233	3.00	3.00	3	252	49	
15	3	35	948.45	1.17	98	230	2.67	2.67	3	252	49	
16	4	37 1/2	950.86	1.21	101	234	2.76	2.76	3	252	49	
17	5	40	953.34	1.03	103	229	2.38	2.38	3	252	49	
18	6	42 1/2	955.58	0.92	104	235	2.11	2.11	3	251	48	
19	7	45	957.73	0.94	106	233	2.17	2.17	3	251	48	
20	8	47 1/2	959.92	1.00	107	235	2.31	2.31	3	252	47	
21	9	50	962.21	1.12	107	228	2.61	2.61	3	252	47	
22	10	52 1/2	964.48	1.26	108	236	2.91	2.91	3	252	47	
23	11	55	966.96	1.26	109	235	2.91	2.91	3	251	47	
24	12	57 1/2	969.53	1.10	110	233	2.56	2.56	3	251	47	
25	OFF	60	971.858									✓

FINAL

** PROBE EXIT & / (probe & filter heat off) apply to NJ Method 1. FILTER BOX for all others. ** FILTER EXIT for NJ Method 1. COND EXIT applies if sampling train has a condenser.

60 55.321 1.0697 99.9 232.4 2.48 115

Min. (θ)

Vm

(ΔP)²

cm

ts

ΔH

SAMPLING DATA - METHOD(S) EPA 5/202

CLIENT LOUISIANA PACIFIC CORP.
PLANT ROXBORO OSA PLANT
CITY/STATE ROXBORO, NC RUN NO. 53-M5/202-2
SAMPLING LOC. RTO #3 OUTLET JOB NO. 15575 DATE 8-06-96
BAROMETRIC PRESSURE, IN. HG 29.80 STATIC PRESSURE, IN. H₂O -0.62 TIME START 1345
LEAK J, VACUUM IN. HG 15 5 TIME FINISH 1508
LEAK RATE, CFM .001 .001 TEST PERSONNEL DLS
POSTTEST POS PRESS LEAK / OK? N/A

• CONDUCT POSTTEST POSITIVE PRESSURE LEAK CHECK FOLLOWING THE LAST RUN PER LOCATION. FOR OTHER RUNS, ENTER "N/A".

EQUIPMENT CHECKS		EQUIPMENT I.D. NUMBERS		LEAK CHECKS	
☒ PITOT, PRETEST	REAGENT BOX <u>616</u>	METER BOX <u>N25</u>	V <u>0.9854</u>	B	B
☒ PITOT, POSTTEST	PITOT <u>9-9</u>	Cp <u>84</u>	NOZ'L <u>1808</u>	E	E
☒ NOZZLE, PRE/POST	TC READOUT <u>F63</u>	TC PROBE <u>R-91</u>	UMBILICAL <u>U9R</u>	B	B
☒ TC <u>103</u> °F PRE	SAMPL'G BOX <u>15</u>	ORSAT PUMP <u>N/A</u>	TEDLAR BAG <u>N/A</u>	E	E
☒ TC <u>105</u> °F POST				B	B
<u>N/A</u> ORSAT SYSTEM				E	E
		MONOGRAPH DATA			
FILTER/XAD	TARE WT.	DELTA-H ₂	METER TEMP.		
<u>E3020</u>	<u>0.5125</u>	<u>1721</u>	<u>100</u>		
		EST. XH ₂ O	<u>3.50</u>		
		"C" FACTOR	<u>0.989</u>		
		STACK TEMP.	<u>225</u>		
		REF DELTA-P	<u>1.237</u>		
		"K" FACTOR	<u>1.488</u>		
				Fyrites, %	Y _{OR}
					<u>0.978</u>
				**% OF CAL'D Y?	
				(Y) ☒ (N) ☐	

BR
8/6/96

LINE	SAMPLE POINT	CLOCK TIME, MINUTES	DRY GAS METER READING, CUBIC FEET	PITOT READING, IN. H ₂ O	GAS METER TEMP., °F	STACK TEMP., °F	ORIFICE SETTING, IN. H ₂ O		GAUGE VACUUM, IN. HG	GAS TEMPERATURES, °F			✓
							ACTUAL	IDEAL		FILTER	IMPING. EXIT	PROBE OR COND. EXIT**	
1	B 1	0	972.133	0.77	98	220	1.15	1.15	2	253	55	N/A	
2	2	2 1/2	973.74	0.81	99	235	1.18	1.18	2	251	54		
3	3	5	975.40	0.81	100	233	1.19	1.19	2	251	53		
4	4	7 1/2	977.07	0.82	101	236	1.20	1.20	2	251	53		
5	5	10	978.72	0.76	102	236	1.11	1.11	2	251	53		
6	6	12 1/2	980.30	0.68	103	233	1.00	1.00	2	251	53		
7	7	15	981.85	0.83	103	235	1.22	1.22	2	252	53		
8	8	17 1/2	983.58	1.02	104	237	1.50	1.50	2	252	53		
9	9	20	985.37	1.29	104	236	1.90	1.90	2	251	53		
10	10	22 1/2	987.43	1.53	104	230	2.27	2.27	2	251	53		
11	11	25	989.68	1.71	105	235	2.52	2.52	3	251	53		
12	12	27 1/2	992.09	1.65	98	235	2.40	2.40	3	252	53		
13	A 1	30	994.28	1.17	98	236	1.70	1.70	2	252	53		
14	2	32 1/2	996.22	1.40	101	235	2.05	2.05	2	252	52		
15	3	35	998.36	1.20	103	229	1.78	1.78	2	252	52		
16	4	37 1/2	1000.40	1.17	105	237	1.72	1.72	2	252	52		
17	5	40	1002.36	0.89	107	229	1.33	1.33	2	252	52		
18	6	42 1/2	1004.20	0.90	108	238	1.33	1.33	2	252	52		
19	7	45	1005.87	0.93	108	236	1.38	1.38	2	252	52		
20	8	47 1/2	1007.67	1.03	109	233	1.54	1.54	2	252	52		
21	9	50	1009.49	1.17	110	236	1.74	1.74	2	253	53		
22	10	52 1/2	1011.51	1.17	111	232	1.75	1.75	2	252	53		
23	11	55	1013.54	1.15	112	238	1.71	1.71	2	252	53		
24	12	57 1/2	1015.58	1.13	113	233	1.69	1.69	2	252	53		
25	OFF	60	1017.496										✓
FINAL													

* FILTER EXIT for NJ Method 1. FILTER BOX for all others.
** PROBE EXIT & ✓ (probe & filter heat off) apply to NJ Method 1. COND EXIT applies if sampling train has a condenser.
60 45.363 1.0658 104.4 233.9 1.60 110
Min. (θ) Vm (ΔP)² cm ts ΔH

SAMPLING DATA - METHOD(S) EPA 5/202

CLIENT LOUISIANA PACIFIC CORP.

PLANT ROXBORO OSB PLANT

CITY/STATE ROXBORO, NC

RUN NO. 53-M5/202-3

JOB NO. 15575

DATE 8-06-96

SAMPLING LOC. RTO-3 OUTLET

TIME START 1430

BAROMETRIC PRESSURE, IN. HG 29.80

STATIC PRESSURE, IN. H₂O -0.65

TIME FINISH 1634

LEAK /, VACUUM IN. HG 15

TEST PERSONNEL DL

LEAK RATE, CFM .006

POSTTEST POS PRESS LEAK / OK? ☒

* CONDUCT POSTTEST POSITIVE PRESSURE LEAK CHECK FOLLOWING THE LAST RUN PER LOCATION. FOR OTHER RUNS, ENTER "N/A".									
EQUIPMENT CHECKS		EQUIPMENT I.D. NUMBERS				LEAK CHECKS			
☒ PITOT, PRETEST	REAGENT BOX <u>1016</u>	METER BOX <u>N25</u>	<u>0.9854</u>		B				
☒ PITOT, POSTTEST	PITOT <u>9-12</u>	NOZ'L <u>1809</u>	<u>210</u>		E				
☒ NOZZLE, PRE/POST	TC READOUT <u>F62</u>	TC PROBE <u>R253</u>	<u>U98</u>		B				
☒ TC <u>103</u> °F PRE	SAMPL'G BOX <u>26</u>	ORSAT PUMP <u>N/A</u>	<u>N/A</u>		E				
☒ TC <u>102</u> °F POST					B				
<u>N/A</u> ORSAT SYSTEM					E				
MONOGRAPH DATA									
DELTA-H ₂		<u>1.721</u>							
METER TEMP.		<u>100</u>							
EST. XH ₂ O		<u>3.50</u>							
"C" FACTOR		<u>0.989</u>							
STACK TEMP.		<u>225</u>							
REF DELTA-P		<u>1.190</u>							
"K" FACTOR		<u>1.546</u>							
Fyrites, %									
Y _{CO}						<u>0.974</u>			
±5% OF CAL'D Y?						(Y) ☒ (N) ☐			

L I N E	SAMPLE POINT	CLOCK TIME, MINUTES	DRY GAS METER READING, CUBIC FEET	PITOT READING, IN. H ₂ O	GAS METER TEMP., °F	STACK TEMP., °F	ORIFICE SETTING, IN. H ₂ O		GALGE VACUUM, IN. HG	GAS TEMPERATURES, °F			PROBE OR COND EXIT	✓
							ACTUAL	IDEAL		FILTER	IMPING. EXIT			
1	B 1	0	18.034	1.00	101	225	1.55	1.55	2	246	57	N/A		
2	2	2 1/2	19.92	0.69	101	237	1.05	1.05	2	247	55			
3	3	5	21.51	0.80	101	231	1.23	1.23	2	247	54			
4	4	7 1/2	23.22	0.71	101	235	1.08	1.08	2	247	54			
5	5	10	24.78	0.73	101	229	1.12	1.12	2	247	54			
6	6	12 1/2	26.41	0.69	102	235	1.05	1.05	2	248	54			
7	7	15	28.02	0.87	102	232	1.33	1.33	2	248	54			
8	8	17 1/2	29.73	1.07	103	238	1.63	1.63	2	248	54			
9	9	20	31.65	1.23	104	234	1.88	1.88	3	249	54			
10	10	22 1/2	33.73	1.57	104	234	2.40	2.40	3	249	54			
11	11	25	36.08	1.19	106	235	1.82	1.82	3	249	54			
12	12	27 1/2	38.13	1.18	106	230	1.82	1.82	3	248	54			
13	A 1	30	40.17	1.38	104	232	2.12	2.12	3	248	54			
14	2	32 1/2	42.24	1.36	105	229	2.10	2.10	3	248	54			
15	3	35	44.41	1.29	105	231	1.99	1.99	3	248	54			
16	4	37 1/2	46.58	0.98	105	229	1.51	1.51	3	248	54			
17	5	40	48.43	0.90	105	240	1.37	1.37	2	248	54			
18	6	42 1/2	50.21	0.72	105	229	1.11	1.11	2	248	54			
19	7	45	51.81	0.86	105	231	1.33	1.33	2	248	54			
20	8	47 1/2	53.54	0.97	104	236	1.48	1.48	2	248	54			
21	9	50	55.38	1.02	104	233	1.57	1.57	2	248	54			
22	10	52 1/2	57.30	1.03	104	231	1.58	1.58	2	248	54			
23	11	55	59.17	1.03	104	230	1.59	1.59	2	248	54			
24	12	57 1/2	61.10	1.08	104	237	1.65	1.65	2	248	54			
5	OFF	60	63.047											

FINAL

* FILTER EXIT for NJ Method 1. FILTER BOX for all others.

PROBE EXIT & / (probe & filter heat off) apply to NJ Method 1. COND EXIT applies if sampling train has a condenser.

6° 45.03 1.06.2 103.6 232.6 1.54 117
Min. (θ) Vm (√ΔP)² tm ts ΔH

MOISTURE ANALYTICAL RESULTS

Client LA. PACIFIC

Plant Name ROXBORO OSB

Job No. 15575

City/State ROXBORO, N.C.

Sampling Loc. RTO #3 OUTLET

Run Number

53-MS/202-1

53-MS/202-2

53-MS/202-3

Sampling Date

8/6/96

8/6/96

8/6/96

Analysis Date

8/6/96

8/6/96

8/6/96

Analyst

gsc

gsc

gsc

Reagent 1 (<u>01 H₂O</u>)			
Final Weight, g	<u>821.0</u>	<u>812.5</u>	<u>805.0</u>
Tared Weight, g	<u>795.3</u>	<u>800.9</u>	<u>799.0</u>
Water Catch, g	<u>25.7</u>	<u>11.6</u>	<u>6.0</u>
Reagent 2 (_____)			
Final Weight, g	_____	_____	_____
Tared Weight, g	_____	_____	_____
Water Catch, g	_____	_____	_____
Reagent 3 (_____)			
Final Weight, g	_____	_____	_____
Tared Weight, g	_____	_____	_____
Water Catch, g	_____	_____	_____
CONDENSED WATER, g	<u>25.7</u>	<u>11.6</u>	<u>6.0</u>

Silica Gel			
Final Weight, g	<u>209.0</u>	<u>197.5</u>	<u>206.5</u>
Tared Weight, g	<u>195.5</u>	<u>187.7</u>	<u>197.3</u>
ADSORBED WATER, g	<u>13.5</u>	<u>9.8</u>	<u>9.2</u>

TOTAL WATER COLLECTED, g	<u>39.2</u>	<u>21.4</u>	<u>15.2</u>
--------------------------	-------------	-------------	-------------

Balance No. 56

Type ☒ Triple Beam

☐ Electronic

Reagent Box No. 616

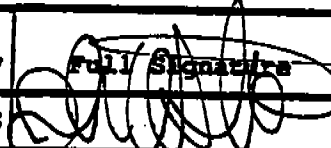
Balance located in stable, draft-free area ☒ Yes ☐ No (If "No", explain below.)

Comments

118

RECORD OF CUSTODY, CONTAINER No. 616

client LA. PACIFIC Job No. 15575
 Plant Name OSB PLANT
 City/State ROXBORO N.C.
 Sampling Method(s) 5/202 (EPA, NIOSH, etc.)
 Container Type (V) Reagent Box ☒ Cooler ☐ Other (specify) _____

Seal No. or "PC"	Date	Time	*	Full Signature	Reason for Breaking Seal**
1069	7/31	1101	S		
	8/5	1300	B	Jeffery S. Coppel	LABEL
3528	8/7	0800	S	Jeffery S. Coppel	
			B		
			S		
			B		
			S		
			B		
			S		
			B		
			S		
			B		
			S		
			B		

PC = Personal Custody * S = Sealed By; B = Broken By ** Use "REMARKS" Section if more space needed.

Container Received by Entropy Sample Custodian <u>Sam Ooley</u> <u>8/12/96</u> <u>1358</u> Signature Date Time			Seal Intact? ** Yes ☒ No ☐ NA ☐
--	--	--	--

As Applicable:
 All liquid levels at mark (✓) YES ☐ NO ☐ (Estimate loss if not at mark; describe in "REMARKS")

As Applicable:
 TUBE SAMPLES put in freezer by _____ Date _____ Time _____
 CONDENSATE SAMPLES put in refrige. by _____ Date _____ Time _____

REMARKS _____
118

FIELD SAMPLE RECOVERY QUALITY CONTROL

Box No. 616 Assembly Date 7-31-96 Assembled By JUS
 Client LA. PACIFIC Job No. 15575
 Plant ROXBORO OSB City/State ROXBORO, N.C.
 Sampling Loc. RTO # 3 OUTLET Method 5/202
 Individual Tare Of Reagent 300 (ML) (gm) Of D1 H₂O
 Individual Tare Of Reagent _____ (ML) (gm) Of _____
 Individual Tare Of Reagent _____ (ML) (gm) Of _____
 Individual Tare Of Sil. Gel ~200 Gm _____

other (specify)

Run Number	Run Date	Filter or XAD Number	Tare, grams	Liquid Tare at Mark? @	Init.	Sample Recov. Date	%Sil. Gel Spent	Liquid Level Marked?	Init.
53-MS/202-1	8/6	E3019	0.5198	✓	JSC	8/6	30	✓	JSC
				Filter Appearance*					
				WHITE					
				Reagents Appearance*					
				CLEAR					
53-MS/202-2	8/6	E3020	0.5125	✓	JSC	8/6	20	✓	JSC
				Filter Appearance*					
				WHITE					
				Reagents Appearance*					
				CLEAR					
53-MS/202-3	8/6	TGF 426	0.4873	✓	JSC	8/6	20	✓	JSC
				Filter Appearance*					
				WHITE					
				Reagents Appearance*					
				CLEAR					
				Filter Appearance*					
				Reagents Appearance*					

* Use "REMARKS" section if needed.

@ All liquid levels at mark? (check) YES _____ NO _____ (estimate loss if not at mark; use "REMARKS" section).

REMARKS _____

120

APPENDIX B. FIELD DATA

4. Plume Opacity

James B. Winegar
Environmental Consultant

10 August 1996

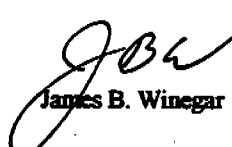
Tod Missner
Entropy Environmentalists Inc.
PO Box 12291
Research Triangle Park, NC 27709-2291

RE: Louisiana Pacific's Roxboro Plant
Entropy Job No. 15575

Dear Tod:

Enclosed you will find the visible emissions data for Louisiana Pacific's Roxboro plant (count=11), a copy of my VE Certificate, and an invoice for my services. Once again, I would like to thank you for the opportunity of working with Entropy on this project.

If you have any questions or require additional information, please give me a call at (919) 365-0449.

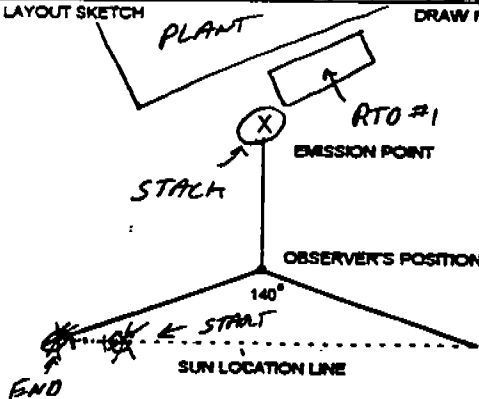
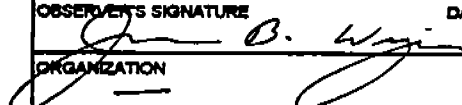

James B. Winegar

Enclosures

cc: file

VISIBLE EMISSION OBSERVATION FORM

10w 7/04

SOURCE NAME L-P OSB PLANT				OBSERVATION DATE 8/9/96				START TIME 1720				STOP TIME 1820			
ADDRESS HWY 501				CITY NOXBORO				STATE NC				ZIP —			
PHONE —				SOURCE ID NUMBER —				Min 1 Sec				0 15 30 45			
PROCESS EQUIPMENT DRYER				OPERATING MODE CONT				Min 1 Sec				0 15 30 45			
CONTROL EQUIPMENT RTO #1				OPERATING MODE CONT				Min 1 Sec				0 15 30 45			
DESCRIBE EMISSION POINT START ~80" DIAM GAY ST STOP SAME								1 0 0 0 0 31 0 0 0 0							
HEIGHT ABOVE GROUND LEVEL START ~60' STOP ~60'								2 0 0 0 0 32 0 0 0 0							
HEIGHT RELATIVE TO OBSERVER START ~60' STOP ~60'								3 0 0 0 0 33 0 0 0 0							
DISTANCE FROM OBSERVER START ~490' STOP ~490'								4 0 0 0 0 34 0 0 0 0							
DIRECTION FROM OBSERVER START N-NE STOP N-NE								5 0 0 0 0 35 0 0 0 0							
DESCRIBE EMISSIONS START NO VE DETECT STOP SAME								6 0 0 0 0 36 0 0 0 0							
EMISSION COLOR START NA STOP NA								7 0 0 0 0 37 0 0 0 0							
PLUME TYPE CONTINUOUS ☐ FUGITIVE ☒ INTERMITTENT ☐								8 0 0 0 0 38 0 0 0 0							
WATER DROPLETS PRESENT YES ☐ NO ☒								9 0 0 0 0 39 0 0 0 0							
IS WATER DROPLET PLUME ATTACHED ☒ DETACHED ☐								10 0 0 0 0 40 0 0 0 0							
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED START ~5' ABOVE STOP SAME								11 0 0 0 0 41 0 0 0 0							
DESCRIBE BACKGROUND START SKY EQUIP STOP SAME								12 0 0 0 0 42 0 0 0 0							
BACKGROUND COLOR START BL STOP BL								13 0 0 0 0 43 0 0 0 0							
SKY CONDITIONS START 50%cl STOP 50%cl								14 0 0 0 0 44 0 0 0 0							
WIND SPEED START 2-4 STOP 2-4								15 0 0 0 0 45 0 0 0 0							
WIND DIRECTION START NW STOP NW								16 0 0 0 0 46 0 0 0 0							
AMBIENT TEMP START — STOP —								17 0 0 0 0 47 0 0 0 0							
WET BULB TEMP START — STOP —								18 0 0 0 0 48 0 0 0 0							
RH (%) START — STOP —								19 0 0 0 0 49 0 0 0 0							
SOURCE LAYOUT SKETCH 								OBSERVER'S NAME (PRINT) JAMES B. WINEGAR							
DRAW NORTH ARROW 								OBSERVER'S SIGNATURE 							
								DATE 8/9/96							
								ORGANIZATION ETA							
								CERTIFIED BY ETA							
								DATE 3/27/96							
								COMMENTS * SLANT ϕ = 7°							

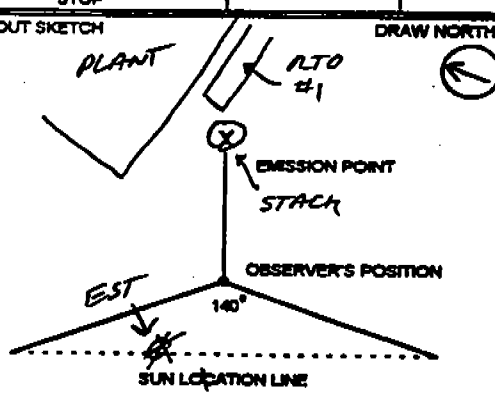
VISIBLE EMISSION OBSERVATION FORM

idw 7/84

SOURCE NAME L-P OSB PLANT				OBSERVATION DATE 8/9/96				START TIME 1845				STOP TIME 1951					
ADDRESS HWY 501				Min	1	Sec	0	15	30	45	Min	1	Sec	0	15	30	45
CITY ROXBORO				STATE NC				ZIP —									
PHONE —				SOURCE ID NUMBER —													
PROCESS EQUIPMENT DRYER				OPERATING MODE CONT													
CONTROL EQUIPMENT RTO #1				OPERATING MODE CONT													
DESCRIBE EMISSION POINT START ~80" DIAM GRAY SK STOP SAME																	
HEIGHT ABOVE GROUND LEVEL START ~60' STOP ~60'				HEIGHT RELATIVE TO OBSERVER START ~60' STOP ~60'													
DISTANCE FROM OBSERVER START ~42' STOP ~42'				DIRECTION FROM OBSERVER START E-NE STOP E-NE													
DESCRIBE EMISSIONS START NO VE DETECT STOP SAME																	
EMISSION COLOR START NA STOP NA				PLUME TYPE CONTINUOUS ☐ FUGITIVE ☒													
WATER DROPLETS PRESENT YES ☐ NO ☒				IS WATER DROPLET PLUME ATTACHED ☐ DETACHED ☒													
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED START ~5' ABOVE STOP SAME																	
DESCRIBE BACKGROUND START SKY STOP SKY																	
BACKGROUND COLOR START CL+WH STOP SAME				SKY CONDITIONS START 50%cl STOP 60%cl													
WIND SPEED START 2-4 STOP 2-4				WIND DIRECTION START NW STOP VAR													
AMBIENT TEMP START — STOP —				WET BULB TEMP —				RH (%) —									
SOURCE LAYOUT SKETCH				DRAW NORTH ARROW													
PLANT RTO #1 EMISSION POINT STACK OBSERVER'S POSITION 140° SUN LOCATION LINE				OBSERVER'S NAME (PRINT) JAMES B. WINEGAR													
				OBSERVER'S SIGNATURE <i>James B. Winegar</i>				DATE 8/9/96									
				ORGANIZATION ETA				DATE 3/27/96									
				COMMENTS * SLANT A = 55°													
				COMMENTS G = 6 min													

VISIBLE EMISSION OBSERVATION FORM

10-7704

SOURCE NAME L-P OSB PLANT				OBSERVATION DATE 8/9/96				START TIME 2009				STOP TIME 2025			
ADDRESS Hwy 501				Min	Sec	0	15	30	45	Min	Sec	0	15	30	45
CITY ROXBORO				STATE NC				ZIP —							
PHONE —				SOURCE ID NUMBER —											
PROCESS EQUIPMENT DRYER				OPERATING MODE CONT											
CONTROL EQUIPMENT RTO #1				OPERATING MODE CONT											
DESCRIBE EMISSION POINT START ~86" DIAM CRY STR STOP SAME															
HEIGHT ABOVE GROUND LEVEL START ~60' STOP ~60'				HEIGHT RELATIVE TO OBSERVER START ~60' STOP ~60'											
DISTANCE FROM OBSERVER START ~42' STOP ~42'				DIRECTION FROM OBSERVER START E-NE STOP E-NE											
DESCRIBE EMISSIONS START NO VE DETECT STOP SAME															
EMISSION COLOR START NA STOP NA				PLUME TYPE CONTINUOUS ☐ FUGITIVE ☐											
WATER DROPLETS PRESENT YES ☐ NO ☒				IS WATER DROPLET PLUME ATTACHED ☐ DETACHED ☐											
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED START ~5' ABOVE STOP SAME															
DESCRIBE BACKGROUND START SKY STOP SKY															
BACKGROUND COLOR START BL-GAY STOP DKK GRN				SKY CONDITIONS START 80%cl STOP 80%cl											
WIND SPEED START 1-3 STOP 1-3				WIND DIRECTION START VAR STOP VAR											
AMBIENT TEMP START — STOP —				WET BULB TEMP —				RH (%) —							
SOURCE LAYOUT SKETCH 				DRAW NORTH ARROW 				OBSERVER'S NAME (PRINT) JAMES B. WINEGAR							
								OBSERVER'S SIGNATURE <i>James B. Winegar</i> DATE 8/9/96							
								ORGANIZATION ETA DATE 3/27/96							
								COMMENTS * SLANT 4 = 55°							

VISIBLE EMISSION OBSERVATION FORM

10m 7/94

SOURCE NAME L-P OSB PLANT			OBSERVATION DATE 8/9/96				START TIME 1720				STOP TIME 1820					
ADDRESS HWY 501			Min	Sec	0	15	30	45	Min	Sec	0	15	30	45		
CITY ROXBORO			STATE NC.		ZIP —		1	0	0	0	0	31	0	0	0	
PHONE —			SOURCE ID NUMBER —			2	0	0	0	0	32	0	0	0	0	
PROCESS EQUIPMENT DRYER			OPERATING MODE CONT			3	0	0	0	0	33	0	0	0	0	
CONTROL EQUIPMENT RTO #2			OPERATING MODE CONT			4	0	0	0	0	34	0	0	0	0	
DESCRIBE EMISSION POINT START ~88" DIAM GRY STR STOP SAME			HEIGHT ABOVE GROUND LEVEL START ~60' STOP ~60'			HEIGHT RELATIVE TO OBSERVER START ~60' STOP ~60'			5			0	0	0	0	
DISTANCE FROM OBSERVER START ~685' STOP ~685'			DIRECTION FROM OBSERVER START E-NE STOP E-NE			6			0			0	0	0		
DESCRIBE EMISSIONS START NO VE DETECT STOP SAME			EMISSION COLOR START NA STOP NA			PLUME TYPE CONTINUOUS ☐ FUGITIVE ☐ NA INTERMITTENT ☐			7			0	0	0	0	
WATER DROPLETS PRESENT YES ☐ NO ☒			IS WATER DROPLET PLUME ATTACHED ☐ NA DETACHED ☐			8			0			0	0	0		
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED START ~5' ABOVE STOP SAME			DESCRIBE BACKGROUND START SKY STOP SKY			9			0			0	0	0		
BACKGROUND COLOR START BL+WH STOP SAME			SKY CONDITIONS START 50%cl STOP 50%cl			10			0			0	0	0		
WIND SPEED START 2-4 STOP 2-4			WIND DIRECTION START NW STOP NW			11			0			0	0	0		
AMBIENT TEMP START — STOP —			WET BULB TEMP —			12			0			0	0	0		
RH (%) —			13			0			0			0	0			
SOURCE LAYOUT SKETCH			DRAW NORTH ARROW			14			0			0	0	0		
PLANT STACK EMISSION POINT RTO #2 OBSERVER'S POSITION 140° SUN LOCATION LINE			OBSERVER'S NAME (PRINT) JAMES B. WINEGAR			15			0			0	0	0		
			OBSERVER'S SIGNATURE <i>J. B. Winegar</i>			DATE 8/9/96			16			0			0	0
			ORGANIZATION ETA			DATE 3/27/96			17			0			0	0
			COMMENTS * SLANT < = 5°			18			0			0			0	0

127

VISIBLE EMISSION OBSERVATION FORM

10w 7/84

SOURCE NAME L-P OSB PLANT				OBSERVATION DATE 8/9/96				START TIME 1845				STOP TIME 1951			
ADDRESS HWY 501				Min	Sec	0	15	30	45	Min	Sec	0	15	30	45
CITY ROXBORO				STATE NC				ZIP —							
PHONE —				SOURCE ID NUMBER —											
PROCESS EQUIPMENT DRYER				OPERATING MODE CONT											
CONTROL EQUIPMENT RTO #2				OPERATING MODE CONT											
DESCRIBE EMISSION POINT START ~86" DIAM GAY STR STOP SAME															
HEIGHT ABOVE GROUND LEVEL START ~60' STOP ~60'				HEIGHT RELATIVE TO OBSERVER START ~60' STOP ~60'											
DISTANCE FROM OBSERVER START ~380' STOP ~380'				DIRECTION FROM OBSERVER START E STOP E											
DESCRIBE EMISSIONS START NO VE DETECT STOP SAME															
EMISSION COLOR START NA STOP NA				PLUME TYPE CONTINUOUS ☐ FUGITIVE ☒											
WATER DROPLETS PRESENT YES ☐ NO ☒				IS WATER DROPLET PLUME ATTACHED ☒ DETACHED ☐											
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED START ~5' ABOVE STOP SAME															
DESCRIBE BACKGROUND START SKY STOP SKY															
BACKGROUND COLOR START OL+WH STOP SAME				SKY CONDITIONS START 50%cl STOP 60%cl											
WIND SPEED START 2-4 STOP 2-4				WIND DIRECTION START NW STOP VAR											
AMBIENT TEMP START — STOP —				WET BULB TEMP —				RH (%) —							
SOURCE LAYOUT SKETCH				DRAW NORTH ARROW											
				OBSERVER'S NAME (PRINT) JAMES B. WINEGAR											
				OBSERVER'S SIGNATURE <i>J. B. Winegar</i>											
				DATE 8/9/96											
				ORGANIZATION ETA											
				DATE 3/27/96											
				COMMENTS * SLANT 4 = 90° G = 6 MIN											

128

VISIBLE EMISSION OBSERVATION FORM

Form 7-94

SOURCE NAME L-P OSB PLANT			OBSERVATION DATE 8/9/96				START TIME 2009				STOP TIME 2025			
ADDRESS HWY 501			Min	Sec	0	15	30	45	Min	Sec	0	15	30	45
CITY ROXBORO			STATE NC		ZIP —		1	0	0	0	0	31		
PHONE —			SOURCE ID NUMBER —				2	0	0	0	0	32		
PROCESS EQUIPMENT DRYER			OPERATING MODE CONT				3	0	0	0	0	33		
CONTROL EQUIPMENT RTO #2			OPERATING MODE CONT				4	0	0	0	0	34		
DESCRIBE EMISSION POINT START ~86" DIAM GRY STR STOP SAME							5	0	0	0	0	35		
HEIGHT ABOVE GROUND LEVEL START ~60' STOP ~60'			HEIGHT RELATIVE TO OBSERVER START ~60' STOP ~60'				6	0	0	0	0	36		
DISTANCE FROM OBSERVER START ~380' STOP ~380'			DIRECTION FROM OBSERVER START E STOP E				7	0	0	0	0	37		
DESCRIBE EMISSIONS START NO VE DETECT STOP SAME							8	0	0	0	0	38		
EMISSION COLOR START NA STOP NA			PLUME TYPE CONTINUOUS ☐ FUGITIVE ☒ INTERMITTENT ☐				9	0	0	0	0	39		
WATER DROPLETS PRESENT YES ☐ NO ☒			IS WATER DROPLET PLUME ATTACHED ☐ DETACHED ☒				10	0	0	0	0	40		
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED START ~5' ABOVE STOP SAME							11	0	0	0	0	41		
DESCRIBE BACKGROUND START SKY STOP SKY							12	0	0	0	0	42		
BACKGROUND COLOR START BL-GRY STOP DNR GRY			SKY CONDITIONS START 80% d STOP 80% d				13	0	0	0	0	43		
WIND SPEED START 1-3 STOP 1-3			WIND DIRECTION START VAR STOP VAR				14	0	0	0	0	44		
AMBIENT TEMP START — STOP —			WET BULB TEMP —				15	0	0	0	0	45		
RH (%) —							16	0	0	0	0	46		
SOURCE LAYOUT SKETCH			DRAW NORTH ARROW				17					47		
			OBSERVER'S NAME (PRINT) JAMES B. WINEGAR				18	END DUE TO DARKNESS				48		
			OBSERVER'S SIGNATURE <i>James B. Winegar</i>				DATE 8/9/96					19		
			OBSERVATION ETA				DATE 3/27/96					20		
			COMMENTS * SLANT α = 90				21							
							22							

VISIBLE EMISSION OBSERVATION FORM

Rev 7/84

SOURCE NAME L-P OSB PLANT				OBSERVATION DATE 8/6/98				START TIME 1045				STOP TIME 1145					
ADDRESS Hwy 501				Min	Sec	0	15	30	45	Min	Sec	0	15	30	45		
CITY ROXBORO	STATE NC	ZIP —		1	0	0	0	0	31	0	0	0	0	0			
PHONE —	SOURCE ID NUMBER —			2	0	0	0	0	32	0	0	0	0	0			
PROCESS EQUIPMENT PRESS				OPERATING MODE CONT				3	0	0	0	0	33	0	0	0	0
CONTROL EQUIPMENT RTO #3				OPERATING MODE CONT				4	0	0	0	0	34	0	0	0	0
DESCRIBE EMISSION POINT START ~80" DIAM GUY STK STOP SAME				5	0	0	0	0	35	0	0	0	0	0			
HEIGHT ABOVE GROUND LEVEL START ~80' STOP ~80'		HEIGHT RELATIVE TO OBSERVER START ~40' STOP ~40'		6	0	0	0	0	36	0	0	0	0	0			
DISTANCE FROM OBSERVER START ~325' STOP ~325'		DIRECTION FROM OBSERVER START NW STOP NW		7	0	0	0	0	37	0	0	0	0	0			
DESCRIBE EMISSIONS START NO VE DETECT STOP SAME				8	0	0	0	0	38	0	0	0	0	0			
EMISSION COLOR START NA STOP NA		PLUME TYPE CONTINUOUS ☐ FUGITIVE ☐ NA INTERMITTENT ☐		9	0	0	0	0	39	0	0	0	0	0			
WATER DROPLETS PRESENT YES ☐ NO ☒		IS WATER DROPLET PLUME ATTACHED ☐ NA DETACHED ☐		10	0	0	0	0	40	0	0	0	0	0			
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED START ~5' ABOVE STOP SAME				11	0	0	0	0	41	0	0	0	0	0			
DESCRIBE BACKGROUND START SKY STOP SKY				12	0	0	0	0	42	0	0	0	0	0			
BACKGROUND COLOR START GRAY STOP SAME		SKY CONDITIONS START 70%cd STOP 70%cd		13	0	0	0	0	43	0	0	0	0	0			
WIND SPEED START 2-4 STOP 2-4		WIND DIRECTION START VAR STOP VAR		14	0	0	0	0	44	0	0	0	0	0			
AMBIENT TEMP START 83°F STOP —		WET BULB TEMP 77°F		15	0	0	0	0	45	0	0	0	0	0			
RH (%) 76				16	0	0	0	0	46	0	0	0	0	0			
SOURCE LAYOUT SKETCH 				17	0	0	0	0	47	0	0	0	0	0			
DRAW NORTH ARROW				18	0	0	0	0	48	0	0	0	0	0			
				19	0	0	0	0	49	0	0	0	0	0			
				20	0	0	0	0	50	0	0	0	0	0			
				21	0	0	0	0	51	0	0	0	0	0			
				22	0	0	0	0	52	0	0	0	0	0			
				23	0	0	0	0	53	0	0	0	0	0			
				24	0	0	0	0	54	0	0	0	0	0			
				25	0	0	0	0	55	0	0	0	0	0			
				26	0	0	0	0	56	0	0	0	0	0			
				27	0	0	0	0	57	0	0	0	0	0			
				28	0	0	0	0	58	0	0	0	0	0			
				29	0	0	0	0	59	0	0	0	0	0			
				30	0	0	0	0	60	0	0	0	0	0			

OBSERVER'S NAME (PRINT) JAMES B. WINEGAR	
OBSERVER'S SIGNATURE 	DATE 8/6/98
ORGANIZATION ETA	
CERTIFIED BY ETA	DATE 3/27/98
COMMENTS * SLANT <math>\alpha</math> = 7°	

VISIBLE EMISSION OBSERVATION FORM

10-794

SOURCE NAME L-P OSB PLANT				OBSERVATION DATE 8/6/96				START TIME 1145				STOP TIME 1245			
ADDRESS HWY 501				Min	1	Sec		Min	1	Sec					
				0	15	30	45	0	15	30	45				
CITY ROXBORO	STATE NC		ZIP —	1	0	0	0	31	0	0	0				
PHONE —	SOURCE ID NUMBER —			2	0	0	0	32	0	0	0				
				3	0	0	0	33	0	0	0				
				4	0	0	0	34	0	0	0				
				5	0	0	0	35	0	0	0				
PROCESS EQUIPMENT PRESS			OPERATING MODE CONT	6	0	0	0	36	0	0	0				
CONTROL EQUIPMENT RTO #3			OPERATING MODE CONT	7	0	0	0	37	0	0	0				
				8	0	0	0	38	0	0	0				
				9	0	0	0	39	0	0	0				
DESCRIBE EMISSION POINT START ~86" DIAM GAY STK STOP SAME				10	0	0	0	40	0	0	0				
HEIGHT ABOVE GROUND LEVEL START ~80' STOP ~80'		HEIGHT RELATIVE TO OBSERVER START ~40' STOP ~40'		11	0	0	0	41	0	0	0				
				12	0	0	0	42	0	0	0				
DISTANCE FROM OBSERVER START ~325' STOP ~325'		DIRECTION FROM OBSERVER START NW STOP NW		13	0	0	0	43	0	0	0				
				14	0	0	0	44	0	0	0				
				15	0	0	0	45	0	0	0				
DESCRIBE EMISSIONS START NO VE DETECT STOP SAME				16	0	0	0	46	0	0	0				
				17	0	0	0	47	0	0	0				
EMISSION COLOR START NA STOP NA		PLUME TYPE CONTINUOUS ☐ PUGITIVE ☒ INTERMITTENT ☐		18	0	0	0	48	0	0	0				
				19	0	0	0	49	0	0	0				
WATER DROPLETS PRESENT YES ☐ NO ☒		IS WATER DROPLET PLUME ATTACHED ☒ DETACHED ☐		20	0	0	0	50	0	0	0				
				21	0	0	0	51	0	0	0				
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED START ~5' ABOVE STOP SAME				22	0	0	0	52	0	0	0				
				23	0	0	0	53	0	0	0				
DESCRIBE BACKGROUND START SKY/ STOP SKY/				24	0	0	0	54	0	0	0				
BACKGROUND COLOR START OL + WH STOP SAME		SKY CONDITIONS START 70%cl STOP 70%cl		25	0	0	0	55	0	0	0				
				26	0	0	0	56	0	0	0				
WIND SPEED START 2-4 STOP 2-4		WIND DIRECTION START VAR STOP VAR		27	0	0	0	57	0	0	0				
				28	0	0	0	58	0	0	0				
AMBIENT TEMP START — STOP —		WET BULB TEMP —		29	0	0	0	59	0	0	0				
		RH (%) —		30	0	0	0	60	0	0	0				

SOURCE LAYOUT SKETCH

DRAW NORTH ARROW

OBSERVER'S NAME (PRINT)
JAMES B. LINEGAR

OBSERVER'S SIGNATURE
[Signature] DATE
8/6/96

ORGANIZATION
ETA

CERTIFIED BY
ETA DATE
3/27/98

COMMENTS
*** SLANT θ = 7°**

VISIBLE EMISSION OBSERVATION FORM

fow 7704

SOURCE NAME L-P OSB PLANT				OBSERVATION DATE 8/6/96				START TIME 1245				STOP TIME 1315			
ADDRESS HWY 501				Min Sec 0 15 30 45				Min Sec 0 15 30 45							
CITY ROXBORO				STATE NC				ZIP —							
PHONE —				SOURCE ID NUMBER —											
PROCESS EQUIPMENT PRESS				OPERATING MODE CONT											
CONTROL EQUIPMENT RTO #3				OPERATING MODE CONT											
DESCRIBE EMISSION POINT START ~88" DIAM CNY STR STOP SAME															
HEIGHT ABOVE GROUND LEVEL START ~80' STOP ~80'				HEIGHT RELATIVE TO OBSERVER START ~40' STOP ~40'											
DISTANCE FROM OBSERVER START ~325' STOP ~325'				DIRECTION FROM OBSERVER START NW STOP NW											
DESCRIBE EMISSIONS START NO VE DETECT STOP SAME															
EMISSION COLOR START NA STOP NA				PLUME TYPE CONTINUOUS ☐ FUGITIVE ☐ INTERMITTENT ☐											
WATER DROPLETS PRESENT YES ☐ NO ☒				IS WATER DROPLET PLUME ATTACHED ☐ DETACHED ☒											
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED START ~5' ABOVE STOP SAME															
DESCRIBE BACKGROUND START SKY STOP SKY															
BACKGROUND COLOR START CNY STOP SAME				SKY CONDITIONS START 70%cl STOP 80%cl											
WIND SPEED START 2-4 STOP 3-6				WIND DIRECTION START VAR STOP SW											
AMBIENT TEMP START — STOP —				WET BULB TEMP —				RH (%) —							

SOURCE LAYOUT SKETCH

DRAW NORTH ARROW

OBSERVER'S NAME (PRINT)
JAMES O. WINEGAR

OBSERVER'S SIGNATURE
[Signature]

DATE
8/6/96

ORGANIZATION
ETA

CERTIFIED BY
ETA

DATE
3/27/96

COMMENTS
*** SLANT 8 = 7°**

VISIBLE EMISSION OBSERVATION FORM

10m 7/04

SOURCE NAME L-P OSB PLANT				OBSERVATION DATE 8/6/96				START TIME 1345				STOP TIME 1502			
ADDRESS HWY 501				CITY ROXBORO				STATE NC				ZIP —			
PHONE —				SOURCE ID NUMBER —				PROCESS EQUIPMENT PRESS				OPERATING MODE CONT			
CONTROL EQUIPMENT RTU #3				OPERATING MODE CONT				DESCRIBE EMISSION POINT START ~86" DIAM GAY STK STOP SAME				HEIGHT ABOVE GROUND LEVEL START ~80' STOP ~80'			
DISTANCE FROM OBSERVER START ~58' STOP ~58'				DIRECTION FROM OBSERVER START E-NE STOP E-NE				DESCRIBE EMISSIONS START NO VE DETECT STOP SAME				EMISSION COLOR START NA STOP NA			
WATER DROPLETS PRESENT YES ☐ NO ☒				IS WATER DROPLET PLUME ATTACHED ☐ DETACHED ☒				POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED START ~5' ABOVE STOP SAME				DESCRIBE BACKGROUND START SKY STOP SKY			
BACKGROUND COLOR START GAY STOP SAME				SKY CONDITIONS START 70% cloud STOP 60% cloud				WIND SPEED START 2-4 STOP 3-6				WIND DIRECTION START VAN STOP SE			
AMBIENT TEMP START — STOP —				WET BULB TEMP —				RH (%) —				OBSERVER'S NAME (PRINT) JAMES B. WINEGAR			
SOURCE LAYOUT SKETCH				DRAW NORTH ARROW				OBSERVER'S SIGNATURE <i>James B. Winegar</i>				DATE 8/6/96			
OBSERVER'S POSITION				EMISSION POINT				ORGANIZATION ETA				DATE 3/27/96			
SUN LOCATION LINE				140°				COMMENTS * SLANT θ = 54°				θ = 17 MIN (PLANT OWN)			

133

VISIBLE EMISSION OBSERVATION FORM

Rev 7/84

SOURCE NAME L-P OSB PLANT				OBSERVATION DATE 8/6/98				START TIME 1530				STOP TIME 1630			
ADDRESS HWY 501				Min	Sec	0	15	30	45	Min	Sec	0	15	30	45
CITY NOXBORO		STATE NL		ZIP —		1	0	0	0	31	0	0	0	0	0
PHONE —		SOURCE ID NUMBER —		2	0	0	0	0	32	0	0	0	0	0	0
PROCESS EQUIPMENT PRESS		OPERATING MODE CONT		3	0	0	0	0	33	0	0	0	0	0	0
CONTROL EQUIPMENT RTO #3		OPERATING MODE CONT		4	0	0	0	0	34	0	0	0	0	0	0
DESCRIBE EMISSION POINT				5	0	0	0	0	35	0	0	0	0	0	0
START ~85' DIAM R/W/5TH STOP SAME				6	0	0	0	0	36	0	0	0	0	0	0
HEIGHT ABOVE GROUND LEVEL START ~80' STOP ~80'		HEIGHT RELATIVE TO OBSERVER START ~80' STOP ~80'		7	0	0	0	0	37	0	0	0	0	0	0
DISTANCE FROM OBSERVER * START ~180' STOP ~180'		DIRECTION FROM OBSERVER START E STOP E		8	0	0	0	0	38	0	0	0	0	0	0
DESCRIBE EMISSIONS				9	0	0	0	0	39	0	0	0	0	0	0
START NO VE DETECT STOP SAME				10	0	0	0	0	40	0	0	0	0	0	0
EMISSION COLOR START NA STOP NA		PLUME TYPE CONTINUOUS ☐ FUGITIVE ☐ INTERMITTENT ☐		11	0	0	0	0	41	0	0	0	0	0	0
WATER DROPLETS PRESENT YES ☐ NO ☒		IS WATER DROPLET PLUME ATTACHED ☐ DETACHED ☒		12	0	0	0	0	42	0	0	0	0	0	0
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED				13	0	0	0	0	43	0	0	0	0	0	0
START ~5' ABOVE STOP SAME				14	0	0	0	0	44	0	0	0	0	0	0
DESCRIBE BACKGROUND				15	0	0	0	0	45	0	0	0	0	0	0
START SKY/ STOP SKY				16	0	0	0	0	46	0	0	0	0	0	0
BACKGROUND COLOR START GRN STOP DL+WH STOP SAME		SKY CONDITIONS START 70%cl STOP 90%cl		17	0	0	0	0	47	0	0	0	0	0	0
WIND SPEED START 3-6 STOP 3-6		WIND DIRECTION START SE STOP E		18	0	0	0	0	48	0	0	0	0	0	0
AMBIENT TEMP START — STOP —		WET BULB TEMP — RH (%) —		19	0	0	0	0	49	0	0	0	0	0	0
SOURCE LAYOUT SKETCH				20	0	0	0	0	50	0	0	0	0	0	0
				21	0	0	0	0	51	0	0	0	0	0	0
DRAW NORTH ARROW				22	0	0	0	0	52	0	0	0	0	0	0
OBSERVER'S NAME (PRINT) JAMES D. WINEGA				23	0	0	0	0	53	0	0	0	0	0	0
OBSERVER'S SIGNATURE <i>James D. Winega</i>				24	0	0	0	0	54	0	0	0	0	0	0
DATE 8/6/98				25	0	0	0	0	55	0	0	0	0	0	0
ORGANIZATION ETA				26	0	0	0	0	56	0	0	0	0	0	0
CERTIFIED BY ETA				27	0	0	0	0	57	0	0	0	0	0	0
DATE 3/27/98				28	0	0	0	0	58	0	0	0	0	0	0
COMMENTS * SLANT A = 24°				29	0	0	0	0	59	0	0	0	0	0	0
				30	0	0	0	0	60	0	0	0	0	0	0

134

VISIBLE EMISSIONS EVALUATOR

This is to certify that

James Winegar

met the specifications of Federal Reference Method 9 and qualified as a visible emissions evaluator. Maximum deviation on white and black smoke did not exceed 7.5% opacity and no single error exceeding 15% opacity was incurred during the certification test conducted by Eastern Technical Associates of Raleigh, North Carolina. This certificate is valid for six months from date of issue.

135

Thomas H. Rose
President

Will S. Lee
Vice President

David B. Savage, Jr.
Program Manager

252728

Certificate Number

Roanoke, Virginia

Location

March 27, 1996

Date of Issue

APPENDIX B. FIELD DATA

5. Sampling Point Determinations and Cyclonic Flow Checks

Sampling and Velocity Point Determination EPA Method 1

CLIENT Louisiana Pacific
 PLANT NAME Roxboro OSB Plant
 CITY, STATE Roxboro, NC
 SAMPLING LOCATION Rtn 3 Stack, Rtn #1, #2

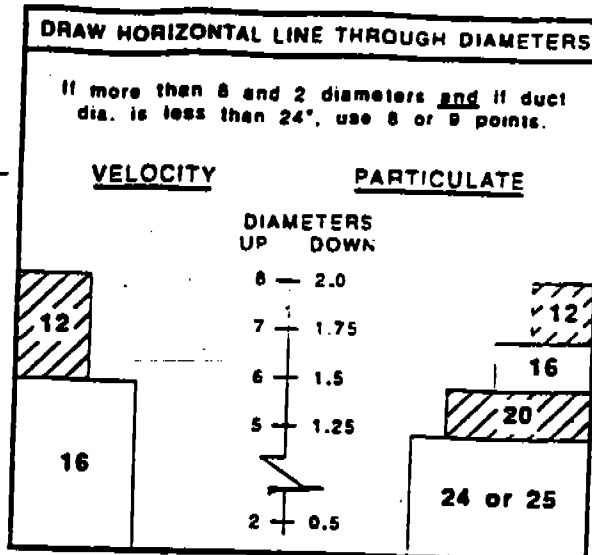
NO. OF PORTS AVAILABLE 2
 NO. OF PORTS USED 2
 PORT INSIDE DIAMETER _____

DISTANCE FROM FAR WALL TO OUTSIDE OF PORT 89 3/4
 * NIPPLE LENGTH AND/OR WALL THICKNESS 4"
 DEPTH OF STACK OR DUCT 85 3/4"
 STACK OR DUCT WIDTH (IF RECTANGULAR) N/A

EQUIVALENT DIAMETER:
 $D_E = \frac{2 \times \text{DEPTH} \times \text{WIDTH}}{\text{DEPTH} + \text{WIDTH}} = \frac{2 \times () \times ()}{() + ()} = ()$

DISTANCE FROM PORTS TO FLOW DISTURBANCES
 UPSTREAM 268" DOWNSTREAM > 420"
 DIAMETERS 3.13 2 1/2

STACK/DUCT AREA = $\pi R^2 = 5775.02 \text{ IN}^2$



PITOT USED (✓) TYPE "S" ✓ STANDARD _____

LOCATION OF POINTS IN CIRCULAR STACKS OR DUCTS

	4	6	8	10	12	14	16	18	20	22	24
1	6.7	4.4	3.2	2.0	2.1	1.8	1.6	1.4	1.3	1.1	1.1
2	25.0	14.0	10.5	8.2	6.7	5.7	4.9	4.4	3.9	3.6	3.2
3	75.0	29.8	19.4	14.6	11.8	9.9	8.5	7.5	6.7	6.0	5.5
4	93.3	70.4	32.3	22.6	17.7	14.6	12.5	10.9	9.7	8.7	7.9
5		85.4	67.7	34.2	26.0	20.1	16.9	14.6	12.9	11.6	10.5
6		95.6	80.6	66.8	36.6	28.9	22.0	18.8	16.5	14.6	13.2
7			89.5	77.4	64.4	36.6	28.3	23.6	20.4	18.0	16.1
8			96.8	86.4	75.0	63.4	37.5	29.6	25.0	21.8	19.4
9				91.8	82.3	73.1	62.5	38.2	30.6	26.2	23.0
10				97.4	88.2	79.0	71.7	61.8	38.6	31.6	27.2
11					93.3	85.4	78.0	70.4	61.2	39.3	32.3
12					97.9	90.1	83.1	76.4	69.4	60.7	39.6
13						94.3	87.5	81.2	75.0	68.5	60.2
14						98.2	91.6	85.4	79.6	73.8	67.7
15							95.1	89.1	83.5	78.2	72.8
16							98.4	92.5	87.1	82.0	77.0
17								95.6	90.3	85.4	80.6
18								98.6	93.3	88.4	83.9
19									96.1	91.3	86.8
20									98.7	94.0	89.5
21										96.5	92.1
22										98.9	94.5
23											96.8
24											98.9

LOCATION OF POINTS IN RECTANGULAR STACKS OR DUCTS

	2	3	4	5	6	7	8	9	10	11	12
1	25.0	16.7	12.5	10.0	8.3	7.1	6.3	5.6	5.0	4.5	4.2
2	76.0	50.0	37.5	30.0	26.0	21.4	18.8	16.7	15.0	13.6	12.6
3		83.3	62.5	50.0	41.7	35.7	31.3	27.8	25.0	22.7	20.8
4			87.5	70.0	58.3	50.0	43.8	38.9	35.0	31.8	29.2
5				90.0	75.0	64.3	56.3	50.0	45.0	40.9	37.5
6					91.7	78.8	68.8	61.1	55.0	50.0	45.8
7						102.0	81.3	72.2	65.0	60.1	54.2
8							93.8	83.3	75.0	68.2	62.5
9								94.4	85.0	77.3	70.8
10									95.0	86.4	79.2
11										95.5	87.5
12											95.8

F-0016 rev. 8-83

* NIPPLE LENGTH = 3 1/4" L BRACKET = 4"

POINT	% OF DUCT DEPTH	DISTANCE FROM INSIDE WALL	DISTANCE FROM OUTSIDE OF PORT
1	2.1	1.80	5.8 3/4
2	6.7	5.75	9 3/4
3	11.8	10.119	14 1/8
4	17.7	15.178	19 1/8
5	25.0	21.44	25 1/2
6	35.6	30.53	34 1/2
7	64.4	55.22	59 1/4
8	75.0	64.31	68 1/4
9	82.3	70.57	74 1/2
10	88.2	75.63	79 5/8
11	93.3	80.00	84
12	97.9	83.95	88
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			
25			

Page of

Horizontal Dust Flyash/Dust Buildup > 1" Depth (✓)? Yes No

Page ____ of ____

Horizontal Duct Flyash/Dust Buildup > 1" Depth (✓)? Yes ☒ No ☐

[illegible]

Page 1 of 1

<u>PRELIMINARY TRAVERSES</u>			
Start - Finish Times:			
<u>1400</u> - <u>1420</u>			
Test Pt.	Yaw Ang. ° ϕ	ΔP "H ₂ O	Temp. °F
A1	-10	0.89	
2	-5	0.88	
3	-8	0.74	
4	-12	0.74	
5	-8	0.78	
6	-7	0.83	
7	+3	0.80	
8	+5	0.96	
9	+3	0.97	
10	+6	0.94	
11	+12	0.96	
12	+14	0.98	
B1	-15	1.12	
2	-8	1.17	
3	-15	0.88	
4	-10	0.86	
5	-8	0.84	
6	-8	0.84	
7	+6	0.78	
8	+9	0.75	
9	+10	0.74	
10	+14	0.94	
11	+14	0.95	
12	+12	0.97	
Avg.	9.3		

[illegible]

142

APPENDIX C. ANALYTICAL DATA

RESOLUTION ANALYTICS, INC.

Specialists in High Performance Liquid Chromatography



2733 LEE AVENUE

SANFORD, NC 27330

(919) 774-5557

ANALYTICAL REPORT

- FILTERABLE/CONDENSIBLE
PARTICULATE

(EPA METHOD 5/202)

CLIENT: ENTROPY, INC.

RFA#: 13034-15575-18



REPORT SUMMARY

RFA#: **13034-15575-18**

SAMPLE ID	Filterable Particulate	Organic Particulate	Inorganic Particulate	Total Particulate
ACETONE BLANK	0.2 mgs (250 mls)			
METHYLENE CHLORIDE BLANK		0.2 mgs (220 mls)		
H ₂ O BLANK			2.1 mgs (445 mls)	
S1-M5/202-1	23.8 mgs	13.1 mgs	2.8 mgs	39.7 mgs
S1-M5/202-2	18.5 mgs	5.1 mgs	0.6 mgs	24.2 mgs
S1-M5/202-3	23.5 mgs	6.6 mgs	11.4 mgs	41.5 mgs
S2-M5/202-1	39.9 mgs	9.2 mgs	11.3 mgs	60.5 mgs
S2-M5/202-2	29.1 mgs	4.9 mgs	1.8 mgs	35.8 mgs
S2-M5/202-3	19.9 mgs	2.3 mgs	3.8 mgs	26.0 mgs
S3-M5/202-1	1.5 mgs	1.7 mgs	3.8 mgs	7.0 mgs 6.9 mgs
S3-M5/202-2	1.4 mgs	0.0 mgs	1.2 mgs	2.6 mgs 2.5 mgs
S3-M5/202-3	3.4 mgs	1.2 mgs	0.5 mgs	5.0 mgs 5.1 mgs

SAMPLE TRANSFER RECORD OF CUSTODY

Please include this form with the final (typed) results, and whenever the final results are faxed to Entropy.

The samples referenced in Entropy Environmentalists Inc. RFA or purchase order No. 13094-15575-18 were shipped by Entropy on 8/12/96 (date) via PERSONAL-CUSTODY (mode) to RAI (laboratory) by Sean Daly (signature)

The samples were received for analysis on 9/12/96 (date) at RAI (laboratory) by JBN (signature)

As applicable, note any broken seals, leakage, spillage, or damage to samples. If discrepancy, specify seal No., jar No., sample No., etc.

62147

Analytical Narrative

RFA # 13094-15575-18

Page 1 of 1

Client/Plant Name: Louisiana-PacificDate Rec'd in lab: 8/13/96Analyst: JBNDate of Analysis: 8/21/96Analysis Method: EPA Method 5/202Analyte(s): Filterable & Condensible Particulate

Sample Matrix & Components:

Dry Filters, Front $\frac{1}{2}$ Acetone Rinses, H₂O impinger samples, Back $\frac{1}{2}$ Methylene Chloride Rinses, and solvent blanks

Summary of Sample Prep:

The acetone rinses and pre-tared filters were transferred to pre-tared teflon "baggies" in a low humidity environment. H₂O impinger samples were extracted with methylene chloride (EPA SW846) using the Back $\frac{1}{2}$ rinse as the first extract. Both acetone and methylene chloride rinses were then evaporated overnight then desiccated for 24 hours, after which time they were weighed daily every six hours until consecutive weights agreed within ± 0.5 mgs. The H₂O impinger samples were evaporated under heat (at ambient pressure) until dry then weighed daily every six hours until consecutive weights agreed within ± 0.5 mgs. The filters were oven dried at 105°C for 2 hours then weighed immediately.

All weights were recorded to the nearest 0.1 mg. The total catch reported for each run is a sum of the filterable and condensible (organic and inorganic) catches. The solvent blank catch weights have been subtracted out of sample catches in proportion with their respective solvent volumes.

Summary of Instrumentation:

Denver model A-250 analytical balance

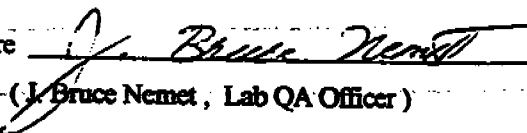
Analytical Detection Limit(s): 0.5 mgs

Miscellaneous Comments Regarding Sample Analysis: (Note unusual catch weights, interferences, odd sample behavior, and steps taken to confirm unusual results. Also note any deviations from standard analytical procedures, together with justification and possible affect on results. Specify samples when applicable.)

- 1) See Data Sheets for individual sample descriptions.

Confirmation of Data Review:

QA Officer Signature


(J. Bruce Nemet, Lab QA Officer)

Date

8/22/96

PARTICULATE SAMPLING LABORATORY RESULTS

Plant Name: LA Pacific	RFA #: 15575	Method: 5/202
Date Received: 8/13/95	Page 1 of 4	File Name: 13064
File Pathway: C:\JOBS\15575\13064.WB1		

Run Number	S1-M5/202-1	S1-M5/202-2	S1-M5/202-3
Filter Container #	3	9	15
Date	8/14	8/14	8/14
Init	JBN	JBN	JBN
Baggie Tare Wt., g.	4.3627	3.9482	4.0507
Filter Tare Wt., g.	3.8585	3.4459	3.5589
Filter Sample Wt., g.	0.4882	0.4875	0.4753
	0.0150	0.0148	0.0165

Acetone Rinse Container #	36	7	24
Date	8/19	8/19	8/19
Init	JBN @	JBN @	JBN @
Tare Wt., g.	3.5157	4.0887	3.5613
Sample Wt., g.	3.5157	4.0884	3.5612
	(200 ml)	(210 ml)	(210 ml)
	0.0090	0.0039	0.0072

DI H2O Container #	681	10	1
Date	8/20	8/20	8/20
Init	JBN @	JBN @	JBN @
Tare Wt., g.	3.4685	3.7331	3.2321
Sample Wt., g.	3.4683	3.7327	3.2322
	(770 ml)	(600 ml)	(650 ml)
	0.0064	0.0037	0.0145

MeCl2 Container #	692	694	662
Date	8/19	8/19	8/19
Init	JBN @	JBN @	JBN @
Tare Wt., g.	3.6418	3.5337	3.5853
Sample Wt., g.	3.6417	3.5333	3.5851
	(180 ml)	(75 ml)	(140 ml)
	0.0132	0.0052	0.0067

Front-Half Rinse Catch, mg.	9.0	3.9	7.2
Acetone Blank Residue, mg.	0.2	0.2	0.2
Front-Half Rinse, mg.	8.8	3.7	7.0
Organic Fraction Catch, mg.	13.2	5.2	6.7
Methylene Chloride Blank Residue, mg.	0.1	0.1	0.1
Organic Fraction Catch, mg.	13.1	5.1	6.6
Inorganic Fraction Catch, mg.	6.4	3.7	14.5
Water Blank Residue, mg.	3.6	3.1	3.1
Inorganic Fraction Catch, mg.	2.8	0.6	11.4
NH4 + Water Residue, mg. (SO4 catch x 0.0205)	N/A	N/A	N/A
Ammonium Chloride Residue, mg.	N/A	N/A	N/A
Adjusted Inorganic Fraction Catch, mg.	2.8	0.6	11.4

TOTAL FILTERABLE PARTICULATE, mg.	23.8	18.5	23.5
TOTAL PARTICULATE, mg.	39.7	24.2	41.5

Miscellaneous Notes & Comments:

Visual Inspection of Filters			
Run ID	S1-M5/202-1	S1-M5/202-2	S1-M5/202-3
Color:	Beige	Tan	Tan
Texture:	Stain	Stain	Stain
Foreign Matter:	None	None	None
Relative Comp:	Equal	Equal	Equal

Visual Inspection of Rinses			
Run ID	S1-M5/202-1	S1-M5/202-2	S1-M5/202-3
Color:	Yellow-Brown	Yellow-Brown	Yellow-Brown
Texture:	Stain / Oily	Stain / Oily	Stain / Oily
Foreign Matter:	None	None	None
Relative Comp:	Equal	Equal	Equal

Printing Date: 22-Aug-95

149

Printing Time:

12:38 AM

PARTICULATE SAMPLING LABORATORY RESULTS

Plant Name: LA Pacific	RFA # 15575
Method: 5202	File Name: 13094
Date Received: 8/13/96	File Pathway: C:\JOBS\15575\13094.WB1
Page 2 of 4	

Run Number	S2-M5/202-1	S2-M5/202-2	S2-M5/202-3
Filter Container #	40	2	43
Date	8/14	8/14	8/14
Init	JBN	E3217	QE161
Baggie Tare Wt., g.	4.1222	4.9053	4.2312
Filter Tare Wt., g.	3.6204	4.4055	3.7308
Filter Sample Wt., g.	0.4781	0.4783	0.4846
	0.0237	0.0215	0.0158

Acetone Rinse Container #	S2-M5/202-1	S2-M5/202-2	S2-M5/202-3
Date	8/19	8/19	8/20
Init	JBN @	JBN @	JBN @
	(230 ml)	(210 ml)	(230 ml)
Tare Wt., g.	3.3342	3.6789	3.5287
Sample Wt., g.	3.3343	3.6787	3.5283
	3.3178	3.6709	3.5220
	0.0164	0.0078	0.0043

DI H2O Container #	S2-M5/202-1	S2-M5/202-2	S2-M5/202-3
Date	8/20	8/20	8/20
Init	JBN @	JBN @	JBN @
	(840 ml)	(840 ml)	(670 ml)
Tare Wt., g.	3.7893	3.5315	3.4208
Sample Wt., g.	3.7896	3.5320	3.4263
	3.7540	3.5257	3.4193
	0.0153	0.0058	0.0070

MeC12 Container #	S2-M5/202-1	S2-M5/202-2	S2-M5/202-3
Date	8/20	8/19	8/19
Init	JBN @	JBN @	JBN @
	(185 ml)	(100 ml)	(100 ml)
Tare Wt., g.	3.5551	3.3961	3.8620
Sample Wt., g.	3.5553	3.3964	3.8623
	3.5457	3.3911	3.8508
	0.0094	0.0050	0.0024

Front-Half Rinse Catch, mg.	16.4	7.8	4.3
Acetone Blank Residue, mg.	0.2	0.2	0.2
Front-Half Rinse, mg.	16.2	7.6	4.1
Organic Fraction Catch, mg.	9.4	5.0	2.4
Methylene Chloride Blank Residue, mg.	0.2	0.1	0.1
Organic Fraction Catch, mg.	9.2	4.9	2.3
Inorganic Fraction Catch, mg.	15.3	5.8	7.0
Water Blank Residue, mg.	4.0	4.0	3.2
Inorganic Fraction Catch, mg.	11.3	1.8	3.8
NH4 + Water Residue, mg. (SC4 catch x 0.0205)	N/A	N/A	N/A
Ammonium Chloride Residue, mg.	N/A	N/A	N/A
Adjusted Inorganic Fraction Catch, mg.	11.3	1.8	3.8

TOTAL FILTERABLE PARTICULATE, mg.	39.9	29.1	19.9
-----------------------------------	------	------	------

TOTAL PARTICULATE, mg.	60.5	35.5	28.1
		35.1	24.0

Miscellaneous Notes & Comments:

Visual Inspection of Filters				
Run ID	S2-M5/202-1	S2-M5/202-2	S2-M5/202-3	
Color:	Beige	Beige	Beige	
Texture:	Stain	Stain	Stain	
Foreign Matter:	None	None	None	
Relative Comp:	1.5x	1.5x	1x	

Visual Inspection of Rinser				
Run ID	S2-M5/202-1	S2-M5/202-2	S2-M5/202-3	
Color:	Yellow-Brown	Yellow-Brown	Yellow-Brown	
Texture:	Stain / Oily	Stain / Oily	Stain / Oily	
Foreign Matter:	None	None	None	
Relative Comp:	3x	2x	1x	

PARTICULATE SAMPLING LABORATORY RESULTS

Plant Name: LA Pacific		RFA #: 15575
Method: 5202		Filename: 13004
Date Received: 8/13/86	Page 3 of 4	File Pathway: CU08SV557513004.WB1
Run Number	S3-M5/202-1	S3-M5/202-2
		S3-M5/202-3

Filter Container #	11			13			26		
	Date	Init		Date			Date		
	8/14	JBN	4.1047	8/14	3.9628		8/14	3.9870	
Baggie Tare Wt., g.			3.6755		3.4502			3.4906	
Filter Tare Wt., g.		E3019	0.5188	E3020	0.5125	TGF426		0.4873	
FILTER SAMPLE WT., g.			0.0004		0.0001			0.0001	

Acetone Rinse Container #		16		23		27	
	Date	Init		Date		Date	
	8/19	JBN	3.4917	8/19	3.3445	8/19	3.4475
	8/18	JBN @	3.4914	8/18	3.3440	8/18	3.4472
Tare Wt., g.	(180 ml)	3.4902	(140 ml)	3.3426	(180 ml)	3.4438	
SAMPLE WT., g.		0.0012		0.0014		0.0034	

DI H2O Container #	17			37			19		
	Date	Init		Date		Date			
	8/20	JBN	3.5306	8/20	3.5195	8/20	@	3.5248	
	8/19	JBN @	3.5301	8/19	3.5191	8/19	@	3.5252	
Tare Wt., g.		(540 ml)	3.5238	(515 ml)	3.5155	(530 ml)		3.5218	
SAMPLE WT., g.			0.0063		0.0036			0.0030	

MeCl2 Container #	29			11			41		
	Date	Init		Date		Date			
	8/19	JBN @	3.6840	8/19 @	3.7102	8/19		3.4246	
	8/18	JBN	3.6844	8/18	3.7106	8/18 @		3.4244	
Tare Wt., g.		(110 ml)	3.6822	(130 ml)	3.7101	(150 ml)		3.4231	
SAMPLE WT., g.			0.0018		0.0001			0.0013	

Front-Half Rinse Catch, mg.	1.2	1.4	3.4
Acetone Blank Residue, mg.	0.1	0.1	0.1
Front-Half Rinse, mg.	1.1	1.3	3.3
Organic Fraction Catch, mg.	1.8	0.1	1.3
Methylene Chloride Blank Residue, mg.	0.1	0.1	0.1
Organic Fraction Catch, mg.	1.7	0.8	1.2
Inorganic Fraction Catch, mg.	6.3	3.6	3.0
Water Blank Residue, mg.	2.5	2.4	2.5
Inorganic Fraction Catch, mg.	3.8	1.2	0.5
NH4 + Water Residue, mg. (SO4 catch x 0.0205)	N/A	N/A	N/A
Ammonium Chloride Residue, mg.	N/A	N/A	N/A
Adjusted Inorganic Fraction Catch, mg.	3.8	1.2	0.5
TOTAL FILTERABLE PARTICULATE, mg.	1.5	1.4	3.4

TOTAL PARTICULATE, mg. 6.5 ^{SW}
7.0 2.5 ^{SW}
2.6 5.0 ^{SW}
5.1

Miscellaneous Notes & Comments:

Visual Inspection of Filters			
Run ID	S3-M5/202-1	S3-M5/202-2	S3-M5/202-3
Color:	Clear	Clear	Clear
Texture:	N/A	N/A	N/A
Foreign Matter:	None	None	None
Relative Comp:	Equal	Equal	Equal
Visual Inspection of Rinses			
Run ID	S3-M5/202-1	S3-M5/202-2	S3-M5/202-3
Color:	Clear to White	Clear to White	Clear to White
Texture:	Stain	Stain	Stain
Foreign Matter:	None	None	None
Relative Comp:	Equal	Equal	Equal

Printing Date: 21-Aug-86

151

Printing Time: 12:35 AM

REAGENT BLANK LABORATORY RESULTS (Version 04.28.92)

Plant Name: LA Pacific RFA # 15575
 Method: 5/202 Filename: 13094
 Date Received: 8/13/96 Page 4 of 4 File Pathway: C:\JOBS\15575\13094.WB1

Blank Type Acetone Methylene Chloride Water

Sample ID/Container #	Date	Ink	33	Date	680	Date	666
	8/19	JBN	3.3566	8/19	3.3276	8/19	@ 3.3570
	8/18	JBN @	3.3565	8/18	3.3275	8/18	@ 3.3570
Tare Wt., g.	(	250 ml)	3.3563	(	220 ml)	(	445 ml)
SAMPLE WT., g.			0.0002		0.0002		0.0021

Blank Beaker #	33	680	666
Final wt., mg.	3.3565	3.3275	3.3570
Tare wt., mg.	3.3563	3.3273	3.3549
Residue, mg.	0.200	0.200	2.100
Volume, ml.	250	220	445
Density, mg/ml	785.0	1315.0	1000.0
Conc., mg/mg	1.019E-06 @	6.913E-07 @	4.719E-06
Upper Limit, mg/mg	1.000E-05	1.000E-05	1.000E-05

Printing Date

08/21/96

Printing Time:

12:35 AM

152

APPENDIX D. CALIBRATION DATA

1. Manual Test Methods

SAMPLING EQUIPMENT AUDIT

Plant Name LOUISIANA-PACIFIC, ROXBORO OSB PLANT Job No. 15575
 City/State ROXBORO, NC Auditor(s) JDK
 Test Loc. RTO #1 STACK Date 8-6-96

BAROMETER
 Entropy In-House Ref. Barometer _____ "Hg vs Field Barometer _____ "Hg
 Date Compared _____ Dev. _____ "Hg (Max. Allowable Dev.: ± 0.1 "Hg)
 Field Barometric Pressure Corrected for Test Location Elevation? (v) _____
 (Note: deduct 0.1" Hg from local NWS STATION pressure for each 100' of test location elevation; example: $29.6 - (300/100 * 0.1) = 29.3$ "Hg.)

Ref. Therm. Initial Ambient Temp., °F	Allowable Deviation From Ambient	Ambient Temperature, °F	Audit OK (v)
THERMOMETERS*			
Dry Gas Meter	± 5.4 °F	_____ (Meterbox No. _____)	_____
Impinger Exit	± 2.0 °F	_____	_____
Filter Box	± 5.4 °F	_____	_____

* Adjust thermometer until acceptable. If it cannot be adjusted, use as backup. If no backup, record ambient temperature indicated by unadjusted thermometer and label with correction factor (indicate):

THERMOCOUPLES Allowable Deviation from Ambient: ± 8.0 °F* (± 2.0 °F)**

TC No. / °F	OK	TC No. / °F	OK	TC No. / °F	OK	TC No. / °F	OK	TC No. / °F	OK
_____	✓	_____	✓	_____	✓	_____	✓	_____	✓

* ± 8.0 °F = $\pm 1.5\%$ of ambient absolute temperature.
 ** (± 2.0 °F if used in saturated or water droplet-laden gas stream.)

ISOKINETIC METERBOX I.D. N-20 Gamma (Y) 0.9981 ΔH_e 1.779

As Applicable (check): Zero Magnehelics? ☒ Zero/Level Manometer? _____

Barometric Pressure (P_{bar}) 29.8 Auditor JDK Date 8-6-96

Dry Gas Meter Reading (Cubic Ft.)	Meter Temperature (°F)	Lower and Upper Limits for Audit Gamma
Final <u>147.287</u>	Final <u>91</u>	$0.96 * Y = \underline{0.9582}$
Initial <u>139.678</u>	Initial <u>85</u>	$1.04 * Y = \underline{1.0380}$

Dry Gas Volume Metered (Cubic Ft.)	Average Meter Temp. (°F)	Run Time (Base = 10)	
		(Minutes)	(Seconds)
V _m = <u>7.609</u>	T _m = <u>88</u>	<u>10</u>	<u>00</u>

0.75 = Ideal Sampling Rate

$$Y_c = \frac{[\text{Min.} + (\text{Sec.} / 60)]}{V_m} * \left[\frac{[(29.92) / (460 + T_m) * (0.75)^2] * (T_m + 460)}{P_{bar}} \right]^{.5}$$

$$Y_c = \frac{[10 + (00 / 60)]}{7.609} * \left[\frac{0.0319 (88 + 460)}{29.8} \right]^{.5} = \underline{1.0066}$$

Audit Gamma

Audit Gamma Acceptable (between lower & upper limits)? (v) ☒ Yes ☐ No

SAMPLING EQUIPMENT AUDIT

Client Louisiana-Pacific
 Plant Louisiana-Pacific Job No. 15575
 City/State Roxboro, NC Team Leader DDH
 Test Location RTD #2

BAROMETER
 Barometer (Van) No. 29.8 Checked OK? (✓) ☒ Shop Auditor DDH
 Entropy In-House Ref. Barometer _____ "Hg VE Van Barometer _____ "Hg
 Date Compared _____ Dev. _____ "Hg (Max. Allowable Dev.: ± 0.1 "Hg)
 Test Loc. Elevation Above Ground (Van) 0 Ft. Date 8-6-96 Field Auditor DDH
 Field Barometric Pressure Reduced for Test Location Elevation by N/A "Hg

Ref. Therm. Initial Ambient Temp., °F _____	Allowable Deviation From Ambient _____	Date <u>8-6-96</u>	Auditor <u>DDH</u>	✓
		Ambient Temperature, °F		
THERMOMETERS				
Dry Gas Meter	± 5.4 °F	<u>72</u>	(Meterbox I.D. <u>N-24</u>)	✓
Impinger Exit	± 2.0 °F	<u>72</u>		✓
Filter Box	± 5.4 °F	<u>72</u>		✓

THERMOCOUPLES				
TC No. / °F <u>✓</u> <u>R133/72</u> ✓ (Including Temp. Change and Direction) Auditor <u>DDH</u>	TC No. / °F <u>✓</u> <u>R474/72</u> ✓ (Including Temp. Change and Direction) Auditor <u>DDH</u>	TC No. / °F <u>✓</u> <u>R454/72</u> ✓ (Including Temp. Change and Direction) Auditor <u>DDH</u>	TC No. / °F <u>✓</u> _____ (Including Temp. Change and Direction) Auditor _____	TC No. / °F <u>✓</u> _____ (Including Temp. Change and Direction) Auditor _____

* As applicable, ASTM ref. thermometer No. Allowable dev. from ambient = ±2°F

ISOKINETIC METERBOX
 I.D. N-24 Gamma (Y) .9978 ΔH₀ 1.839
 As Applicable (check): Zero Magnetics? ☒ Zero/Level Manometer? _____
 Barometric Pressure (P_{bar}) 29.80 Auditor DDH Date _____

Dry Gas Meter Reading (Cubic Ft.)	Meter Temperature (°F)	Lower and Upper Limits for Audit Gamma
Final <u>324.442</u>	Final <u>92</u>	0.96 * Y = <u>0.95788</u>
Initial <u>316.829</u>	Initial <u>87</u>	1.04 * Y = <u>1.03771</u>
Dry Gas Volume Metered (Cubic Ft.)	Average Meter Temp. (°F)	Run Time (Base = 10)
V _m = <u>7.613</u>	T _m = <u>89.5</u>	(Minutes) <u>10</u> (Seconds) <u>0</u>

$$Y_c = \frac{[10 + (0 / 60)]}{7.613} \cdot \left[\frac{0.0319 (89.5 + 460)}{29.8} \right]^{.5} = \frac{1.00743}{\text{Audit Gamma}}$$

Audit Gamma Acceptable (between lower & upper limits)? (✓) Yes ☒ No _____
 Ideal Sampling Rate = 0.75

Positive Pressure Leak Check OK? Yes ☒ No _____

SAMPLING EQUIPMENT AUDIT

Client LOUISIANA PACIFIC CORP.
 Plant ROXBORO OSB PLANT Job No. 15575
 City/State ROXBORO, NC Team Leader DLS
 Test Location RTO #3 OUTLET

BAROMETER
 Barometer (Van) No. _____ Checked OK? (✓) _____ Shop Auditor _____
 Entropy In-House Ref. Barometer _____ "Hg vs Van Barometer _____ "Hg
 Date Compared _____ Dev. _____ "Hg (Max. Allowable Dev.: ± 0.1 "Hg)
 Test Loc. Elevation Above Ground (Van) 50 Ft. Date 8-05-96 Field Auditor DLS
 Field Barometric Pressure Reduced for Test Location Elevation by .05 "Hg

Ref. Therm. Initial Ambient Temp., °F 95 Allowable Deviation From Ambient _____ Date 8-06-96 Auditor DLS
 Ambient Temperature, °F _____
THERMOMETERS
 Dry Gas Meter ± 5.4 °F 91 (Meterbox I.D. N25) ✓
 Impinger Exit ± 2.0 °F 94 95 ✓
 Filter Box ± 5.4 °F 93 95 ✓

THERMOCOUPLES

TC No. / °F	✓	TC No. / °F	✓	TC No. / °F	✓	TC No. / °F	✓	TC No. / °F	✓
<u>R133/95</u>	✓	<u>R91/98</u>	✓	<u>R253/96</u>	✓				
(Including Temp. Change and Direction)		(Including Temp. Change and Direction)		(Including Temp. Change and Direction)		(Including Temp. Change and Direction)		(Including Temp. Change and Direction)	
Auditor <u>DLS</u>		Auditor <u>DLS</u>		Auditor <u>DLS</u>		Auditor _____		Auditor _____	

Allowable Deviation from Ambient: ± 8.0°F * (or ± 2.0°F) **
 * ± 8.0 °F = ± 1.5% of ambient absolute temperature.
 ** (± 2.0 °F if used in saturated or water droplet-laden gas stream.)

ISOKINETIC METERBOX
 I.D. N25 Gamma (Y) 0.9854 AHE 1.721
 As Applicable (check): Zero Magnehelics? ☒ Zero/Level Manometer? N/A
 Barometric Pressure (Pbar) 29.80 Auditor DLS Date 8-05-96

Dry Gas Meter Reading (Cubic Ft.)	Meter Temperature (°F)	Lower and Upper Limits for Audit Gamma	
Final <u>916.439</u>	Final <u>102</u>	0.96 * Y = <u>0.946</u>	
Initial <u>908.500</u>	Initial <u>98</u>	1.04 * Y = <u>1.025</u>	
Dry Gas Volume Metered (Cubic Ft.)	Average Meter Temp. (°F)	Run Time (Base = 10)	
Vm = <u>7.939</u>	Tm = <u>100</u>	(Minutes)	(Seconds)
		<u>10</u>	<u>0</u>

$$Y_c = \frac{(10 + 0 / 60)}{7.939} \cdot \left[\frac{0.0319 (100 + 460)}{29.80} \right]^{.5} = \frac{0.975}{\text{Audit Gamma}}$$

Audit Gamma Acceptable (between lower & upper limits)? (✓) Yes ☒ No _____
 Ideal Sampling Rate = 0.75

Positive Pressure Leak Check OK? Yes ☒ No _____

NOZZLE NUMBER 1808

Note: 1. All diameters measured in inches. 158
2. Maximum 0.004 inches from lowest to highest diameter.

R-0033a rev. 3-91

ENTROPY

NOZZLE NUMBER 1809

Note: 1. All diameters measured in inches.
2. Maximum 0.004 inches from lowest to highest diameter.

NOZZLE NUMBER 1811

Note: 1. All diameters measured in inches. 160
2. Maximum 0.004 inches from lowest to highest diameter.
R-0033a rev. 3-91

ENTROPY

NOZZLE NUMBER 1812

Note: 1. All diameters measured in inches. 161
2. Maximum 0.004 inches from lowest to highest diameter.

R-0033a rev. 3-91

NOZZLE NUMBER 1813

Note: 1. All diameters measured in inches.
2. Maximum 0.004 inches from lowest to highest diameter.

R-0033a rev. 3-91

ENTROPY

NOZZLE NUMBER 1814

Note: 1. All diameters measured in inches. 163
2. Maximum 0.004 inches from lowest to highest diameter.

R-0033a rev. 3-91

NOZZLE NUMBER 1815

Note: 1. All diameters measured in inches. 164
2. Maximum 0.004 inches from lowest to highest diameter.
R-0033a rev. 3-91



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Office of Air Quality Planning and Standards
Research Triangle Park, North Carolina 27711

MAY 24 1994

Mr. Roger T. Shigehara
Director, Research Division
Entropy Environmentalists, Inc.
Post Office Box 12291
Research Triangle Park, NC 27709-2291

Dear Mr. Shigehara:

This letter is written in response to your March 7, 1994 letter to Mr. Peter Westlin concerning an alternative to the post-test calibration procedure for the dry gas meter in section 5.3.2 of Method 5. A review of Entropy's proposed alternative procedure of the field calibration of the metering system in lieu of the post-test calibration, which usually requires the use of a spirometer or wet test meter in the laboratory, has been completed.

The Emission Measurement Branch finds this alternative acceptable and intends to propose the alternative procedure as a part of the proposed methods revision package. An Emission Measurement Technical Information Center (EMTIC) guidance document will be developed for this field calibration and placed on the EMTIC Bulletin Board System (BBS) in early June.

I appreciate this opportunity to be of service and trust this information will be helpful to you.

Sincerely,

Michael K. Ciolek

Michael K. Ciolek
Manufacturing and Combustion
Testing Section
Emission Measurement Branch

EMISSION MEASUREMENT TECHNICAL INFORMATION CENTER
GUIDELINE DOCUMENT

Alternative Method 5 Post-Test Calibration

INTRODUCTION AND BACKGROUND

EPA Method 5 requires the calibration of the metering system after each field use. Because the post-test calibration requires the use of a spirometer or wet test meter, the calibration is often conducted in the laboratory. However, a field calibration procedure is highly desirable for two reasons: (1) it eliminates questions about the possibility of the damage to the metering system occurring during transport and (2) it eliminates travel costs for a retest if the metering system fails the post-test calibration.

The alternative post-test calibration procedure described below is based on the principles of the optional pretest orifice meter coefficient check in Section 4.4.1 of Method 5. Since the orifice meter coefficient check will not detect leakages between the inlet of the metering system and the dry gas meter, the alternative procedure includes two additional steps: (1) a leak check from either the inlet of the sampling train or the inlet of the metering system and (2) a leak check of that portion of the sampling train from the pump to the orifice meter.

PROCEDURE

The alternative to the post-test calibration in Section 5.3.2 of Method 5 is as follows:

After each test run, do the following:

1. Ensure that the metering system has passed the post-test leak-check. If not, conduct a leak-check of the metering system from its inlet.
2. Conduct the leak-check of that portion of the train from the pump to the orifice meter as described in Section 5.6 of Method 5.
3. Calculate Y_p for each test run using the following equation:

$$Y_p = \frac{\theta}{V_p} \sqrt{\frac{0.0319 T_p}{\Delta H_p (P_p + \Delta \frac{H_{avg}}{13.6})} \frac{29}{M_d}} (\sqrt{\Delta H})_{avg}$$

where:

- Y_d = dry gas meter calibration check value, dimensionless.
 θ = total run time, min.
 V_d = total sample volume measured by dry gas meter, dcf.
 T_d = absolute average dry gas meter temp., °R.
 P_b = barometric pressure, in. Hg.
 $0.0319 = (29.92/528)(0.75)^2$ (in. Hg/o/R) cfm².
 ΔH_m = average orifice meter differential, in. H₂O.
 ΔH_c = orifice meter calibration coefficient, in. H₂O.
 M_g = dry molecular weight of stack gas, lb/lb-mole.
29 = dry molecular weight of air, lb/lb-mole.
13.6 = specific gravity of mercury.

After each test run series, do the following:

4. Average the three or more Y_d 's obtained from the test run series and compare this average Y_d with the dry gas meter calibration factor, Y . The average Y_d must be within 5 percent of Y .
5. If the average Y_d does not meet the ± 5 percent criterion, recalibrate the meter over the full range of orifice settings, as detailed in Section 5.3.1 of Method 5. Then follow the procedure in Section 5.3.3 of Method 5.

REFERENCE

Roger T. Shigehara, P.G. Royals, and E.W. Steward,
"Alternative Method 5 Post-Test Calibration", Entropy, Inc,
contained in the EMTIC TSAR Library.

Standardized Critical Orifice Calibrations (K Factors)

Calibrated By P. Judd
Date 10/3/95
Orifice Set # BE47-81

Meterbox ID N18
Leak Check OK

Meterbox Gamma	0.9837	0.9837	0.9837	0.9837	0.9837	0.9837	0.9837	0.9837
Orifice #	47		55		63		73	
Crit Vacuum	17	17	17	17	17	17	17	17
Pump Vac.	24	24	23	23	21	21	19	19
Run No.	1	2	1	2	1	2	1	2
DGM Initial Rdg, V_d	654.2	656.5	659.2	662.4	665.9	670.1	695.3	700.8
DGM Final Rdg, V_{df}	656.401	658.7	662.303	665.5	669.904	674.201	700.7	706.201
DGM temp Initial, t_d	82	85	90	95	100	107	95	100
DGM temp Final, t_{df}	86	89	96	101	108	114	100	105
Time, Min, M	5	5	5	5	5	5	5	5
Time, Sec, S	7	3	7	3	0	4	4	2
Delta H, ΔH	0.51	0.51	1.06	1.06	1.86	1.86	3.2	3.2
Bar Press, P_b	29.44	29.44	29.44	29.44	29.44	29.44	29.44	29.44
Amb Temp, t_{amb}	77	77	77	77	77	77	77	77
K factor, K'	0.3186	0.3208	0.4424	0.4438	0.5739	0.5735	0.7753	0.7737
Avg K'	0.3197		0.4431		0.5737		0.7745	
Deviation, %	0.36%		0.16%		0.04%		0.11%	

Maximum Deviation = 0.5% From Average.

$$K' = \frac{17.65(V_{df} - V_d)Y\left(P_b + \frac{\Delta H}{13.6}\right)\sqrt{t_{amb} + 460}}{P_b\left(\frac{t_d + t_{df}}{2} + 460\right)\left(M + \frac{S}{60}\right)}$$

Standardized Critical Orifice Calibrations (K Factors)

Calibrated By P. Judd
Date 4/18/96
Orifice Set # 9046

Meterbox ID N31
Leak Check OK

Meterbox Gamma

	0.9967	0.9967	0.9967	0.9967	0.9967	0.9967	0.9967	0.9967
Orifice #	48		54		62		72	
Crit Vacuum	14	14	14	14	14	14	14	14
Pump Vac.	26.5	26.5	25	25	23	23	21	21
Run No.	1	2	1	2	1	2	1	2
DGM Initial Rdg, V_d	649.1	651.7	642.2	645.6	633.4	637.8	621.6	627.5
DGM Final Rdg, V_d	651.601	654.201	645.501	648.9	637.701	642.102	627.403	633.301
DGM temp Initial, t_d	110	110	111	112	114	112	111	114
DGM temp Final, t_d	111	111	113	114	116	114	114	116
Time, Min, M	5	5	5	5	5	5	5	5
Time, Sec, S	3	2	0	0	4	5	2	1
Delta H, ΔH	0.61	0.63	1.15	1.17	1.98	2	3.79	3.8
Bar Press, P_b	29.65	29.65	29.65	29.65	29.65	29.65	29.65	29.65
Amb Temp, t_{amb}	74	74	74	74	74	74	74	74
K factor, K'	0.3534	0.3546	0.4705	0.4696	0.6031	0.6034	0.8263	0.8252
Avg K'	0.3540		0.4701		0.6032		0.8258	
Deviation, %	0.17%		0.10%		0.02%		0.07%	

Maximum Deviation = 0.5% From Average.

$$K' = \frac{17.65(V_d - V_d)Y\left(P_b + \frac{\Delta H}{13.6}\right)\sqrt{t_{amb} + 460}}{P_b\left(\frac{t_d + t_d}{2} + 460\right)\left(M + \frac{S}{60}\right)}$$

Isokinetic Meterbox Full-Test Calibration

Meterbox ID:

N20

Calibrated by:

P. Judd

Date:

5/16/96

Range Run No.	Low		Medium		High	
	1A	1B	2A	2B	3A	3B
Stand. Crit. Orifice (SCRIT)						
SCRIT ID#	47		63		73	
SCRIT K' Factor	0.3197	0.3197	0.5737	0.5737	0.7745	0.7745
Min. SCRIT Vac., V_{cr} in. Hg	17	17	17	17	17	17
Amb Temp, t_{amb} °F	66	66	66	66	66	66
Bar. Pressure, P_b in. Hg	29.74	29.74	29.74	29.74	29.74	29.74
Meterbox (MB)						
Leak-check OK? (Y or N)	Y	Y	Y	Y	Y	Y
MB Orifice Delta H in. H ₂ O	0.56	0.58	1.91	1.93	3.38	3.4
Initial MB Vol. Reading, V_{di} acf	305.400	310.600	294.300	299.500	283.300	288.600
Final MB Vol. Reading, V_{df} acf	310.566	315.833	299.492	305.149	288.523	293.869
Difference ≥ 5.0 cf?	5.166	5.233	5.192	5.649	5.223	5.269
Initial MB Temp, t_{di} °F	108	111	101	104	90	96
Final MB Temp, t_{df} °F	111	115	104	109	96	103
Pump Vac ($> V_{cr}$ in. HG?)	24	24	22	22	20	20
Time, Minutes (M)	11	11	6	7	5	5
Time, Seconds (S)	30	30	30	0	0	0
Calculations						
M5 DGM Factor, Y_i	0.99986	0.99308	0.99335	0.99018	1.00449	1.00737
Average, $Y_{ab(avg)}$	0.9965		0.9918		1.0059	
Diff = $Y_{i(avg)} - Y_{ab(avg)}$ ($\leq \pm 0.02$)?	-0.002	ok	-0.006	ok	-0.006	ok
Delta $H_{@i}$	1.691	1.741	1.820	1.826	1.804	1.793
Average, Delta $H_{@ab(avg)}$	1.715		1.823		1.799	
Diff=Delta $H_{@i(avg)} - \Delta H_{@ab(avg)}$ ($\leq \pm 0.20$)?	0.063	ok	-0.044	ok	-0.019	ok

$Y_{i(avg)}$	0.9981
Delta $H_{@i(avg)}$	1.779

$$Y_i = \frac{K'P_b \left(\frac{t_{di} + t_{df}}{2} + 460 \right) \left(M + \frac{S}{60} \right)}{17.65(V_{df} - V_{di}) \left(P_b + \frac{\Delta H}{13.6} \right) \sqrt{t_{amb} + 460}}$$

$$\Delta H_{@i} = \frac{9.926 \Delta H \left(P_b + \frac{\Delta H}{13.6} \right) (t_{amb} + 460)}{(K'P_b)^2 \left(\frac{t_{di} + t_{df}}{2} + 460 \right)}$$

QA/QC Check

Completeness ☒ Legibility ☒ Accuracy ☒ Specifications ☒ Reasonableness ☒

Checked By: *P. Judd* 5-16-96
QC Administrator (Signature/Date)

170

Isokinetic Meterbox Post-Test Calibration

Job Name: LA. PACIFIC CORP.
 Calibrated by: P. Judd
 Date: 8/16/96
 Full-Test Date: 5/16/96

Job Number: 15575
 Meterbox: N20
 Delta H_{g@int}: 1.779
 Gamma Y_{int}: 0.9981

Run No.	1	2	3
Stand. Crit. Orifice (SCRIT)			
SCRIT ID#	63	63	63
SCRIT K' Factor	0.5737	0.5737	0.5737
Min. SCRIT Vac., V _{cr} in. Hg	17	17	17
Amb Temp, t _{amb} °F	74	74	74
Bar. Pressure, P _b in. Hg	29.67	29.67	29.67
Meterbox (MB)			
Leak-check OK? (Y or N)	Y	Y	Y
Post-test Orifice Delta H in. H ₂ O	1.85	1.87	1.89
Initial MB Vol. Reading, V _{di} acf	427.500	432.700	437.900
Final MB Vol. Reading, V _{df} acf	432.611	437.863	443.114
Difference ≥ 5.0 cf?	5.111	5.163	5.214
Initial MB Temp, t _{di} °F	88	94	100
Final MB Temp, t _{df} °F	94	100	106
Pump Vac (> V _{cr} in. HG?)	22	22	22
Time, Minutes (M)	6	6	6
Time, Seconds (S)	30	30	30
DGM Factor, Y _i	0.9812	0.9818	0.9828
Post-Test Average Y _{i(ave)}			0.9819
Deviation From Full-Test: < ± 5.0%?			-1.6%

For Y_i and Delta H_g equations, see accompanying Full-Test Calibration.

Note: EPA Method 5 does not require a post-test calibration check on Delta H_g.			
Delta H _g	1.831	1.831	1.831
Post-Test Average Delta H _{g(ave)}			1.831
Deviation From Full-Test: < ± 10%?			2.9%

Pressure Gauge Post-Test Calibrations

	Pressure Gauge Used	Readings, In. H ₂ O		Deviation, %* ($< \pm 5.0\%$)
		Press. Gauge	Inclined Manometer	
Delta p	0 - 0.5"	0.4	0.4	0.0
	0 - 2"	0.8	0.795	0.5
	0 - 2"	1.2	1.2	0.0
Delta H	0 - 2"	1.9	1.9	0.0

* Dev. % = ((Press. Gauge - Inclined Manometer) / Inclined Manometer) * 100

QC Check

Completeness _____ Legibility _____ Accuracy _____ Specifications _____ Reasonableness _____

Checked By: [Signature] 8-19-96
 QC Administrator (Signature/Date)

Isokinetic Meterbox Full-Test Calibration

Meterbox ID: **N24**
 Calibrated by: **P. Judd**
 Date: **5/6/96**

Range Run No.	Low		Medium		High	
	1A	1B	2A	2B	3A	3B
Stand. Crit. Orifice (SCRIT)						
SCRIT ID#	4847	<i>Sure</i>	6863	<i>Sure</i>	7873	<i>Sure</i>
SCRIT K' Factor	0.3197	0.3197	0.5737	0.5737	0.7745	0.7745
Min. SCRIT Vac., V_{cr} in. Hg	17	17	17	17	17	17
Amb Temp, t_{amb} °F	74	74	74	74	74	74
Bar. Pressure, P_b in. Hg	29.53	29.53	29.53	29.53	29.53	29.53
Meterbox (MB)						
Leak-check OK? (Y or N)	Y	Y	Y	Y	Y	Y
MB Orifice Delta H in. H ₂ O	0.55	0.55	1.98	2	3.41	3.43
Initial MB Vol. Reading, V_{di} acf	445.400	450.800	468.000	473.300	457.000	462.300
Final MB Vol. Reading, V_{df} acf	450.326	455.744	473.207	478.565	462.246	467.590
Difference ≥ 5.0 cf?	4.926	4.944	5.207	5.265	5.246	5.290
Initial MB Temp, t_{di} °F	84	86	107	111	92	101
Final MB Temp, t_{df} °F	92	89	111	116	101	108
Pump Vac ($> V_{cr}$ in. HG?)	23	23	19	19	17	17
Time, Minutes (M)	11	11	6	6	5	5
Time, Seconds (S)	30	30	30	30	0	0
Calculations						
M5 DGM Factor, Y_i	1.00142	0.99687	0.99420	0.99097	0.99871	1.00459
Average, $Y_{ab(avg)}$	0.9991		0.9926		1.0017	
Diff = $Y_{i(avg)} - Y_{ab(avg)}$ ($\leq \pm 0.02$)?	-0.001	ok	0.005	ok	-0.004	ok
Delta H_{ei}	1.765	1.767	1.907	1.911	1.849	1.834
Average, Delta $H_{ei(avg)}$	1.765		1.909		1.843	
Diff=Delta $H_{ei(avg)} - \Delta H_{ei}$ ($\leq \pm 0.20$)?	0.073	ok	-0.070	ok	-0.003	ok

$Y_{i(avg)}$	0.9978
Delta $H_{ei(avg)}$	1.839

$$Y_i = \frac{K'P_b \left(\frac{t_{di} + t_{df}}{2} + 460 \right) \left(M + \frac{S}{60} \right)}{17.65(V_{df} - V_{di}) \left(P_b + \frac{\Delta H}{13.6} \right) \sqrt{t_{amb} + 460}}$$

$$\Delta H_{ei} = \frac{9.926 \Delta H \left(P_b + \frac{\Delta H}{13.6} \right) (t_{amb} + 460)}{(K'P_b)^2 \left(\frac{t_{di} + t_{df}}{2} + 460 \right)}$$

QA/QC Check

Completeness ☒ Legibility ☒ Accuracy ☒ Specifications ☒ Reasonableness ☒

Checked By: *P. Judd* 5-6-96
 QC Administrator (Signature/Date)

Isokinetic Meterbox Post-Test Calibration

Job Name: LA. PACIFIC CORP.
 Calibrated by: P. Judd
 Date: 8/16/96
 Full-Test Date: 5/6/96

Job Number: 15575
 Meterbox: N24
 Delta H_{gint}: 1.839
 Gamma Y_{int}: 0.9978

Run No.	1	2	3
Stand. Crit. Orifice (SCRIT)			
SCRIT ID#	63	63	63
SCRIT K Factor	0.5737	0.5737	0.5737
Min. SCRIT Vac., V _{cr} in. Hg	17	17	17
Amb Temp, t _{amb} °F	74	74	74
Bar. Pressure, Pb in. Hg	29.67	29.67	29.67
Meterbox (MB)			
Leak-check OK? (Y or N)	Y	Y	Y
Post-test Orifice Delta H in. H ₂ O	1.93	1.95	1.97
Initial MB Vol. Reading, V _{di} acf	680.700	685.800	691.000
Final MB Vol. Reading, V _{df} acf	685.763	690.900	696.144
Difference ≥ 5.0 cft?	5.063	5.100	5.144
Initial MB Temp, t _{di} °F	83	88	94
Final MB Temp, t _{df} °F	88	94	100
Pump Vac (> V _{cr} in. HG?)	20	20	20
Time, Minutes (M)	6	6	6
Time, Seconds (S)	30	30	30
DGM Factor, Y _i	0.9804	0.9830	0.9852
For Y _i and Delta H _g equations, see accompanying Full-Test Calibration.			
Post-Test Average Y _{i(avg)}			0.9829
Deviation From Full-Test: < ± 5.0%?			-1.5%

Note: EPA Method 5 does not require a post-test calibration check on Delta H_g.			
Delta H _g	1.930	1.930	1.929
Post-Test Average Delta H _{g(avg)}			1.930
Deviation From Full-Test: < ± 10%?			4.9%

Pressure Gauge Post-Test Calibrations

	Pressure Gauge Used	Readings, In. H ₂ O		Deviation, %* (< ± 5.0%?)
		Press. Gauge	Inclined Manometer	
Delta p	0 - 0.5"	0.3	0.29	3.4
	0 - 2"	0.6	0.6	0.0
	0 - 2"	0.9	0.91	1.1
Delta H	0 - 2"	1.8	1.8	0.0

* Dev.% = ((Press. Gauge - Inclined Manometer) / Inclined Manometer) * 100

QC Check
 Completeness Legibility Accuracy Specifications Reasonableness

Checked By: Ray Judd 8-19-96
 QC Administrator (Signature/Date)

Isokinetic Meterbox Full-Test Calibration

Meterbox ID: **N25**
 Calibrated by: **P. Judd**
 Date: **6/11/96**

Range Run No.	Low		Medium		High	
	1A	1B	2A	2B	3A	3B
Stand. Crit. Orifice (SCRIT)						
SCRIT ID#	47		63		73	
SCRIT K' Factor	0.3197	0.3197	0.5737	0.5737	0.7745	0.7745
Min. SCRIT Vac., V_{cr} in. Hg	17	17	17	17	17	17
Amb Temp, t_{amb} °F	75	75	75	75	75	75
Bar. Pressure, P_b in. Hg	29.57	29.57	29.57	29.57	29.57	29.57
Meterbox (MB)						
Leak-check OK? (Y or N)	Y	Y	Y	Y	Y	Y
MB Orifice Delta H in. H ₂ O	0.55	0.57	1.81	1.83	3.15	3.17
Initial MB Vol. Reading, V_{di} acf	816.200	821.600	827.200	833.500	805.300	810.600
Final MB Vol. Reading, V_{df} acf	821.549	826.795	833.442	838.938	810.553	815.911
Difference ≥ 5.0 cf?	5.349	5.195	6.242	5.438	5.253	5.311
Initial MB Temp, t_{di} °F	99	106	114	121	92	99
Final MB Temp, t_{df} °F	106	114	121	126	99	106
Pump Vac ($> V_{cr}$ in. HG?)	22	22	18	18	16	16
Time, Minutes (M)	12	11	7	6	5	5
Time, Seconds (S)	0	30	30	30	0	0
Calculations						
M5 DGM Factor, Y_i	0.98687	0.98672	0.97074	0.97568	0.99531	0.99680
Average, $Y_{ab(avg)}$	0.9868		0.9732		0.9961	
Diff = $Y_{i(avg)} - Y_{ab(avg)}$ ($\leq \pm 0.02$)?	-0.001	ok	0.012	ok	-0.011	ok
Delta $H_{@i}$	1.720	1.760	1.718	1.719	1.711	1.701
Average, Delta $H_{@ab(avg)}$	1.740		1.718		1.706	
Diff=Delta $H_{@i(avg)} - \Delta H_{@ab(avg)}$ ($\leq \pm 0.20$)?	-0.019	ok	-0.003	ok	0.016	ok

$Y_{i(avg)}$	0.9854
Delta $H_{@i(avg)}$	1.721

$$Y_i = \frac{K'P_b \left(\frac{t_{di} + t_{df}}{2} + 460 \right) \left(M + \frac{S}{60} \right)}{17.65(V_{df} - V_{di}) \left(P_b + \frac{\Delta H}{13.6} \right) \sqrt{t_{amb} + 460}}$$

$$\Delta H_{@i} = \frac{9.926 \Delta H \left(P_b + \frac{\Delta H}{13.6} \right) (t_{amb} + 460)}{(K'P_b)^2 \left(\frac{t_{di} + t_{df}}{2} + 460 \right)}$$

QA/QC Check

Completeness ☒ Legibility ☒ Accuracy ☒ Specifications ☒ Reasonableness ☒

Checked By: Joe Scholone 6-11-96

QC Administrator (Signature/Date)

174

Isokinetic Meterbox Post-Test Calibration

Job Name: LA. PACIFIC CORP.

Job Number: 15575

Calibrated by: P. Judd

Meterbox: N25

Date: 8/13/96

Delta H_{g@int}: 1.721

Full-Test Date: 6/11/96

Gamma Y_{int}: 0.9854

Run No.	1	2	3
Stand. Crit. Orifice (SCRIT)			
SCRIT ID#	63	63	63
SCRIT K' Factor	0.5737	0.5737	0.5737
Min. SCRIT Vac., V _{cr} in. Hg	17	17	17
Amb Temp, t _{amb} °F	73	73	73
Bar. Pressure, P _b in. Hg	29.48	29.49	29.49
Meterbox (MB)			
Leak-check OK? (Y or N)	Y	Y	Y
Post-test Orifice Delta H in. H ₂ O	1.73	1.75	1.77
Initial MB Vol. Reading, V _{ai} acf	86.900	92.100	97.400
Final MB Vol. Reading, V _{af} acf	92.086	97.335	102.681
Difference ≥ 5.0 cf?	5.186	5.235	5.281
Initial MB Temp, t _{ai} °F	91	97	103
Final MB Temp, t _{af} °F	97	103	110
Pump Vac (> V _{cr} in. HG?)	19	19	19
Time, Minutes (M)	6	6	6
Time, Seconds (S)	30	30	30
DGM Factor, Y _i	0.9734	0.9747	0.9774
Post-Test Average Y _{i(avg)}			0.9752
Deviation From Full-Test: < ± 5.0%?			-1.0%

For Y_i and Delta H_g equations, see accompanying Full-Test Calibration.

Note: EPA Method 5 does not require a post-test calibration check on Delta H_g.			
Delta H _g	1.709	1.711	1.711
Post-Test Average Delta H _{g(avg)}			1.710
Deviation From Full-Test: < ± 10%?			-0.6%

Pressure Gauge Post-Test Calibrations

	Pressure Gauge Used	Readings, In. H ₂ O		Deviation, %* ($< \pm 5.0\%$)
		Press. Gauge	Inclined Manometer	
Delta p	0 - 2"	0.7	0.69	-1.4
	0 - 2"	1.3	1.3	0.0
	0 - 2"	1.8	1.85	-2.7
Delta H	0 - 2"	1.9	1.95	-2.6

* Dev. % = ((Press. Gauge - Inclined Manometer) / Inclined Manometer) * 100

QC Check

Completeness i Legibility Accuracy Specifications Reasonableness

Checked By:

QC Administrator (Signature/Date)

175

THERMOCOUPLE CALIBRATION

Thermocouple No.: R091

Date: 2/17/90

Calibrated By: TAB

Barometric Pressure, Inches Hg: 29.80

Ambient Temperature, °F: 72.0

Mercury-In-Glass Thermometer I.D. No.: 7121K

Calibration System Used	Potentiometer I.D. Number	Reference Thermometer Temperature		Mean Temperature of Hg Column T_m °F	Thermocouple Thermometer Temperature T_c °F	Temperature Diff., % (Allowable: ≤ 1.5 %)
		T_o °F	T_c °F			
Ice Bath	F69	32.0	31.96	67.0	29.8	.44
		32.0	31.96	67.0	29.6	.48
		32.0	31.96	67.0	29.6	.48
Boiling Water	F69	212.0	213.76	110.0	209.2	.68
		212.0	213.76	110.0	209.0	.71
		212.0	213.80	108.0	209.6	.62
Boiling Oil	F69	388.0	396.94	118.0	386.0	1.28
		387.0	395.82	120.0	385.4	1.22
		388.0	397.21	110.0	385.6	1.35

$$\text{Corrected Temperature} = T_c = T_o + [(.00009) * (T_o - 20) * (T_o - T_m)]$$

$$\text{Temperature Difference} = \frac{[(T_c + 460) - (T_e + 460)]}{(T_c + 460)} * 100$$

THERMOCOUPLE CALIBRATION

Thermocouple No.: R133

Date: 3/13/90

Calibrated By: TAB

Barometric Pressure, Inches Hg: 29.64

Ambient Temperature, °F: 74.0

Mercury-In-Glass Thermometer I.D. No.: 7121K

Calibration System Used	Potentiometer I.D. Number	Reference Thermometer Temperature		Mean Temperature of Hg Column T_m °F	Thermocouple Thermometer Temperature T_c °F	Temperature Diff., % (Allowable: ≤ 1.5 %)
		T_o °F	T_c °F			
Ice Bath	F24	32.0	31.96	72.0	30.0	.40
		32.0	31.96	72.0	32.0	-.01
		32.0	31.96	72.0	32.0	-.01
Boiling Water	F24	214.0	215.82	110.0	210.0	.86
		214.0	215.82	110.0	211.0	.71
		214.0	215.82	110.0	210.0	.86
Boiling Oil	F24	388.0	396.88	120.0	390.0	.80
		388.0	396.88	120.0	390.0	.80
		388.0	396.88	120.0	390.0	.80

$$\text{Corrected Temperature} = T_c - \Delta T = T_o + [(-.00009) * (T_o - 20) * (T_o - T_m)]$$

$$\text{Temperature Difference} = \frac{[(T_c + 460) - (T_o + 460)]}{(T_c + 460)} * 100$$

THERMOCOUPLE CALIBRATION

Thermocouple No.: R197

Date: 8/03/90

Calibrated By: LM

Barometric Pressure, Inches Hg: 29.64

Ambient Temperature, °F: 76.0

Mercury-In-Glass Thermometer I.D. No.: 7121K

Calibration System Used	Potentiometer I.D. Number	Reference Thermometer Temperature		Mean Temperature of Hg Column T_m °F	Thermocouple Thermometer Temperature T_c °F	Temperature Diff., % (Allowable: ≤ 1.5 %)
		T_o °F	T_c °F			
Ice Bath	F34	32.0	31.96	72.0	31.6	.07
		32.0	31.96	72.0	32.0	-.01
		32.0	31.96	72.0	32.0	-.01
Boiling Water	F34	214.0	215.82	110.0	211.8	.59
		214.0	215.82	110.0	212.0	.56
		214.0	215.82	110.0	212.0	.56
Boiling Oil	F34	388.0	396.88	120.0	387.6	1.08
		388.0	396.88	120.0	388.0	1.04
		388.0	396.88	120.0	389.0	.92

$$\text{Corrected Temperature} = T_c = T_o + [(.00009) * (T_o - 20) * (T_o - T_m)]$$

$$\text{Temperature Difference} = \frac{[(T_c + 460) - (T_t + 460)]}{(T_c + 460)} * 100$$

178

THERMOCOUPLE CALIBRATION

Thermocouple No.: R253

Date: 5/27/91

Calibrated By: WLS

Barometric Pressure, Inches Hg: 29.74

Ambient Temperature, °F: 71.0

Mercury-In-Glass Thermometer I.D. No.: 7121K

Calibration System Used	Potentiometer I.D. Number	Reference Thermometer Temperature		Mean Temperature of Hg Column T_m °F	Thermocouple Thermometer Temperature T_t °F	Temperature Diff., % (Allowable: ≤ 1.5 %)
		T_o °F	T_c °F			
Ice Bath	F41	32.0	31.96	70.0	32.6	-.13
		32.0	31.96	70.0	32.2	-.05
		32.0	31.96	70.0	32.2	-.05
Boiling Water	F41	212.0	213.76	110.0	210.2	.53
		214.0	215.78	112.0	212.6	.47
		214.0	215.78	112.0	212.4	.50
Boiling Oil	F41	392.0	398.83	188.0	387.8	1.28
		392.0	398.80	189.0	388.2	1.23
		392.0	398.80	189.0	388.8	1.16

$$\text{Corrected Temperature} = T_c = T_o + [(.00009) * (T_o - 20) * (T_o - T_m)]$$

$$\text{Temperature Difference} = \frac{[(T_c + 460) - (T_t + 460)]}{(T_c + 460)} * 100$$

THERMOCOUPLE CALIBRATION

THERMOCOUPLE No. R 467

Date 10-11-95

Calibrated By CUR

Barometric Pressure, "Hg 29.74

Ambient Temperature, °F 76

Calibration System Used	Ref. Digital Thermometer & Thermocouple I.D. Nos.	Reference Thermocouple Temperature (T _r °F)	Test Digital Thermometer I.D. No.	Test Thermocouple Temperature (T _t °F)	Temperature Diff., % (Allowable: ≤ 1.5 %)
ICE BATH	T-10289	31.4	F56	32.3	0.1
		31.7		32.2	↓
		31.5		32.1	↓
BOILING WATER		211.6	F56	210.8	0.1
		211.8		210.6	↓
		211.8		210.6	↓
BOILING OIL	✓	398.6	F56	398.7	0
		398.4		398.6	↓
		398.5		398.8	↓

$$\text{Temperature Difference} = \frac{T_r - T_t}{T_r + 460} \times 100$$

THERMOCOUPLE CALIBRATION

THERMOCOUPLE No. R 455

Date 12-11-95

Calibrated By CM

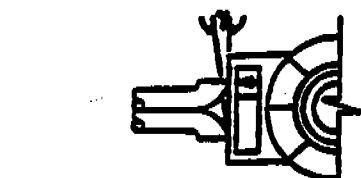
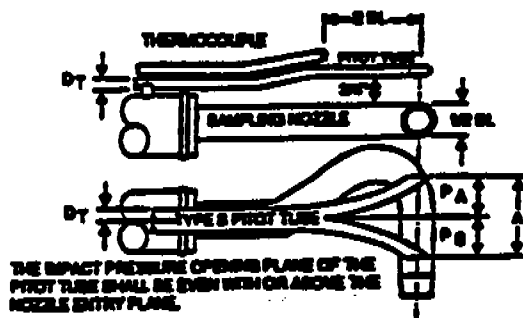
Barometric Pressure, "Hg 29.74

Ambient Temperature, °F 26°C

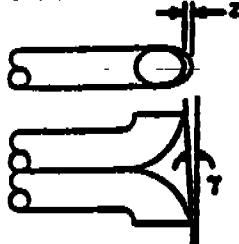
Calibration System Used	Ref. Digital Thermometer & Thermocouple I.D. Nos.	Reference Thermocouple Temperature (T _r °F)	Test Digital Thermometer I.D. No.	Test Thermocouple Temperature (T _t °F)	Temperature Diff., % (Allowable: ≤ 1.5 %)
ICE BATH	T102529	31.8	F117	33.0	
	1	31.8		33.0	
		31.8		32.9	
BOILING WATER		210.8	F117	210.6	
		211.8		210.8	
		211.8		211.8	
BOILING OIL		396.6	F117	398.6	
		396.4		398.4	
		396.4		398.4	

$$\text{Temperature Difference} = \frac{T_r - T_t}{T_r + 460} \times 100$$

PITOT TUBE INSPECTION



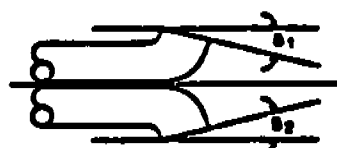
DEGREE INDICATING LEVEL POSITION FOR DETERMINING γ , THEN CALCULATING Z.



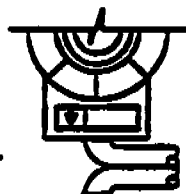
DEGREE INDICATING LEVEL POSITION FOR DETERMINING α .



DEGREE INDICATING LEVEL POSITION FOR DETERMINING A_1 AND A_2 .



DEGREE INDICATING LEVEL POSITION FOR DETERMINING B_1 AND B_2 .



level?	Yes
obstructions?	NONE
damaged?	NONE
$-10^\circ < \alpha_1 < +10^\circ$	0
$-10^\circ < \alpha_2 < +10^\circ$	0
$-5^\circ < B_1 < +5^\circ$	0
$-5^\circ < B_2 < +5^\circ$	0
γ	0
θ	1°
A	.955
$1.05 D_1 < P_1 < 1.5 D_1$	.472
$1.05 D_2 < P_2 < 1.5 D_2$	.483
$3/16^\circ < D_1 < 3/8^\circ$	.375
$A \tan \gamma < 0.125^\circ$	0
$A \tan \theta < 0.03125^\circ$	.015
$P_1 = P_2 \pm 0.063^\circ$	Yes .011

See 40 CFR 60, Vol. 42 No. 160 EPA Method 2. Verify the minimum 2-inch setback of the thermocouple and the minimum 3/4-inch separation between the pitot tube and the nozzle as shown at the top of this page.

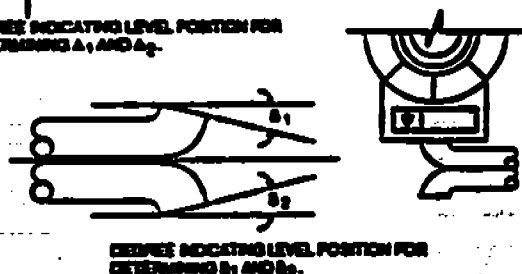
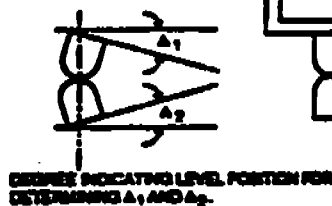
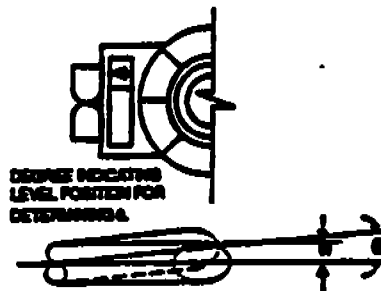
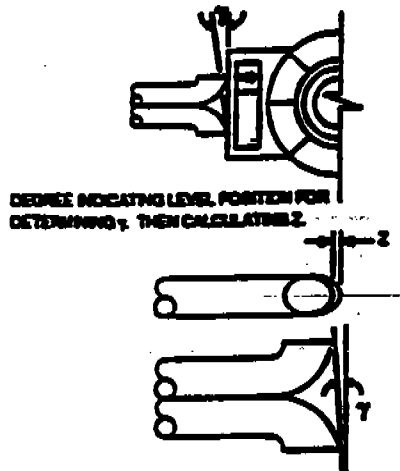
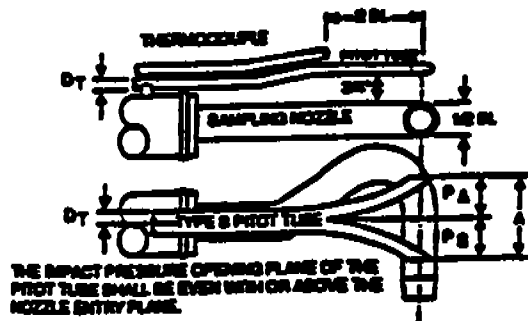
Comments: _____

I certify that pitot tube/probe number 9-9 meets or exceeds all specifications, criteria and/or applicable design features and is hereby assigned a pitot tube calibration factor of 0.84.

Signature [Signature]

Date 12-26-91

PITOT TUBE INSPECTION



level?	yes
obstructions?	NONE
damaged?	NONE
$-10^\circ < \alpha_1 < +10^\circ$	0
$-10^\circ < \alpha_2 < +10^\circ$	0
$-5^\circ < B_1 < +5^\circ$	0
$-5^\circ < B_2 < +5^\circ$	0
γ	0
θ	0
A	.945
$1.05 D_1 < P_1 < 1.5 D_1$	.484
$1.05 D_2 < P_2 < 1.5 D_2$	.461
$3/16^\circ < \phi_1 < 3/8^\circ$	.375
$A \tan \gamma < 0.125^\circ$	0
$A \tan \theta < 0.03125^\circ$	0
$P_1 = P_2 \pm 0.063^\circ$	yes .023

See 40 CFR 60, Vol. 42 No. 160 EPA Method 2. Verify the minimum 2-inch setback of the thermocouple and the minimum 3/4-inch separation between the pitot tube and the nozzle as shown at the top of this page.

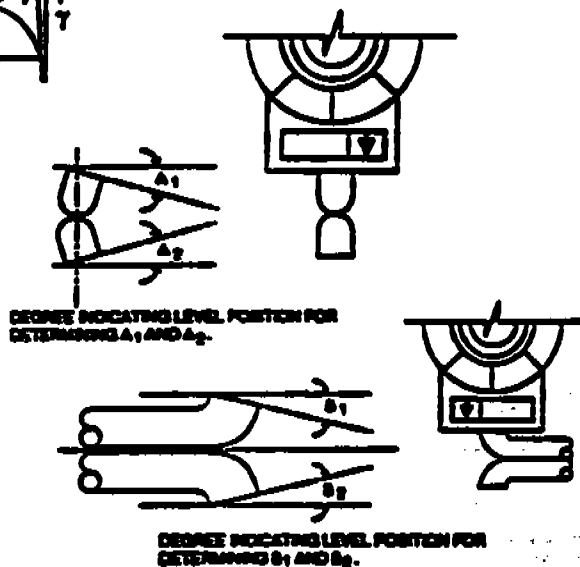
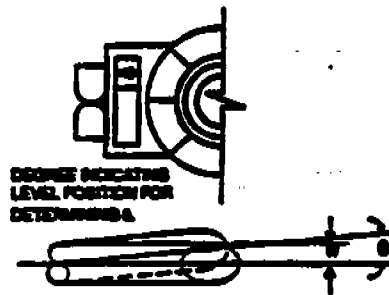
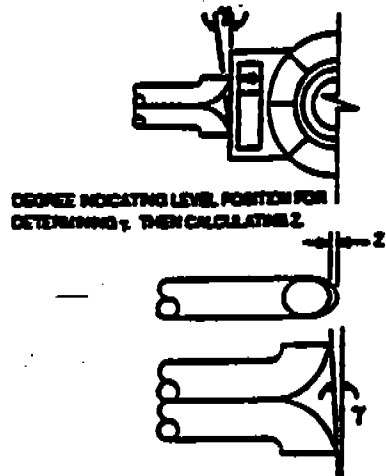
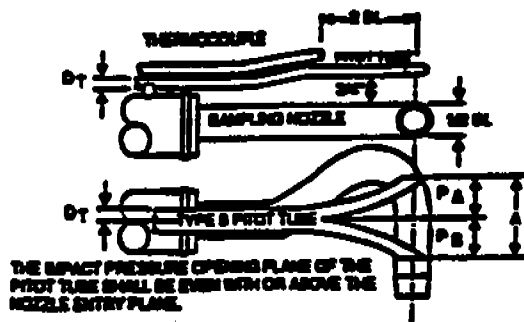
Comments: _____

I certify that pitot tube/probe number 9-13 meets or exceeds all specifications, criteria and/or applicable design features and is hereby assigned a pitot tube calibration factor of 0.84.

Signature W.L. Shultz

Date 12-26-91

PITOT TUBE INSPECTION



DEGREE INDICATING LEVEL POSITION FOR DETERMINING θ_1 AND θ_2 .

level?	yes
obstructions?	NONE
damaged?	NONE
$-10^\circ < \alpha_1 < +10^\circ$	0
$-10^\circ < \alpha_2 < +10^\circ$	0
$-5^\circ < \theta_1 < +5^\circ$	1°
$-5^\circ < \theta_2 < +5^\circ$	1°
γ	0
θ	0
A	1.036
$1.05 D_1 < P_1 < 1.5 D_1$	.520
$1.05 D_2 < P_2 < 1.5 D_2$	.516
$3/16^\circ < \theta_1 < 3/8^\circ$	.375
$A \tan \gamma < 0.125^\circ$	0
$A \tan \theta < 0.03125^\circ$	0
$P_1 = P_2 \pm 0.063^\circ$	yes .004

See 40 CFR 60, Vol. 42 No. 160 EPA Method 2. Verify the minimum 2-inch setback of the thermocouple and the minimum 3/4-inch separation between the pitot tube and the nozzle as shown at the top of this page.

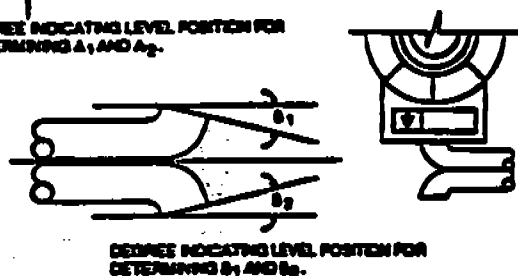
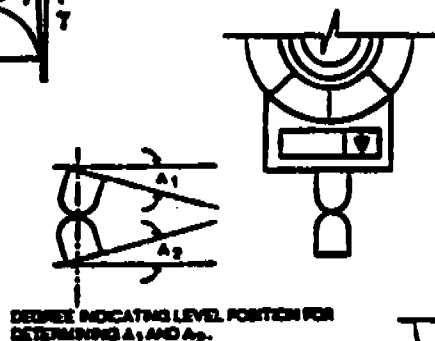
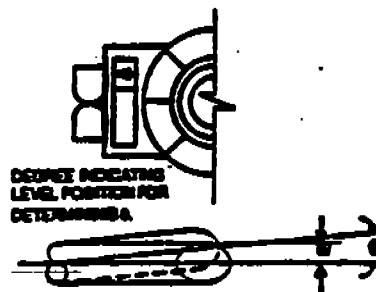
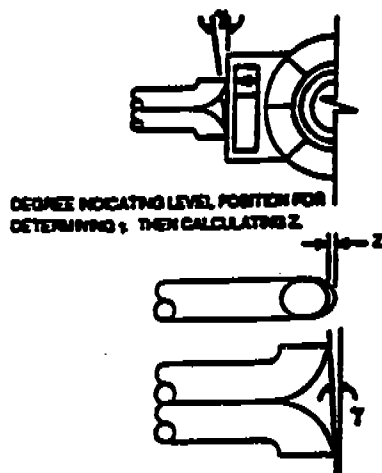
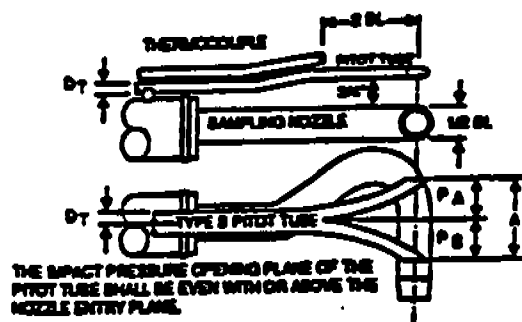
Comments: _____

I certify that pitot tube/probe number PPT-83 meets or exceeds all specifications, criteria and/or applicable design features and is hereby assigned a pitot tube calibration factor of 0.84.

Signature W. L. Sherrill

Date 12-26-91

PITOT TUBE INSPECTION



level?	YES
obstructions?	NONE
damaged?	NONE
$-10^\circ < \alpha_1 < +10^\circ$	0
$-10^\circ < \alpha_2 < +10^\circ$	0
$-5^\circ < \beta_1 < +5^\circ$	0
$-5^\circ < \beta_2 < +5^\circ$	0
γ	1.0
θ	1.0
A	1.091
$1.05 D_1 < P_1 < 1.5 D_1$	.547
$1.05 D_2 < P_2 < 1.5 D_2$	.544
$3/16^\circ < D_1 < 3/8^\circ$	.375
$A \tan \gamma < 0.125^\circ$	.017
$A \tan \theta < 0.03125^\circ$	.017
$P_1 = P_2 \pm 0.003^\circ$	YES .003

See 40 CFR 60, Vol. 42 No. 160 EPA Method 2. Verify the minimum 2-inch setback of the thermocouple and the minimum 3/4-inch separation between the pitot tube and the nozzle as shown at the top of this page.

Comments: _____

I certify that pitot tube/probe number PPT-122 meets or exceeds all specifications, criteria and/or applicable design features and is hereby assigned a pitot tube calibration factor of 0.84.

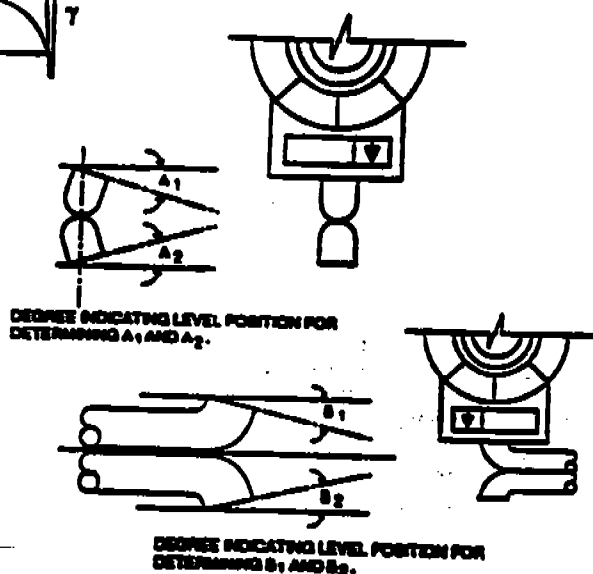
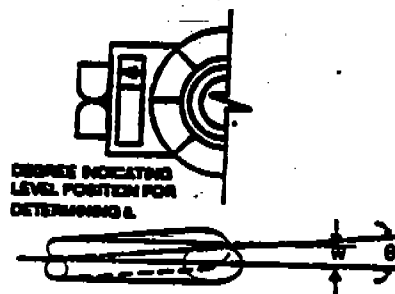
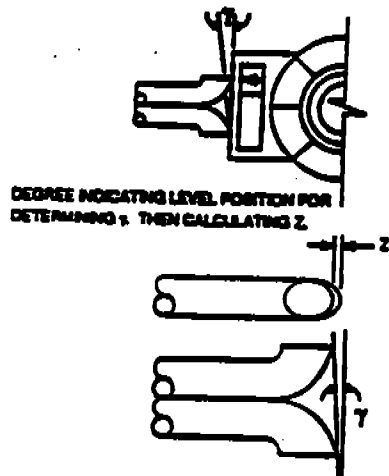
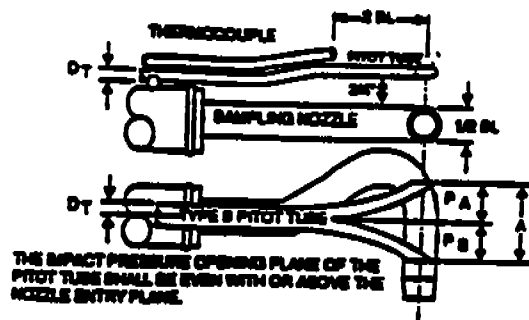
Signature [Signature]

Date 1-3-92

R-0028 rev. 3/90

ENTROPY

PITOT TUBE INSPECTION



level?	YES
obstructions?	NONE
damaged?	NO
$-10^\circ < \alpha_1 < +10^\circ$	0
$-10^\circ < \alpha_2 < +10^\circ$	0
$-5^\circ < B1 < +5^\circ$	0
$-5^\circ < B2 < +5^\circ$	0
γ	1°
θ	0
A	1.012
$1.05 D_1 < P_1 < 1.5 D_1$	0.505
$1.05 D_2 < P_2 < 1.5 D_2$	0.509
$3/16" < D_1 < 3/8"$	0.375
$A \tan \gamma < 0.125"$	0
$A \tan \theta < 0.03125"$	0.018
$P_1 = P_2 \pm 0.053"$	YES 0.006

See 40 CFR 60, Vol. 42 No. 160 EPA Method 2. Verify the minimum 2-inch setback of the thermocouple and the minimum 3/4-inch separation between the pitot tube and the nozzle as shown at the top of this page.

Comments:

Recal

I certify that pitot tube/probe number DP-108-3 meets or exceeds all specifications, criteria and/or applicable design features and is hereby assigned a pitot tube calibration factor of 0.84;

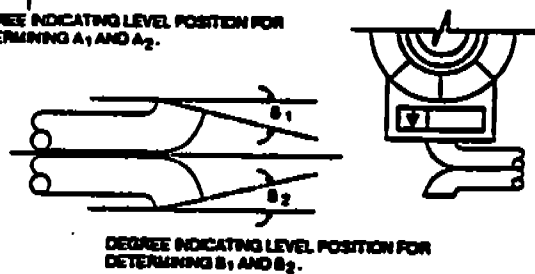
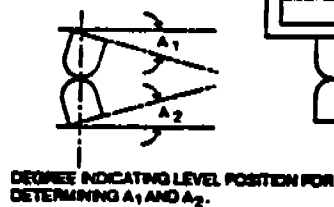
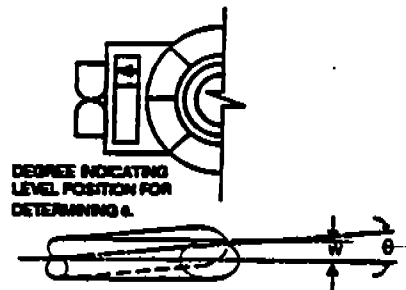
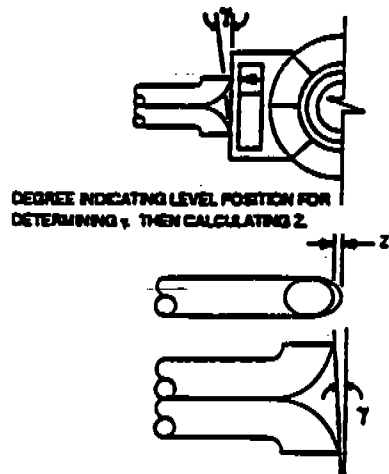
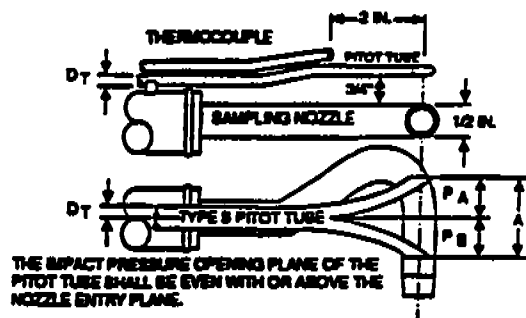
Signature

Patrick F. Daley

Date

6/18/96

PITOT TUBE INSPECTION



level?	YES
obstructions?	NONE
damaged?	NONE
$-10^\circ < \alpha_1 < +10^\circ$	0
$-10^\circ < \alpha_2 < +10^\circ$	0
$-5^\circ < B_1 < +5^\circ$	0
$-5^\circ < B_2 < +5^\circ$	0
γ	0
θ	0
A	1.03
$1.05 D_i < P_o < 1.5 D_i$	.516
$1.05 D_i < P_o < 1.5 D_i$	.514
$3/16^\circ < D_i < 3/8^\circ$	.375
$A \tan \gamma < 0.125^\circ$	.016
$A \tan \theta < 0.03125^\circ$	.016
$P_o = P_s \pm 0.063^\circ$	YES .002

See 40 CFR 60, Vol. 42 No. 160 EPA Method 2. Verify the minimum 2-inch setback of the thermocouple and the minimum 3/4-inch separation between the pitot tube and the nozzle as shown at the top of this page.

Comments: NEW

I certify that pitot tube/probe number DP-120-5 meets or exceeds all specifications, criteria and/or applicable design features and is hereby assigned a pitot tube calibration factor of 0.84.

Signature [Signature]

Date 7-2-92

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5842

APPENDIX D. CALIBRATION DATA

2. Instrumental Test Methods

981

190



Scott Specialty Gases

1750 EAST CLUB BOULEVARD, DURHAM, NC 27704

(919) 220-0803 FAX: (919) 220-0808

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

Customer
Entropy
Attn: John Maxwell
P.O. Box 12291
Research Triangle Park, NC 27709

Assay Laboratory
Scott Specialty Gases, Inc.
1750 East Club Boulevard
Durham, NC 27704

Purchase Order 5071-MAXWEJ
Scott Project # 12-14602

ANALYTICAL INFORMATION

Certified to exceed the minimum specifications of EPA Protocol Procedure #G1, issued September, 1993.

Cylinder Number ALM-017598
Cylinder Pressure 2000 PSIG

Certification Date 11-14-95
Previous Certification None

Expiration Date 11-14-98

ANALYZED CYLINDER

Components

Propane
Air

Certified Concentration

9.98 PPM

Analytical Uncertainty*

+/- 1% NIST Directly Traceable
Balance

Do not use when cylinder pressure is less than 150 PSIG.

*Analytical uncertainty is inclusive of usual known error sources which at least includes reference standard error & precision of the measurement process.

REFERENCE STANDARD

Type Expiration Date
NTRM # 1666 09-97

Cylinder Number
AAL-8237

Concentration
9.62 PPM C3H8 Balance in Air

INSTRUMENTATION

Instrument/Model/Serial #
Varian /3400/0160

Last Date Calibrated
10-24-95

Analytical Principle
Gas Chromatography

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components

Propane

First Triad Analysis

Date: 11-14-95 Response Units: Area
STD-29263 SPL-30377
SPL-30408 STD-29255
STD-29265 SPL-30260

Second Triad Analysis

Date: Response Units:
STD- SPL-
SPL- STD-
STD- SPL-

Calibration Curve

Date: 10-24-95

Date: Response Units:
STD- SPL-
SPL- STD-
STD- SPL-

Date: Response Units:
STD- SPL-
SPL- STD-
STD- SPL-

Date:

Date: Response Units:
STD- SPL-
SPL- STD-
STD- SPL-

Date: Response Units:
STD- SPL-
SPL- STD-
STD- SPL-

Analyst S/Vaughan



Scott Specialty Gases

1750 EAST CLUB BOULEVARD, DURHAM, NC 27704

(919) 220-0803 FAX: (919) 220-0808

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

Customer
Entropy
Attn: John Maxwell
CEM Division
8724 Glenwood Avenue
Raleigh, NC 27612

Assay Laboratory
Scott Specialty Gases, Inc.
1750 East Club Boulevard
Durham, NC 27704

Purchase Order 5159-MAXWELL
Scott Project # 12-17291

ANALYTICAL INFORMATION

Certified to exceed the minimum specifications of EPA Protocol Procedure #G1, issued September, 1993.

Cylinder Number ALM-028320
Cylinder Pressure 2000 psig

Certification Date 05-07-96
Previous Certification None

Expiration Date 05-07-99

ANALYZED CYLINDER

Components

Propane
Air

Certified Concentration

10.63 ppm

Analytical Uncertainty*

+/- 1% NIST Directly Traceable
Balance

Do not use when cylinder pressure is less than 150 PSIG.

*Analytical uncertainty is inclusive of usual known error sources which at least includes reference standard error & precision of the measurement process.

REFERENCE STANDARD

Type NTRM # 1666
Expiration Date 09-97

Cylinder Number
AAL-8237

Concentration
9.62 ppm C3H8 Balance in Air

INSTRUMENTATION

Instrument/Model/Serial #
Varian /3400/0160

Last Date Calibrated
05-07-96

Analytical Principle
Gas Chromatography

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components

First Triad Analysis

Date: 05-07-96 Response Units: Area
STD-52485 SPL-54721
SPL-54720 STD-52566
STD-52576 SPL-54876

Second Triad Analysis

Date: Response Units:
STD- SPL-
SPL- STD-
STD- SPL-

Calibration Curve

Date: 05-07-96

Date: Response Units:
STD- SPL-
SPL- STD-
STD- SPL-

Date: Response Units:
STD- SPL-
SPL- STD-
STD- SPL-

Date:

Date: Response Units:
STD- SPL-
SPL- STD-
STD- SPL-

Date: Response Units:
STD- SPL-
SPL- STD-
STD- SPL-

Date:

B. Becton
Analyst B. Becton



Scott Specialty Gases

1750 EAST CLUB BOULEVARD, DURHAM, NC 27704

(919) 220-0803 FAX: (919) 220-0808

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

Customer
Entropy Environmentalists
Attn: John Maxwell
Accounts Payable
P.O. Box 12291
Research Triangle Park, NC 27612

Assay Laboratory
Scott Specialty Gases, Inc.
1750 East Club Boulevard
Durham, NC 27704

Purchase Order MAXWELL
Scott Project # 12-16095

ANALYTICAL INFORMATION

Certified to exceed the minimum specifications of EPA Protocol Procedure #G1, issued September, 1993.

Cylinder Number ALM-017510
Cylinder Pressure 2000 PSIG

Certification Date 03-05-96
Previous Certification None

Expiration Date 03-05-99

ANALYZED CYLINDER

Components

Propane
Air

Certified Concentration
10.64 PPM

Analytical Uncertainty*
+/- 1% NIST Directly Traceable
Balance

Do not use when cylinder pressure is less than 150 PSIG.

*Analytical uncertainty is inclusive of usual known error sources which at least includes reference standard error & precision of the measurement processes.

REFERENCE STANDARD

Type NTRM # 1666
Expiration Date 09-97

Cylinder Number
AAL-8237

Concentration
9.62 PPM C3H8 Balance in Air

INSTRUMENTATION

Instrument/Model/Serial #
Varian /3400/0160

Last Date Calibrated
03-05-96

Analytical Principle
Gas Chromatography

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components

Propane

First Triad Analysis

Date: 03-05-96 Response Units: Area
STD-30738 SPL-52753
SPL-52794 STD-50471
STD-50957 SPL-52925

Second Triad Analysis

Date: Response Units:
STD- SPL-
SPL- STD-
STD- SPL-

Calibration Curve

Date: 03-05-96

Date: Response Units:
STD- SPL-
SPL- STD-
STD- SPL-

Date: Response Units:
STD- SPL-
SPL- STD-
STD- SPL-

Date:

Date: Response Units:
STD- SPL-
SPL- STD-
STD- SPL-

Date: Response Units:
STD- SPL-
SPL- STD-
STD- SPL-

Analyst S. Vaughan



Scott Specialty Gases, Inc.

1750 EAST CLUB BOULEVARD, DURHAM, NC 27704

(919) 220-0803 FAX: (919) 220-0808

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

Customer
Entropy
Attn: Mr. John Maxwell
CEM Division
8724 Glenwood Avenue
Raleigh, NC 27612

Assay Laboratory
Scott Specialty Gases, Inc.
1750 East Club Boulevard
Durham, NC 27704

Purchase Order 4739-MAXWELL
Scott Project # 12-

ANALYTICAL INFORMATION

Certified to exceed the minimum specifications of EPA Protocol Procedure #G1, issued September, 1993.

Cylinder Number	1L-1329	Certification Date	12-19-94	Expiration Date	12-19-97
Cylinder Pressure	1900 PSIG	Previous Certification	None		

ANALYZED CYLINDER

Components

Propane
Air

Certified Concentration

17.05 PPM

Analytical Uncertainty*

+/- 1% NIST Directly Traceable
Balance

Do not use when cylinder pressure is less than 150 PSIG.

*Analytical uncertainty is inclusive of usual known error sources which at least includes reference standard error & precision of the measurement process.

REFERENCE STANDARD

Type	Expiration Date	Cylinder Number	Concentration
NTRM # 1668	06-96	ALM-032005	95.5 PPM Balance in Air

INSTRUMENTATION

Instrument/Model/Serial #	Last Date Calibrated	Analytical Principle
Varian /3400/16804	12-19-94	Gas Chromatography

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components	First Triad Analysis	Second Triad Analysis	Calibration Curve																	
Propane	<table><tr><td>Date: 12-19-94</td><td>Response Units: Area</td></tr><tr><td>STD-78744</td><td>SPL-14095</td></tr><tr><td>SPL-14027</td><td>SPL-14081</td></tr><tr><td>STD-78810</td><td>STD-78776</td></tr></table>	Date: 12-19-94	Response Units: Area	STD-78744	SPL-14095	SPL-14027	SPL-14081	STD-78810	STD-78776	<table><tr><td>Date:</td><td>Response Units:</td></tr><tr><td>STD-</td><td>SPL-</td></tr><tr><td>SPL-</td><td>SPL-</td></tr><tr><td>STD-</td><td>STD-</td></tr></table>	Date:	Response Units:	STD-	SPL-	SPL-	SPL-	STD-	STD-	<table><tr><td>Date: 12-19-94</td></tr></table>	Date: 12-19-94
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Date:	Response Units:																			
STD-	SPL-																			
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Date:	Response Units:																			
STD-	SPL-																			
SPL-	SPL-																			
STD-	STD-																			

A. Barber
Analyst A. Barber



Scott Specialty Gases

1750 EAST CLUB BOULEVARD, DURHAM, NC 27704

(919) 220-0803 FAX: (919) 220-0808

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

Customer
Entropy Environmentalists
Attn: John Maxwell
Accounts Payable
P.O. Box 12291
Research Triangle Park, NC 27612

Assay Laboratory
Scott Specialty Gases, Inc.
1750 East Club Boulevard
Durham, NC 27704

Purchase Order MAXWELL
Scott Project # 12-16095

ANALYTICAL INFORMATION

Certified to exceed the minimum specifications of EPA Protocol Procedure #G1, issued September, 1993.

Cylinder Number ALM-039869
Cylinder Pressure 2000 PSIG

Certification Date 03-05-96
Previous Certification None

Expiration Date 03-05-99

ANALYZED CYLINDER

Components

Propane
Air

Certified Concentration

17.20 PPM

Analytical Uncertainty*

+/- 1% NIST Directly Traceable
Balance

Do not use when cylinder pressure is less than 150 PSIG.

*Analytical uncertainty is inclusive of usual known error sources which at least includes reference standard error & precision of the measurement process.

REFERENCE STANDARD

Type NTRM # 1666
Expiration Date 09-97

Cylinder Number AAL-8237

Concentration 9.62 PPM C3H8 Balance in Air

INSTRUMENTATION

Instrument/Model/Serial #
Varian /3400/0160

Last Date Calibrated
03-05-96

Analytical Principle
Gas Chromatography

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components

Propane

First Triad Analysis

Date: 03-05-96 Response Unit: Area
STD-30738 SPL-90865
SPL-90765 STD-50471
STD-50957 SPL-90465

Second Triad Analysis

Date: Response Unit:
STD- SPL-
SPL- STD-
STD- SPL-

Calibration Curve

Date: 03-05-96

Date: Response Unit:
STD- SPL-
SPL- STD-
STD- SPL-

Date: Response Unit:
STD- SPL-
SPL- STD-
STD- SPL-

Date:

Date: Response Unit:
STD- SPL-
SPL- STD-
STD- SPL-

Date: Response Unit:
STD- SPL-
SPL- STD-
STD- SPL-

[Signature]

Analyst S. Vaughan



Scott Specialty Gases

1750 EAST CLUB BOULEVARD, DURHAM, NC 27704

(919) 220-0803 FAX: (919) 220-0808

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

Customer
Entropy
Attn: John Maxwell
CEM Division
8724 Glenwood Avenue
Raleigh, NC 27612

Assay Laboratory
Scott Specialty Gases, Inc.
1750 East Club Boulevard
Durham, NC 27704

Purchase Order 5159-MAXWELL
Scott Project # 12-17291

ANALYTICAL INFORMATION

Certified to exceed the minimum specifications of EPA Protocol Procedure #G1, issued September, 1993.

Cylinder Number ALM-029291
Cylinder Pressure 2000 psig

Certification Date 05-07-96
Previous Certification None

Expiration Date 05-07-99

ANALYZED CYLINDER

Components

Propane
Air

Certified Concentration
17.5 ppm

Analytical Uncertainty*
+/- 1% NIST Directly Traceable
Balance

Do not use when cylinder pressure is less than 150 PSIG.

*Analytical uncertainty is inclusive of usual known error sources which at least includes reference standard error & precision of the measurement processes.

REFERENCE STANDARD

Type NIRM # 1666
Expiration Date 09-97

Cylinder Number
AAL-8237

Concentration
9.62 ppm C3H8 Balance in Air

INSTRUMENTATION

Instrument/Model/Serial #
Varian /3400/0160

Last Date Calibrated
05-07-96

Analytical Principle
Gas Chromatography

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components

Propane

First Triad Analysis

Date: 05-07-96 Response Units: Area
STD=52485 SPL=95349
SPL=95340 STD=52566
STD=52576 SPL=95392

Second Triad Analysis

Date: Response Units:
STD= SPL=
SPL= STD=
STD= SPL=

Calibration Curve

Date: 05-07-96

Date: Response Units:
STD= SPL=
SPL= STD=
STD= SPL=

Date: Response Units:
STD= SPL=
SPL= STD=
STD= SPL=

Date:

Date: Response Units:
STD= SPL=
SPL= STD=
STD= SPL=

Date: Response Units:
STD= SPL=
SPL= STD=
STD= SPL=

Date:

B. Bector
Analyst B. Bector



Scott Specialty Gases

1750 EAST CLUB BOULEVARD, DURHAM, NC 27704

(919) 220-0803 FAX: (919) 220-0808

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

Customer
Entropy Environmentalists
Attn: John Maxwell
Accounts Payable
P.O. Box 12291
Research Triangle Park, NC 27612

Assay Laboratory
Scott Specialty Gases, Inc.
1750 East Club Boulevard
Durham, NC 27704

Purchase Order MAXWELL
Scott Project # 12-16095

ANALYTICAL INFORMATION

Certified to exceed the minimum specifications of EPA Protocol Procedure #G1, issued September, 1993.

Cylinder Number ALM-046161
Cylinder Pressure 2000 PSIG

Certification Date 03-05-96
Previous Certification None

Expiration Date 03-05-99

ANALYZED CYLINDER

Components

Propane
Air

Certified Concentration
27.54 PPM

Analytical Uncertainty*

+/- 1% NIST Directly Traceable
Balance

Do not use when cylinder pressure is less than 150 PSIG.

*Analytical uncertainty is inclusive of usual known error sources which at least includes reference standard error & precision of the measurement process.

REFERENCE STANDARD

Type NTRM # 1668
Expiration Date 06-96

Cylinder Number
ALM-032005

Concentration
95.5 PPM C3H8 Balance in Air

INSTRUMENTATION

Instrument/Model/Serial #
Varian /3400/16804

Last Date Calibrated
03-05-96

Analytical Principle
Gas Chromatography

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components

First Triad Analysis

Date: 03-05-96
Response Units: Area
STD-521891 SPL-150699
SPL-150434 STD-522215
STD-521892 SPL-150512

Second Triad Analysis

Date:
Response Units:
STD- SPL-
SPL- STD-
STD- SPL-

Calibration Curve

Date: 03-05-96

Date:
Response Units:
STD- SPL-
SPL- STD-
STD- SPL-

Date:
Response Units:
STD- SPL-
SPL- STD-
STD- SPL-

Date:

Date:
Response Units:
STD- SPL-
SPL- STD-
STD- SPL-

Date:
Response Units:
STD- SPL-
SPL- STD-
STD- SPL-

Date:

S. Vaughan
Analyst S. Vaughan



Scott Specialty Gases

1750 EAST CLUB BOULEVARD, DURHAM, NC 27704

(919) 220-0803 FAX: (919) 220-0808

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

Customer
Entropy
Attn: John Maxwell
CEM Division
8724 Glenwood Avenue
Raleigh, NC 27612

Assay Laboratory
Scott Specialty Gases, Inc.
1750 East Club Boulevard
Durham, NC 27704

Purchase Order 5159-MAXWELLJ
Scott Project # 12-17291

ANALYTICAL INFORMATION

Certified to exceed the minimum specifications of EPA Protocol Procedure #G1, issued September, 1993.

Cylinder Number ALM-045725
Cylinder Pressure 2000 psig

Certification Date 05-07-96
Previous Certification None

Expiration Date 05-07-99

ANALYZED CYLINDER

Components

Propane
Air

Certified Concentration

28.1 ppm

Analytical Uncertainty*

+/- 1% NIST Directly Traceable
Balance

Do not use when cylinder pressure is less than 150 PSIG.

*Analytical uncertainty is inclusive of actual known error sources which at least includes reference standard error & precision of the measurement process.

REFERENCE STANDARD

Type NIRM # 1668
Expiration Date 06-07-96

Cylinder Number
ALM-032005

Concentration
95.5 ppm C3H8 Balance in Air

INSTRUMENTATION

Instrument/Model/Serial #
Varian /3400/0160

Last Date Calibrated
05-07-96

Analytical Principle
Gas Chromatography

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components

First Triad Analysis

Date: 05-07-96 Response Units: Area
STD=527620 SPL=155071
SPL=155263 STD=527656
STD=528104 SPL=155170

Second Triad Analysis

Date: Response Units:
STD= SPL=
SPL= STD=
STD= SPL=

Calibration Curve

Date: 05-07-96

Date: Response Units:
STD= SPL=
SPL= STD=
STD= SPL=

Date: Response Units:
STD= SPL=
SPL= STD=
STD= SPL=

Date:

Date: Response Units:
STD= SPL=
SPL= STD=
STD= SPL=

Date: Response Units:
STD= SPL=
SPL= STD=
STD= SPL=

B. Bector
Analyst B. Bector



Scott Specialty Gases

1750 EAST CLUB BOULEVARD, DURHAM, NC 27704

(919) 220-0803 FAX: (919) 220-0808

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

Customer

Entropy
Attn: John Maxwell
CEM Division
8724 Glenwood Avenue
Raleigh, NC 27612

Assay Laboratory

Scott Specialty Gases, Inc.
1750 East Club Boulevard
Durham, NC 27704

Purchase Order 5159-MAXWELLJ

Scott Project # 12-17291

ANALYTICAL INFORMATION

Certified to exceed the minimum specifications of EPA Protocol Procedure #G1, issued September, 1993.

Cylinder Number AAL-15461

Certification Date

05-07-96

Expiration Date

05-07-99

Cylinder Pressure 2000 psig

Previous Certification

None

ANALYZED CYLINDER

Components

Propane

Air

Certified Concentration

28.8 ppm

Analytical Uncertainty*

+/- 1% NIST Directly Traceable
Balance

Do not use when cylinder pressure is less than 150 PSIG.

*Analytical uncertainty is inclusive of usual known error sources which at least includes reference standard error & precision of the measurement process.

REFERENCE STANDARD

Type

Expiration Date

Cylinder Number

Concentration

NTRM # 1668

06-07-96

ALM-032005

95.5 ppm C3H8 Balance in Air

INSTRUMENTATION

Instrument/Model/Serial #

Last Date Calibrated

Analytical Principle

Varian /3400/0160

05-07-96

Gas Chromatography

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components

First Triad Analysis

Second Triad Analysis

Calibration Curve

Propane

Date: 05-07-96 Response Units: Area
STD=527620 SPL=159165
SPL=159055 STD=527636
STD=528104 SPL=159148

Date: Response Units:
STD= SPL=
SPL= STD=
STD= SPL=

Date: 05-07-96

Date: Response Units:
STD= SPL=
SPL= STD=
STD= SPL=

Date: Response Units:
STD= SPL=
SPL= STD=
STD= SPL=

Date:

Date: Response Units:
STD= SPL=
SPL= STD=
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Date: Response Units:
STD= SPL=
SPL= STD=
STD= SPL=

B. Becton
Analyst B. Becton



Scott Specialty Gases, Inc.

1750 EAST CLUB BOULEVARD, DURHAM, NC 27704

(919) 220-0803 FAX: (919) 220-0808

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

Customer

Entropy
Attn: Mr. John Maxwell
CEM Division
8724 Glenwood Avenue
Raleigh, NC 27612

Assay Laboratory

Scott Specialty Gases, Inc.
1750 East Club Boulevard
Durham, NC 27704

Purchase Order 4739-MAXWELL
Scott Project # 12-09458

ANALYTICAL INFORMATION

Certified to exceed the minimum specifications of EPA Protocol Procedure #G1, issued September, 1993.

Cylinder Number ALM-036747
Cylinder Pressure 2000 PSIG

Certification Date 12-19-94 Expiration Date 12-19-97
Previous Certification None

ANALYZED CYLINDER

Components

Carbon Monoxide
Nitrogen

Certified Concentration

30.1 PPM

Analytical Uncertainty*

+/- 1% NIST Directly Traceable
Balance

Do not use when cylinder pressure is less than 150 PSIG.

*Analytical uncertainty is inclusive of total known error sources which at least includes reference standard error & precision of the measurement process.

REFERENCE STANDARD

Type Expiration Date
NTRM# 1678 07-96

Cylinder Number
ALM-000901

Concentration
45.76 PPM Balance in Nitrogen

INSTRUMENTATION

Instrument/Model/Serial #
LOW CO: Horiba/AIA23AS/850658012

Last Date Calibrated
12-12-94

Analytical Principle
NDIR

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components

Carbon Monoxide

First Triad Analysis

Date: 12-11-94 Response Units: PPM
Z1=0.1 R2=45.9 Z3=0.1
R1=45.9 Z2=0.1 T3=30.3
T1=30.2 T2=30.3 R3=46.0

Second Triad Analysis

Date: 12-19-94 Response Units: PPM
Z1=0.1 R2=45.7 Z3=0.2
R1=45.7 Z2=0.1 T3=30.0
T1=30.1 T2=30.1 R3=45.7

Calibration Curve

Date: 12-12-94

Date: Response Units:
Z1= R2= Z3=
R1= Z2= T3=
T1= T2= R3=

Date: Response Units:
Z1= R2= Z3=
R1= Z2= T3=
T1= T2= R3=

Date:

Date: Response Units:
Z1= R2= Z3=
R1= Z2= T3=
T1= T2= R3=

Date: Response Units:
Z1= R2= Z3=
R1= Z2= T3=
T1= T2= R3=

Date:

Analyst K. Cooke

Air Products and Chemicals, Inc.
P.O. BOX 3
R.D. #1
TAMAQUA, PA 18252

Certificate of Analysis - EPA Protocol Gas Standard

Page 1 of 1

PERFORMED ACCORDING TO EPA TRACEABILITY PROTOCOL FOR ASSAY AND CERTIFICATION OF GASEOUS CALIBRATION STANDARDS (PROCEDURE #G1)

Customer:

AIR PRODUCTS

1115 SLIGH BLVD.

ORLANDO

Notes:

FL 32806-

Order No:

Batch No:

Cylinder No:

Cylinder Pressure:

Certification Date:

Expiration Date:

Analytical Instrumentation

Serial Last Measurement

Instrument Make/Model

Concentration

150.9000 PPM Hewlett Packar 2518A052

05/17/95 GC-FID

PO: Rel:

*** Certified Concentration *** Reference Standards *****

Certified Standard

Component Concentration Cylinder #

CARBON MONOXIDE 59.4 ±0.44 PPM SG9115170BAL GMIS

Balance Gas: Nitrogen

* Standard should not be used below 150 psig

201

Analyst:

Dave Woodward

Dave Woodward

Approved By:

K. Roubik

Ken Roubik



Scott Specialty Gases

1750 E. CLUB BLVD., DURHAM, NC 27704

(919) 220-0803 FAX: (919) 220-0808

CERTIFICATE OF ANALYSIS: Interference Free™ Multi-Component EPA Protocol Gas

Customer
Entropy
Attn: John Maxwell
CEM Division
8724 Glenwood Avenue
Raleigh, NC 27612

Assay Laboratory
Scott Specialty Gases, Inc.
1750 E. Club Blvd.
Durham, NC 27704

Purchase Order 5159-MAXWELLJ
Scott Project # 12-17291

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay and Certification of Gaseous Calibration Standards; Procedure G1; September, 1993.

Cylinder Number ALM-001094
Cylinder Pressure+ 1957 psig

Previous Certification Dates

Certification Date 05-06-96
Exp. Date 05-06-99

ANALYZED CYLINDER

Components

Carbon Monoxide
Nitrogen

Certified Concentration

60.51 ppm
Balance Gas

Analytical Accuracy*

±1% NIST Traceable

+ Do not use when cylinder pressure is below 150 psig.

* Analytical accuracy is inclusive of usual known error sources which at least includes precision of the measurement processes.

REFERENCE STANDARD

Type/Sample No. NIRM 1679
Expiration Date 08-11-96

Cylinder Number ALM-041546

Concentration 97.1 ppm CO Balance N2

INSTRUMENTATION

Instrument/Model/Serial #
Nicolet FTIR/8220/AAB9400252

Last Date Calibrated
05-02-96

Analytical Method
Scott Enhanced FTIR™

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components

First Triad Analysis

Second Triad Analysis

Calibration Curve

CO

Date: 04-29-96 Response Units: ppm
Z1= -0.020 R1= 97.91 T1= 60.49
R2= 97.23 Z2= -0.009 T2= 60.44
Z3= -0.003 T3= 60.41 R3= 97.16
Avg. Concentration = 60.45 ppm

Date: 05-06-96 Response Units: ppm
Z1= -0.094 R1= 96.90 T1= 60.49
R2= 97.19 Z2= -0.077 T2= 60.56
Z3= -0.074 T3= 60.45 R3= 97.21
Avg. Concentration = 60.51 ppm

Concentration = $A + Bx + Cx^2 + Dx^3 + Ex^4 + Fx^5$
 $r = 0.99999$
Constants: A= -3.23459E-1
B= 2.69481E-1 C= 3.28372E-4
D= 4.54495E-6 E= -3.89233E-9
F= 1.80390E-12

Special Notes:

B. Becton
Analyst B. Becton



Scott Specialty Gases

1750 E. CLUB BLVD., DURHAM, NC 27704

(919) 220-0803 FAX: (919) 220-0803

CERTIFICATE OF ANALYSIS: Interference Free™ Multi-Component EPA Protocol Gas

Customer
Entropy
Attn: John Maxwell
CEM Division
8724 Glenwood Avenue
Raleigh, NC 27612

Assay Laboratory
Scott Specialty Gases, Inc.
1750 E. Club Blvd.
Durham, NC 27704

Purchase Order 5159-MAXWELLJ
Scott Project # 12-17291

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay and Certification of Gaseous Calibration Standards, Procedure G1, September, 1993.

Cylinder Number AAL-17348
Cylinder Pressure† 1957 psig

Previous Certification Dates

Certification Date 05-06-96
Exp. Date 05-06-99

ANALYZED CYLINDER

Components
Carbon Monoxide
Nitrogen

Certified Concentration
60.59 ppm
Balance Gas

Analytical Accuracy*
±1% NIST Traceable

* Do not use when cylinder pressure is below 150 psig.

† Analytical accuracy is inclusive of usual known error sources which at least includes precision of the measurement procedure.

REFERENCE STANDARD

Type/Sample No. Expiration Date
NIRM 1679 08-11-96

Cylinder Number
ALM-041546

Concentration
97.1 ppm CO Balance N2

INSTRUMENTATION

Instrument/Model/Serial #
Nicolet FTIR/8220/AAB9400252

Last Date Calibrated
05-02-96

Analytical Method
Scott Enhanced FTIR™

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components

First Triad Analysis

Second Triad Analysis

Calibration Curve

CO

Date: 04-29-96 Response Units: ppm
Z1=-0.020 R1=97.91 T1=60.52
R2=97.23 Z2=-0.009 T2=60.44
Z3=-0.003 T3=60.60 R3=97.16
Avg. Concentration = 60.52 ppm

Date: 05-06-96 Response Units: ppm
Z1=-0.094 R1=96.90 T1=60.56
R2=97.19 Z2=-0.077 T2=60.46
Z3=-0.074 T3=60.75 R3=97.21
Avg. Concentration = 60.66 ppm

Concentration = $A + Bx + Cx^2 + Dx^3 + Ex^4 + Fx^5$
 $r = 0.99999$
Constants: A = -3.23439E-1
B = 2.69481E-1 C = 3.28372E-4
D = 4.54492E-6 E = -3.89233E-9
F = 1.86390E-12

Special Notes:

B. Bector
Analyst B. Bector

Air Products and Chemicals, Inc.
P.O. BOX 351
R.D. #1
TAMAQUA, PA 18252

Certificate of Analysis - EPA Protocol Gas Standard

Page 1 of 1

PERFORMED ACCORDING TO EPA TRACEABILITY PROTOCOL FOR ASSAY AND CERTIFICATION OF GASEOUS CALIBRATION STANDARDS (PROCEDURE #G1)

Customer:

AIR PRODUCTS AND CHEMICALS, INC.
HOMETOWN FACILITY
R.R. #1, P.O. BOX 351
TAMAQUA PA 18252-

Notes:

Order No: 255-055424-02
Batch No: 255-73389

Cylinder No: SG861591NB
Cylinder Pressure*: 2000 psig
Certification Date: 08/24/95
Expiration Date: 08/24/98

PO: Rel:

*** Certified Concentration *** ***** Reference Standards ***** Analytical Instrumentation *****

Component	Certified Concentration	Cylinder #	Standard	Instrument	Serial	Last	Measurement
CARBON MONOXIDE	90.1 ±0.23 PPM	SG887934	GMIS	Concentration	Make/Model	Number Calibration	Principal
					91.7000 PPM	Hewlett Packar 2518A052	08/12/95 GC-FID

Balance Gas: Nitrogen

* Standard should not be used below 150 psig

204

Analyst:

Mike Pascolini
Mike Pascolini

Approved By:

K. Roubik/mk
Ken Roubik



Scott Specialty Gases, Inc.

1750 EAST CLUB BOULEVARD, DURHAM, NC 27704

(919) 220-0803 FAX: (919) 220-0808

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

Customer
Entropy
Attn: Mr. John Maxwell
CEM Division
8724 Glenwood Avenue
Raleigh, NC 27612

Assay Laboratory
Scott Specialty Gases, Inc.
1750 East Club Boulevard
Durham, NC 27704

Purchase Order 4704-MAXWELL
Scott Project # 12-09145

ANALYTICAL INFORMATION

Certified to exceed the minimum specifications of EPA Protocol Procedure #G1, issued September, 1993.

Cylinder Number ALM-020086
Cylinder Pressure 2000 PSIG

Certification Date 11-18-94
Previous Certification None

Expiration Date 11-18-97

ANALYZED CYLINDER

Components
Carbon Monoxide
Nitrogen

Certified Concentration
90.1 PPM

Analytical Uncertainty*
+/- 1% NIST Directly Traceable
Balance

Do not use when cylinder pressure is less than 150 PSIG.

*Analytical uncertainty is inclusive of usual known error sources which at least includes reference standard error & precision of the measurement processes.

REFERENCE STANDARD

Type NTRM# 2636
Expiration Date 08-96

Cylinder Number
ALM-034195

Concentration
244.2 PPM Balance in Nitrogen

INSTRUMENTATION

Instrument/Model/Serial #
LOW CO: Horiba/AIA23AS/850658012

Last Date Calibrated
11-11-94

Analytical Principle
NDIR

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components	First Triad Analysis	Second Triad Analysis	Calibration Curve
Carbon Monoxide	Date: 11-11-94 Response Units: PPM Z1=0.0 R2=244.2 Z3=0.1 R1=244.1 Z2=0.1 T3=90.2 T1=90.1 T2=90.0 R3=244.2	Date: 11-18-94 Response Units: PPM Z1=0.1 R2=244.2 Z3=0.1 R1=244.2 Z2=0.1 T3=90.2 T1=90.1 T2=90.2 R3=244.2	Date: 11-11-94
	Date: Response Units: Z1= R2= Z3= R1= Z2= T3= T1= T2= R3=	Date: Response Units: Z1= R2= Z3= R1= Z2= T3= T1= T2= R3=	Date:
	Date: Response Units: Z1= R2= Z3= R1= Z2= T3= T1= T2= R3=	Date: Response Units: Z1= R2= Z3= R1= Z2= T3= T1= T2= R3=	Date:

Analyst K. Cooke



Scott Specialty Gases, Inc.

1750 EAST CLUB BOULEVARD, DURHAM, NC 27704

(919) 220-0808 FAX: (919) 220-0808

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

Customer

Entropy
Attn: Mr. John Maxwell
CEM Division
8724 Glenwood Avenue
Raleigh, NC 27612

Assay Laboratory

Scott Specialty Gases, Inc.
1750 East Club Boulevard
Durham, NC 27704

Purchase Order 4514MULLINT
Scott Project # 12-07707

ANALYTICAL INFORMATION

Certified to exceed the minimum specifications of EPA Protocol Procedure #G1, issued September, 1993.

Cylinder Number ALM-011700
Cylinder Pressure 1915 PSIG

Certification Date 07-06-94
Previous Certification None

Expiration Date 07-06-97

ANALYZED CYLINDER

Components

Carbon Monoxide
Nitrogen

Certified Concentration

150.6 PPM

Analytical Uncertainty*

+/- 1% NIST Directly Traceable
Balance

Do not use when cylinder pressure is less than 150 PSIG.

*Analytical uncertainty is inclusive of usual known error sources which at least includes reference standard error & precision of the measurement program.

REFERENCE STANDARD

Type Expiration Date
NTRM # 2636 12/94

Cylinder Number
ALM-024902

Concentration
243.2 PPM Balance in Nitrogen

INSTRUMENTATION

Instrument/Model/Serial #
Varian /3400/16804

Last Date Calibrated
06-17-94

Analytical Principle
Gas Chromatography

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components

Carbon Monoxide

First Triad Analysis

Date: 06-30-94 Response Units: Area
STD-12143 SPL-7560
SPL-7544 SPL-7502
STD-12229 STD-12136

Second Triad Analysis

Date: 07-06-94 Response Units: Area
STD-13298 SPL-8255
SPL-8231 SPL-8240
STD-13309 STD-13323

Calibration Curve

Date: 06-17-94

Date: Response Units:
STD- SPL-
SPL- SPL-
STD- STD-

Date: Response Units:
STD- SPL-
SPL- SPL-
STD- STD-

Date:

Date: Response Units:
STD- SPL-
SPL- SPL-
STD- STD-

Date: Response Units:
STD- SPL-
SPL- SPL-
STD- STD-

Date:

A. Barber
Analyst A. Barber



Scott Specialty Gases, Inc.

6141 EASTON ROAD, P.O. BOX 310, PLUMSTEADVILLE, PA 18949-0310

(215) 768-8861 FAX: (215) 766-0320

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

Customer
Entropy
Cam Division
8724 Glenwood Avenue
Raleigh, NC 27612

Assay Laboratory
Scott Specialty Gases, Inc.
6141 Easton Road
P.O. Box 310
Plumsteadville, PA 18949-0310

Purchase Order 4397HARRISB
Scott Project # 01-55881-003

ANALYTICAL INFORMATION

Certified to exceed the minimum specifications of EPA Protocol 1 Procedure #G1, Section Number 3.0.4

Cylinder Number ALM024154

Certification Date

04-13-94

Expiration Date

04-13-97

Cylinder Pressure 2000 psig

Previous Certification Dates

None

ANALYZED CYLINDER

Components

Carbon monoxide

Balance Gas: Nitrogen

Certified Concentration

150.7 ppm

Analytical Uncertainty*

±1% NIST Directly Traceable

*Analytical uncertainty is inclusive of usual known error sources which at least includes reference standard error & precision of the measurement processes.

REFERENCE STANDARD

Type

NIRM2636

Expiration Date

09-18-94

Cylinder Number

ALM019690

Concentration

243 ppm CO in N₂

INSTRUMENTATION

Instrument/Model/Serial

CO: Horiba/CFA310A/474091

Last Date Calibrated

04-13-94

Analytical Principle

NDIR

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components

First Triad Analysis

Date: 04-05-94 Response Units: Volts
Z1=0.0022 R1=0.9478 T1=0.5926
R2=0.9487 Z2=0.0029 T2=0.5928
Z3=0.0019 T3=0.5933 R3=0.9503
Avg. Conc. of Cust. Cyl. 150.5 ppm

Second Triad Analysis

Date: 04-13-94 Response Units: Volts
Z1=0.0017 R1=0.9446 T1=0.5916
R2=0.9461 Z2=0.0028 T2=0.5916
Z3=0.0019 T3=0.5913 R3=0.9463
Avg. Conc. of Cust. Cyl. 150.9 ppm

Calibration Curve

Concentration = $A + Bx + Cx^2 + Dx^3 + Ex^4$
 $r = 0.99999$ NIRM2636
Constants: $A = -8.2654E-02$
 $B = 2.5193E+02$ $C = 5.5813E+00$
 $D = 0.0000E+00$ $E = 0.0000E+00$

Special Notes

Analyst
Analyst AJ Rojas



Scott Specialty Gases

1750 EAST CLUB BOULEVARD, DURHAM, NC 27704

(919) 220-0803 FAX: (919) 220-0808

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

Customer
Entropy Environmentalist
Attn: John Maxwell
Attn: Accts Payable
P.O. Box 12291
Research Triangle Park, NC 27709

Assay Laboratory
Scott Specialty Gases, Inc.
1750 East Club Boulevard
Durham, N.C. 27704

Purchase Order 5011-MAXWELL
Scott Project # 12-13047

ANALYTICAL INFORMATION

Certified to exceed the minimum specifications of EPA Protocol Procedure #G1, issued September, 1993.

Cylinder Number ALM-021947
Cylinder Pressure 1919 PSIG

Certification Date 08-21-95
Previous Certification None

Expiration Date 08-21-98

ANALYZED CYLINDER

Components

Carbon Monoxide
Nitrogen

Certified Concentration
301.4 PPM

Analytical Uncertainty*

+/- 1% NIST Directly Traceable
Balance

Do not use when cylinder pressure is less than 150 PSIG.

*Analytical uncertainty is inclusive of usual known error sources which at least includes reference standard error & precision of the measurement process.

REFERENCE STANDARD

Type NTRM# 2636
Expiration Date 08-96

Cylinder Number
ALM-034275

Concentration
244.2 PPM CO Balance in N2

INSTRUMENTATION

Instrument/Model/Serial #
NICOLET / 8220 / AAB9400252

Last Date Calibrated
08-01-95

Analytical Principle
FTIR

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components

Carbon Monoxide

First Triad Analysis

Date: 08-11-95 Response Units: PPM
Z1=0.038 R2=243.8 Z3=0.133
R1=244.2 Z2=0.068 T3=301.6
T1=301.7 T2=301.1 R3=243.8

Second Triad Analysis

Date: 08-21-95 Response Units: PPM
Z1=0.028 R2=243.8 Z3=0.200
R1=244.2 Z2=0.017 T3=301.0
T1=301.1 T2=301.5 R3=243.5

Calibration Curve

Date: 08-01-95

Date: Response Units:
Z1- R2- Z3-
R1- Z2- T3-
T1- T2- R3-

Date: Response Units:
Z1- R2- Z3-
R1- Z2- T3-
T1- T2- R3-

Date:

Date: Response Units:
Z1- R2- Z3-
R1- Z2- T3-
T1- T2- R3-

Date: Response Units:
Z1- R2- Z3-
R1- Z2- T3-
T1- T2- R3-

Date:

B. Becton
Analyst B. Becton



Scott Specialty Gases, Inc.

6141 EASTON ROAD, P.O. BOX 310, PLUMSTEADVILLE, PA 18949-0310

(215) 766-8861 FAX: (215) 766-0320

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

Customer
Entropy
8724 Glenwood Ave
Raleigh, NC 27612

Assay Laboratory
Scott Specialty Gases, Inc.
6141 Easton Road
P.O. Box 310
Plumsteadville, PA 18949-0310

Purchase Order 3938 HARRISB
Scott Project # 01-50352-004

ANALYTICAL INFORMATION

Certified to exceed the minimum specifications of EPA Protocol 1 Procedure #G1, Section Number 3.0.4

Cylinder Number AAL20314
Cylinder Pressure 2000 psig

Certification Date 09-22-93
Previous Certification Dates None

Expiration Date 09-22-96

ANALYZED CYLINDER

Components
Carbon monoxide
Balance Gas: Nitrogen

Certified Concentration
448 ppm

Analytical Uncertainty*
±1% NIST Directly Traceable

*Analytical uncertainty is inclusive of usual known error sources which at least includes reference standard error & precision of the measurement processes.

REFERENCE STANDARD

Type NTRM1680
Expiration Date 09-24-94

Cylinder Number
ALM024877

Concentration
474 ppm CO in N₂

INSTRUMENTATION

Instrument/Model/Serial #
CO: Horiba/CFA310A/474091

Last Date Calibrated
08-28-93

Analytical Principle
NDIR

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components	First Triad Analysis	Second Triad Analysis	Calibration Curve
Carbon monoxide	Date: 09-15-93 Response Units: Volts Z1=0.0015 R1=1.0020 T1=0.4795 R2=1.0019 Z2=0.0033 T2=0.4786 Z3=0.0039 T3=0.4787 R3=1.0039 Avg. Conc. of Cust. Cyl. 447 ppm	Date: 09-22-93 Response Units: Volts Z1=0.0055 R1=0.4964 T1=0.4702 R2=0.4972 Z2=0.0056 T2=0.4695 Z3=0.0052 T3=0.4702 R3=0.4965 Avg. Conc. of Cust. Cyl. 448 ppm	Concentration = $A + Bx + Cx^2 + Dx^3 + Ex^4$ $r = 1.00000$ NTRM1681 Constant: A=3.5192E-01 B=9.2703E+02 C=5.9938E+01 D=0.0000E+00 E=0.0000E+00

Special Notes

209

Analyst Michael A. Kuhns



Scott Specialty Gases

6141 EASTON ROAD, P.O. BOX 310, PLUMSTEADVILLE, PA 18949-0310

(215) 766-6861 FAX: (215) 766-0320

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

Customer
Entropy
Cem Division
8724 Glenwood Avenue
Raleigh, NC 27612

Assay Laboratory
Scott Specialty Gases, Inc.
6141 Easton Road
P.O. Box 310
Plumsteadville, PA 18949-0310

Purchase Order 5011-MAXWELL
Scott Project # 01-70629-001

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards: 1 Procedure #G1, Section Number 3.0.4, September, 1993.

Cylinder Number A1.M035396
Cylinder Pressure 2000 psig+

Certification Date 08-14-95
Previous Certification Dates None

Expiration Date 08-14-97

ANALYZED CYLINDER

Components

Nitric Oxide
Total Oxides of Nitrogen
Balance Gas: Nitrogen

Certified Concentration

25.9 ppm
25.0 ppm

Analytical Uncertainty*

±1% NIST Traceable
Reference Value Only

*Do not use when cylinder is less than 150 psig.

*Analytical uncertainty is inclusive of usual known error sources which at least includes reference standard error & precision of the measurement process.

REFERENCE STANDARD

Type NTR04629
Expiration Date 11-21-96

Cylinder Number KLM001188

Concentration 19.87 ppm NO in N₂

INSTRUMENTATION

Instrument/Model/Serial #
NO. 555/10/9741111S

Last Date Calibrated 08-14-95

Analytical Principle
Chemiluminescent

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components

Nitric Oxide

First Triad Analysis

Date: 08-07-95 Response Units: Volts
Z1=0.0022 R1=1.9942 T1=2.9996
Z2=2.0054 Z3=0.0028 T2=2.6720
Z3=0.0281 T3=2.5980 R3=1.9936
Avg. Conc. of Cust. Cyl. 25.9 ppm

Second Triad Analysis

Date: 08-14-95 Response Units: Volts
Z1=0.0184 R1=1.5285 T1=1.9753
Z2=1.5050 Z3=0.0038 T2=1.9680
Z3=0.0041 T3=1.9529 R3=1.5135
Avg. Conc. of Cust. Cyl. 25.9 ppm

Calibration Curve

Concentration=A+Br+Cr+Dr+Er
r=1.00000 NTR04629
Constants A=-1.8334E-01
B=1.3871E+01 C=0.0000E+00
D=0.0000E+00 E=0.0000E+00

Special Notes:

Analyst: Wesley Blair



Scott Specialty Gases

1750 EAST CLUB BOULEVARD, DURHAM, NC 27704

(919) 220-0803 FAX: (919) 220-0803

CERTIFICATE OF ANALYSIS: Interference-Free™ Multi-Component EPA Protocol Gas

Customer
Entropy Environmentalists
Attn: John Maxwell
Accounts Payable
P.O. Box 12291
Research Triangle Park, NC 27709

Assay Laboratory
Scott Specialty Gases, Inc.
1750 East Club Boulevard
Durham, NC 27704

Purchase Order MAXWELL
Scott Project # 12- 16095

ANALYTICAL INFORMATION

Certified to exceed the minimum specifications of EPA Protocol Procedure #G1, issued September, 1993.

Cylinder Number ALM-044018
Cylinder Pressure 1939 PSIG

Certification Date 03-06-95
Previous Certification None

Expiration Date 03-06-98

ANALYZED CYLINDER

Components

Nitric Oxide
NOx
Nitrogen

Certified Concentration

43.52 PPM
44.05 PPM

Analytical Uncertainty*

+/- 1% NIST Directly Traceable
Reference Value Only
Balance

Do not use when cylinder pressure is less than 150 PSIG.

*Analytical uncertainty is inclusive of usual known error sources which at least includes precision of the measurement processes.

REFERENCE STANDARD

Type NTRM# 1684
Expiration Date 06-97

Cylinder Number
ALM-049051

Concentration
94.4 PPM NO Balance in N2

INSTRUMENTATION

Instrument/Model/Serial #
NICOLET / 8220 / AAB9400252

Last Date Calibrated
02-06-96

Analytical Principle
Scott Enhanced FTIR

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components

Nitric Oxide

First Triad Analysis

Date: 02-28-96 Response Units: PPM
Z1=-0.155 R2=94.48 Z3=-0.045
R1=94.28 Z2=0.048 T3=43.56
T1=43.61 T2=43.69 R3=94.42
Average Concentration : 43.62 PPM

Second Triad Analysis

Date: 03-06-96 Response Units: PPM
Z1=-0.184 R2=94.37 Z3=-0.018
R1=94.50 Z2=-0.155 T3=43.26
T1=43.56 T2=43.45 R3=94.33
Average Concentration : 43.42 PPM

Calibration Curve

Date: 02-06-96
Concentration = A+Bx+Cx2+Dx3+Ex4+Fx5
R=0.99999 A=-2.04523E-1
B=7.55972E-1 C=2.59896E-4
D=5.37748E-7 E=-1.13202E-1
F=1.91805E-13

Date: Response Units:
Z1- R2- Z3-
R1- Z2- T3-
T1- T2- R3-

Date: Response Units:
Z1- R2- Z3-
R1- Z2- T3-
T1- T2- R3-

Date:

Date: Response Units:
Z1- R2- Z3-
R1- Z2- T3-
T1- T2- R3-

Date: Response Units:
Z1- R2- Z3-
R1- Z2- T3-
T1- T2- R3-

Date:

B. Becton
Analyst B. Becton



Scott Specialty Gases

6141 EASTON ROAD, P.O. BOX 310, PLUMSTEADVILLE, PA 18949-0310

(215) 765-8861 FAX (215) 765-0320

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

Customer
Entropy
Attn: John Maxwell
Cem Division
Raleigh, NC 27612

Assay Laboratory
Scott Specialty Gases, Inc.
6141 Easton Road
P.O. Box 310
Plumsteadville, PA 18949-0310

Purchase Order 5159-MAXWELLJ
Scott Project # 01-78849-009

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; 1 Procedure #G1, Section Number 3.0.4; September, 1993.

Cylinder Number ALM054563
Cylinder Pressure 2000 psig+

Certification Date 05-07-96
Previous Certification Dates None

Expiration Date 05-07-98

ANALYZED CYLINDER

Components
Nitric Oxide
Total Oxides of Nitrogen
Balance Gas: Nitrogen

Certified Concentration
46.3 ppm
46.4 ppm

Analytical Uncertainty*
±1% NIST Traceable
Reference Value Only

*Do not use when cylinder is less than 150 psig.

*Analytical uncertainty is inclusive of usual known error sources which at least includes precision of the measurement process.

REFERENCE STANDARD

Type NRM1684
Expiration Date 06-07-97

Cylinder Number
ALM047456

Concentration
94.4 ppm NO in N₂

INSTRUMENTATION

Instrument/Model/Serial #
NO: Horiba/CLA220/5708850810

Last Date Calibrated
04-17-96

Analytical Principle
Chemiluminescent

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components

Nitric Oxide

First Triad Analysis

Date: 04-30-96 Response Units: Volts
Z1=0.0009 R1=0.9549 T1=0.4690
R2=0.9526 Z2=0.0009 T2=0.4697
Z3=0.0009 T3=0.4703 R3=0.9518
Avg. Conc. of Cust. Cyl 46.5 ppm

Second Triad Analysis

Date: 05-07-96 Response Units: Volts
Z1=0.0003 R1=0.9715 T1=0.4728
R2=0.9680 Z2=0.0008 T2=0.4737
Z3=0.0004 T3=0.4723 R3=0.9666
Avg. Conc. of Cust. Cyl 46.1 ppm

Calibration Curve

Concentration = $A + Bx + Cx^2 + Dx^3 + Ex^4$
 $r = 1.0000$ NRM1684
Constants: A = -7.1805E-03
B = 9.9259E+01 C = 0.0000E+00
D = 0.0000E+00 E = 0.0000E+00

Special Notes:

Wesley Bleiler
Analyst Wesley Bleiler



Scott Specialty Gases

6141 EASTON ROAD, P.O. BOX 310, PLUMSTEADVILLE, PA 18949-0310

(215) 766-8861 FAX: (215) 766-0320

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

Customer

Entropy
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Raleigh, NC 27612

Assay Laboratory

Scott Specialty Gases, Inc.
6141 Easton Road
P.O. Box 310
Plumsteadville, PA 18949-0310

Purchase Order 5071-MAXWEJ
Scott Project # 01-73802-005

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; 1 Procedure #G1, Section Number 3.0.4; September, 1993.

Cylinder Number ALM050120
Cylinder Pressure 2000 psig*

Certification Date 11-28-95
Previous Certification Dates None

Expiration Date 11-28-97

ANALYZED CYLINDER

Components

Nitric Oxide
Total Oxides of Nitrogen
Balance Gas: Nitrogen

Certified Concentration

46.4 ppm
47.1 ppm

Analytical Uncertainty*

±1% NIST Traceable
Reference Value Only

*Do not use when cylinder is less than 150 psig.

*Analytical uncertainty is inclusive of usual known error sources which at least includes reference standard error & precision of the measurement processes.

REFERENCE STANDARD

Type: NTRM1684
Expiration Date 06-07-97

Cylinder Number
ALM049155

Concentration
94.4 ppm NO in N₂

INSTRUMENTATION

Instrument/Model/Serial #
NO: Horiba/CLA220/5708850810

Last Date Calibrated
11-10-95

Analytical Principle
Chemiluminescent

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components

First Triad Analysis

Date: 11-21-95 Response Units: Volts
Z1=0.0001 R1=0.9443 T1=0.4568
R2=0.9414 Z2=0.0003 T2=0.4602
Z3=0.0003 T3=0.4595 R3=0.9447
Avg. Conc. of Cast. Cyl. 46.5 ppm

Second Triad Analysis

Date: 11-28-95 Response Units: Volts
Z1=0.0002 R1=0.9490 T1=0.4650
R2=0.9486 Z2=0.0000 T2=0.4679
Z3=0.0003 T3=0.4683 R3=0.9490
Avg. Conc. of Cast. Cyl. 46.3 ppm

Calibration Curve

Concentration=A+Bx+Cx²+Dx³+Ex⁴
r=0.99992 NTRM1684
Constants: A=-2.4890E-01
B=9.8680E+01 C=0.0000E+00
D=0.0000E+00 E=0.0000E+00

Special Notes:

Wesley Bleker
Analyst Wesley Bleker



Scott Specialty Gases

8141 EASTON ROAD, P.O. BOX 310, PLUMSTEADVILLE, PA 18949-0310

(215) 788-8881 FAX: (215) 788-0320

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

Customer
Kilbally Environmental
4905 Green Rd.
Suite 104
Raleigh, NC 27604

Assay Laboratory
Scott Specialty Gases, Inc.
6141 Easton Road
P.O. Box 310
Plumsteadville, PA 18949-0310

Purchase Order KBA-0550-330
Scott Project # 01-63834-032

ANALYTICAL INFORMATION

Certified to exceed the minimum specifications of EPA Protocol 1 Procedure 601. Section Number 3.0.4

Cylinder Number ALM55455
Cylinder Pressure 2800 psig

Certification Date 01-05-95
Previous Certification Date None

Expiration Date 01-05-97

ANALYZED CYLINDER

Contents
Nitric Oxide
Total Oxides of Nitrogen
Balance Gas: Nitrogen

Certified Concentration
82.2 ppm
82.2 ppm

Analytical Uncertainty:
±1% NIST Traceable
Reference Value Only

*Do not use when cylinder is less than 150 psig.

*Analytical uncertainty is inclusive of usual known uncertainties which at least includes reference standard error & precision of the measurement process.

REFERENCE STANDARD

Type SRM1631B
Expiration Date 11-18-95

Cylinder Number CLM00135

Concentration
47.9 ppm NO in N₂

INSTRUMENTATION

Instrument/Model/Serial #
NO: 1200/19/9701115

Last Date Calibrated
01-03-95

Analytical Principle
Chemiluminescent

ANALYZER READINGS (2-Zero Gas 8-Reference Gas 10-Test Gas 11-Correlation Coefficient)

Components	First Test Analysis	Second Test Analysis	Calibration Curve
Nitric Oxide	Date: 12-08-94 Response Units: Volts 21-0.0100 21-0.0225 21-0.0325 22-0.0142 22-0.0284 22-0.0426 23-0.0200 23-0.0400 23-0.0600 Avg. Conc. of Cal. Gas: 82.2 ppm	Date: 01-05-95 Response Units: Volts 21-0.0100 21-0.0225 21-0.0325 22-0.0142 22-0.0284 22-0.0426 23-0.0200 23-0.0400 23-0.0600 Avg. Conc. of Cal. Gas: 82.2 ppm	Concentration = A + Bx + Cx² + Dx³ + Ex⁴ r = 0.9999 Constant: 0.000000 Coefficient: 0.000000 C = 0.000000 D = 0.000000 E = 0.000000

Special Notes:

☐ Check this box if certified concentration has been corrected for analytical interference.

Handwritten signature
Analyst: [Signature]

214

2000

SCOTT CASES

0200001072 17:31 02A 06/07/96



Scott Specialty Gases

1750 EAST CLUB BOULEVARD, DURHAM, NC 27704

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CERTIFICATE OF ANALYSIS: Interference-Free™ EPA Protocol Gas

Customer
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CEM Division
8724 Glenwood Avenue
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Assay Laboratory
Scott Specialty Gases, Inc.
1750 East Club Boulevard
Durham, NC 27704

Purchase Order 1238721TOV
Scott Project # 12-15771

ANALYTICAL INFORMATION

Certified to exceed the minimum specifications of EPA Protocol Procedure #G1, issued September, 1993.

Cylinder Number AAL-830
Cylinder Pressure 647 PSIG

Certification Date 01-31-96
Previous Certification 08-05-93

Expiration Date 01-31-98

ANALYZED CYLINDER

Components

Nitric Oxide
N.O.X.
Nitrogen

Certified Concentration
80.22 PPM
80.22 PPM

Analytical Uncertainty*
+/- 1% NIST Directly Traceable
Reference Value Only
Balance

Do not use when cylinder pressure is less than 150 PSIG.

*Analytical uncertainty is inclusive of usual known error sources which at least includes reference standard error & precision of the measurement process.

REFERENCE STANDARD

Type NTRM# 1684
Expiration Date 06-97

Cylinder Number
ALM-049051

Concentration
94.4 PPM NO Balance in N2

INSTRUMENTATION

Instrument/Model/Serial #
NICOLET / 8220 / AAB9400252

Last Date Calibrated
01-05-96

Analytical Principle
Scott Enhanced FTIR

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components

Nitric Oxide

First Triad Analysis

Date: 01-31-96 **Response Unit:** PPM
Z1= -0.137 R2= 94.57 Z3= -0.091
R1= 94.23 Z2= 0.097 T3= 80.22
T1= 80.16 T2= 80.27 R3= 94.40
Average Concentration: 80.22 PPM

Second Triad Analysis

Date: **Response Unit:**
Z1= R2= Z3=
R1= Z2= T3=
T1= T2= R3=

Calibration Curve

Date: 01-05-96
Concentration = A+Bx+Cx2+Dx3+Ex4+Fx5
R= 0.99999 A= 4.65378E-2
B= 6.33838E-1 C= 4.83089E-4
D= 6.25995E-7 E= -1.78069E-10
F= 1.95346E-13

Date: **Response Unit:**
Z1= R2= Z3=
R1= Z2= T3=
T1= T2= R3=

Date: **Response Unit:**
Z1= R2= Z3=
R1= Z2= T3=
T1= T2= R3=

Date:

Date: **Response Unit:**
Z1= R2= Z3=
R1= Z2= T3=
T1= T2= R3=

Date: **Response Unit:**
Z1= R2= Z3=
R1= Z2= T3=
T1= T2= R3=

Date:

B. Becton
Analyst B. Becton

PS



Scott Specialty Gases

1750 E. CLUB BLVD., DURHAM, NC 27704

(919) 220-0803 FAX: (919) 220-0808

CERTIFICATE OF ANALYSIS: Interference Free™ Multi-Component EPA Protocol Gas

Customer
Entropy
Attn: John Maxwell
CEM Division
8724 Glenwood Avenue
Raleigh, NC 27612

Assay Laboratory
Scott Specialty Gases, Inc.
1750 E. Club Blvd.
Durham, NC 27704

Purchase Order 5159-Maxwell
Scott Project # 12-17291

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay and Certification of Gaseous Calibration Standards, Procedure G1, September, 1993.

Cylinder Number ALM-003737
Cylinder Pressure+ 1917 psig

Previous Certification Dates

Certification Date 05-09-96
Exp. Date 05-09-98

ANALYZED CYLINDER

Components

Nitric Oxide
Total Oxides of Nitrogen
Nitrogen

Certified Concentration

82.02 ppm
82.74 ppm
Balance Gas

Analytical Accuracy*

±1% NIST Traceable
Reference Value Only

+ Do not use when cylinder pressure is below 150 psig.

* Analytical accuracy is inclusive of usual known error sources which at least includes precision of the measurement process.

REFERENCE STANDARD

Type/Sample No. Expiration Date
NTRM 1684 06-97

Cylinder Number
ALM-047432

Concentration
94.4 ppm NO in N2

INSTRUMENTATION

Instrument/Model/Serial #
Nicolet FTIR/8220/AAB9400252

Last Date Calibrated
05-02-96

Analytical Method
Scott Enhanced FTIR™

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components

First Triad Analysis

Second Triad Analysis

Calibration Curve

NO

Date: 05-01-96 Response Units: ppm
Z1=0.279 R1=93.8 T1=82.4
R2=94.6 Z2=0.176 T2=82.1
Z3=0.377 T3=82.2 R3=94.8
Avg. Concentration = 82.2 ppm

Date: 05-09-96 Response Units: ppm
Z1=0.574 R1=94.20 T1=81.90
R2=94.65 Z2=1.093 T2=81.85
Z3=1.713 T3=81.78 R3=94.57
Avg. Concentration = 81.84 ppm

Concentration = $A + Bx + Cx^2 + Dx^3 + Ex^4 + Fx^5$
 $r = 0.99999$
Constants: A = -2.04523E-1
B = 7.55972E-1 C = 1.59896E-4
D = 5.37748E-7 E = -1.13202E-1
F = 1.91805E-13

Special Notes:

B. Bector
Analyst B. Bector



Scott Specialty Gases

1750 E. CLUB BLVD., DURHAM, NC 27704

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CERTIFICATE OF ANALYSIS: Interference Free™ Multi-Component EPA Protocol Gas

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1750 E. Club Blvd.
Durham, NC 27704

Purchase Order 5159-MAXWELLJ
Scott Project # 12-17291

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay and Certification of Gaseous Calibration Standards; Procedure G1; September, 1993.

Cylinder Number AAL-6899
Cylinder Pressure† 1993 psig

Previous Certification Dates

Certification Date 05-06-96
Exp. Date 05-06-99

ANALYZED CYLINDER

Components
Carbon Dioxide
Nitrogen

Certified Concentration
11.02 %
Balance Gas

Analytical Accuracy*
±1% NIST Traceable

† Do not use when cylinder pressure is below 150 psig.

* Analytical accuracy is inclusive of usual known error sources which at least includes precision of the measurement processes.

REFERENCE STANDARD

Type/Sample No. NIRM 18000
Expiration Date 12-21-96

Cylinder Number ALM-047732

Concentration
17.95% CO2 in N2

INSTRUMENTATION

Instrument/Model/Serial #
Nicolet FTIR/8220/AAB9400252

Last Date Calibrated
05-02-96

Analytical Method
Scott Enhanced FTIR™

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components

First Triad Analysis

Second Triad Analysis

Calibration Curve

CO2

Date: 05-06-96 Response Units: %
Z1= -0.006 R1= 17.95 T1= 11.02
R2= 17.96 Z2= 0.007 T2= 11.02
Z3= 0.004 T3= 11.02 R3= 17.95
Avg. Concentration = 11.02 %

Date: Response Units:
Z1= R1= T1=
R2= Z2= T2=
Z3= T3= R3=
Avg. Concentration =

Concentration= A+BX+CX²+DX³
r= 0.99999
Constants: A= -4.03729E-3
B= 6.78095E-5 C= 1.57142E-10
D= 1.02225E-16

Special Notes:

B. Becton
Analyst B. Becton



Scott Specialty Gases

1750 E. CLUB BLVD., DURHAM, NC 27704

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CERTIFICATE OF ANALYSIS: Interference Free™ Multi-Component EPA Protocol Gas

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Durham, NC 27704

Purchase Order 5159-MAXWELLJ
Scott Project # 12-17291

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay and Certification of Gaseous Calibration Standards; Procedure G1; September, 1993.

Cylinder Number AAL-4107
Cylinder Pressure+ 1993 psig

Previous Certification Dates

Certification Date 05-06-96
Exp. Date 05-06-99

ANALYZED CYLINDER

Components
Carbon Dioxide
Nitrogen

Certified Concentration
11.02 %
Balance Gas

Analytical Accuracy*
±1% NIST Traceable

+ Do not use when cylinder pressure is below 150 psig.

* Analytical accuracy is inclusive of usual known error sources which at least includes precision of the measurement process.

REFERENCE STANDARD

Type/Sample No. NTRM 18000
Expiration Date 12-21-96

Cylinder Number
ALM-047732

Concentration
17.95% CO2 in N2

INSTRUMENTATION

Instrument/Model/Serial #
Nicolet FTIR/8220/AAB9400252

Last Date Calibrated
05-02-96

Analytical Method
Scott Enhanced FTIR™

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components

CO2

First Triad Analysis

Date: 05-06-96 Response Units: %
Z1= -0.006 R1= 17.95 T1= 11.03
R2= 17.96 Z2= 0.007 T2= 11.02
Z3= 0.004 T3= 11.02 R3= 17.95
Avg. Concentration = 11.02 %

Second Triad Analysis

Date: Response Units:
Z1= R1= T1=
R2= Z2= T2=
Z3= T3= R3=
Avg. Concentration =

Calibration Curve

Concentration = $A + Bx + Cx^2 + Dx^3$
 $r = 0.99999$
Constants: $A = -4.03729E-3$
 $B = 6.78095E-5$ $C = 1.57142E-10$
 $D = 1.02225E-16$

Special Notes:

B. Becton
Analyst B. Becton



Scott Specialty Gases

1750 E. CLUB BLVD., DURHAM, NC 27704

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CERTIFICATE OF ANALYSIS: Interference Free™ Multi-Component EPA Protocol Gas

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1750 E. Club Blvd.
Durham, NC 27704

Purchase Order 5159-MAXWELLJ
Scott Project # 12-17291

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay and Certification of Gaseous Calibration Standards, Procedure G1; September, 1993.

Cylinder Number AAL-14906
Cylinder Pressure+ 1993 psig

Previous Certification Dates

Certification Date 05-06-96
Exp. Date 05-06-99

ANALYZED CYLINDER

Components
Carbon Dioxide
Nitrogen

Certified Concentration
11.83 %
Balance Gas

Analytical Accuracy*
±1% NIST Traceable

+ Do not use when cylinder pressure is below 150 psig.

* Analytical accuracy is inclusive of usual known error sources which at least includes precision of the measurement processes.

REFERENCE STANDARD

Type/Sample No. NIRM 18000
Expiration Date 12-21-96

Cylinder Number
ALM-047732

Concentration
17.95% CO₂ in N₂

INSTRUMENTATION

Instrument/Model/Serial #
Nicolet FTIR/8220/AAB9400252

Last Date Calibrated
05-02-96

Analytical Method
Scott Enhanced FTIR™

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components
CO₂

First Triad Analysis

Date: 05-06-96 Response Units: %
Z1= -0.006 R1= 17.95 T1= 11.83
R2= 17.96 Z2= 0.007 T2= 11.82
Z3= 0.004 T3= 11.83 R3= 17.95
Avg. Concentration = 11.83 %

Second Triad Analysis

Date: Response Units:
Z1= R1= T1=
R2= Z2= T2=
Z3= T3= R3=
Avg. Concentration =

Calibration Curve

Concentration = A + B(rC + D)
r = 0.99999
Constants: A = -4.8372E-3
B = 6.7889E-5 C = 1.5714E-10
D = 1.8222E-16

Special Notes:

B. Becton
Analyst B. Becton



Scott Specialty Gases

1750 EAST CLUB BOULEVARD, DURHAM, NC 27704

(919) 220-0803 FAX: (919) 220-0808

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

Customer
Entropy Environmentalists
Attn: John Maxwell
Accounts Payable
P.O. Box 12291
Research Triangle Park, NC 27709

Assay Laboratory
Scott Specialty Gases, Inc.
1750 East Club Boulevard
Durham, NC 27704

Purchase Order MAXWELL
Scott Project # 12-16095

ANALYTICAL INFORMATION

Certified to exceed the minimum specifications of EPA Protocol Procedure #G1, issued September, 1993.

Cylinder Number ALM-046363
Cylinder Pressure 2000 PSIG

Certification Date 03-05-96
Previous Certification None

Expiration Date 03-05-99

ANALYZED CYLINDER

Components

Oxygen
Nitrogen

Certified Concentration
12.05 %

Analytical Uncertainty*
+/- 1% NIST Directly Traceable
Balance

Do not use when cylinder pressure is less than 150 PSIG.

*Analytical uncertainty is inclusive of total known error sources which at least includes reference standard error & precision of the measurement process.

REFERENCE STANDARD

Type Expiration Date
NIRM # 2659 11-96

Cylinder Number
ALM-017564

Concentration
20.63% O2 Balance in N2

INSTRUMENTATION

Instrument/Model/Serial #
Varian /3400/16804

Last Date Calibrated
02-08-96

Analytical Principle
Gas Chromatography

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components

Oxygen

First Triad Analysis

Date: 03-05-96 Response Units: Area
Area
STD-325149 SPL-306735
SPL-306969 STD-325479
STD-325406 SPL-306747

Second Triad Analysis

Date: Response Units:
STD- SPL-
SPL- STD-
STD- SPL-

Calibration Curve

Date: 02-06-96

Date: Response Units:
STD- SPL-
SPL- STD-
STD- SPL-

Date: Response Units:
STD- SPL-
SPL- STD-
STD- SPL-

Date:

Date: Response Units:
STD- SPL-
SPL- STD-
STD- SPL-

Date: Response Units:
STD- SPL-
SPL- STD-
STD- SPL-

Analyst S. Vaughan



Scott Specialty Gases

1750 EAST CLUB BOULEVARD, DURHAM, NC 27704

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CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

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Assay Laboratory
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1750 East Club Boulevard
Durham, NC 27704

Purchase Order MAXWELL
Scott Project # 12-16095

ANALYTICAL INFORMATION

Certified to exceed the minimum specifications of EPA Protocol Procedure #G1, issued September, 1993.

Cylinder Number AAL-5695
Cylinder Pressure 2000 PSIG

Certification Date 03-05-96
Previous Certification None

Expiration Date 03-05-99

ANALYZED CYLINDER

Components

Oxygen
Nitrogen

Certified Concentration
12.06 %

Analytical Uncertainty*

+/- 1% NIST Directly Tracable
Balance

Do not use when cylinder pressure is less than 150 PSIG.

*Analytical uncertainty is inclusive of usual known error sources which at least includes reference standard error & precision of the measurement process.

REFERENCE STANDARD

Type NTRM # 2659
Expiration Date 11-96

Cylinder Number
ALM-017564

Concentration
20.63% O2 Balance in N2

INSTRUMENTATION

Instrument/Model/Serial #
Varian /3400/16804

Last Date Calibrated
02-08-96

Analytical Principle
Gas Chromatography

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components

Oxygen

First Triad Analysis

Date: 03-05-96
Response Unit: Area
Area
STD-525149 SPL-307235
SPL-307036 STD-525479
STD-525406 SPL-307321

Second Triad Analysis

Date:
Response Unit:
STD- SPL-
SPL- STD-
STD- SPL-

Calibration Curve

Date: 02-06-96

Date:
Response Unit:
STD- SPL-
SPL- STD-
STD- SPL-

Date:
Response Unit:
STD- SPL-
SPL- STD-
STD- SPL-

Date:

Date:
Response Unit:
STD- SPL-
SPL- STD-
STD- SPL-

Date:
Response Unit:
STD- SPL-
SPL- STD-
STD- SPL-

Analyst: S. Vaughan



Scott Specialty Gases

1750 EAST CLUB BOULEVARD, DURHAM, NC 27704

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CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

Customer
Entropy
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CEM Division
8724 Glenwood Avenue
Raleigh, NC 27612

Assay Laboratory
Scott Specialty Gases, Inc.
1750 East Club Boulevard
Durham, NC 27704

Purchase Order 5159-MAXWELL
Scott Project # 12-17291

ANALYTICAL INFORMATION

Certified to exceed the minimum specifications of EPA Protocol Procedure #G1, issued September, 1993.

Cylinder Number ALM-044661
Cylinder Pressure 2000 psig

Certification Date 05-06-96
Previous Certification None

Expiration Date 05-06-99

ANALYZED CYLINDER

Components

Oxygen
Nitrogen

Certified Concentration
12.26 %

Analytical Uncertainty*
+/- 1% NIST Directly Traceable
Balance

Do not use when cylinder pressure is less than 150 PSIG.

*Analytical uncertainty is inclusive of usual known error sources which at least includes reference standard error & precision of the measurement process.

REFERENCE STANDARD

Type NIRM # 2658
Expiration Date 11-96

Cylinder Number
ALM-031884

Concentration
9.68 % O2 Balance in N2

INSTRUMENTATION

Instrument/Model/Serial #
Varian /3400/16804

Last Date Calibrated
04-23-96

Analytical Principle
Gas Chromatography

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components

Oxygen

First Triad Analysis

Date: 05-06-96 Response Units: Area
STD-247107 SPL-313313
SPL-312578 STD-247520
STD-247300 SPL-313260

Second Triad Analysis

Date: Response Units:
STD- SPL-
SPL- STD-
STD- SPL-

Calibration Curve

Date: 04-23-96

Date: Response Units:
STD- SPL-
SPL- STD-
STD- SPL-

Date: Response Units:
STD- SPL-
SPL- STD-
STD- SPL-

Date:

Date: Response Units:
STD- SPL-
SPL- STD-
STD- SPL-

Date: Response Units:
STD- SPL-
SPL- STD-
STD- SPL-

S. Vaughan
Analyst S. Vaughan



Scott Specialty Gases

1750 EAST CLUB BOULEVARD, DURHAM, NC 27704

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CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

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Durham, NC 27704

Purchase Order 4922
Scott Project # 12-11576

ANALYTICAL INFORMATION

Certified to exceed the minimum specifications of EPA Protocol Procedure #G1, issued September, 1993.

Cylinder Number	ALM-001351	Certification Date	05-15-95	Expiration Date	05-15-98
Cylinder Pressure	2000 PSIG	Previous Certification	None		

ANALYZED CYLINDER

<u>Components</u>	<u>Certified Concentration</u>	<u>Analytical Uncertainty*</u>
Oxygen	28.22 %	+/- 1% NIST Directly Traceable
Carbon Dioxide	16.92 %	+/- 1% NIST Directly Traceable
Nitrogen		Balance

Do not use when cylinder pressure is less than 150 PSIG.

*Analytical uncertainty is inclusive of usual known error sources which at least includes reference standard error & precision of the measurement process.

REFERENCE STANDARD

Type	Expiration Date	Cylinder Number	Concentration
NTRM # 2659	11-96	ALM-031720	20.72% O2 Balance in N2
NTRM# 1675	09-95	ALM-032766	14.01% CO2 Balance in N2

INSTRUMENTATION

Instrument/Model/Serial # Varian /3400/16804	Last Date Calibrated 04-17-95	Analytical Principle Gas Chromatography
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ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components	First Triad Analysis	Second Triad Analysis	Calibration Curve																	
Oxygen	<table><tr><td>Date: 05-15-95</td><td>Response Unit: Area</td></tr><tr><td>STD-543753</td><td>SPL-530929</td></tr><tr><td>SPL-531718</td><td>STD-543709</td></tr><tr><td>STD-543680</td><td>SPL-529444</td></tr></table>	Date: 05-15-95	Response Unit: Area	STD-543753	SPL-530929	SPL-531718	STD-543709	STD-543680	SPL-529444	<table><tr><td>Date:</td><td>Response Unit:</td></tr><tr><td>STD-</td><td>SPL-</td></tr><tr><td>SPL-</td><td>STD-</td></tr><tr><td>STD-</td><td>SPL-</td></tr></table>	Date:	Response Unit:	STD-	SPL-	SPL-	STD-	STD-	SPL-	<table><tr><td>Date: 04-17-95</td></tr></table>	Date: 04-17-95
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SPL-531718	STD-543709																			
STD-543680	SPL-529444																			
Date:	Response Unit:																			
STD-	SPL-																			
SPL-	STD-																			
STD-	SPL-																			
Date: 04-17-95																				
Carbon Dioxide	<table><tr><td>Date: 05-15-95</td><td>Response Unit: Area</td></tr><tr><td>STD-264952</td><td>SPL-319387</td></tr><tr><td>SPL-319436</td><td>STD-264618</td></tr><tr><td>STD-265012</td><td>SPL-320673</td></tr></table>	Date: 05-15-95	Response Unit: Area	STD-264952	SPL-319387	SPL-319436	STD-264618	STD-265012	SPL-320673	<table><tr><td>Date:</td><td>Response Unit:</td></tr><tr><td>STD-</td><td>SPL-</td></tr><tr><td>SPL-</td><td>STD-</td></tr><tr><td>STD-</td><td>SPL-</td></tr></table>	Date:	Response Unit:	STD-	SPL-	SPL-	STD-	STD-	SPL-	<table><tr><td>Date: 04-17-95</td></tr></table>	Date: 04-17-95
Date: 05-15-95	Response Unit: Area																			
STD-264952	SPL-319387																			
SPL-319436	STD-264618																			
STD-265012	SPL-320673																			
Date:	Response Unit:																			
STD-	SPL-																			
SPL-	STD-																			
STD-	SPL-																			
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Date:	Response Unit:																			
STD-	SPL-																			
SPL-	STD-																			
STD-	SPL-																			
Date:	Response Unit:																			
STD-	SPL-																			
SPL-	STD-																			
STD-	SPL-																			

B. Becton
Analyst B. Becton



Scott Specialty Gases

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Durham, NC 27704

Purchase Order 5051-MXWELJ
Scott Project # 12-14198

ANALYTICAL INFORMATION

Certified to exceed the minimum specifications of EPA Protocol Procedure #G1, issued September, 1993.

Cylinder Number	AAL-21309	Certification Date	10-16-95	Expiration Date	10-16-98
Cylinder Pressure	2000 PSIG	Previous Certification	None		

ANALYZED CYLINDER

Components

Carbon Dioxide

Oxygen

Nitrogen

Certified Concentration

17.20 %

20.34 %

Analytical Uncertainty*

+/- 1% NIST Directly Traceable

+/- 1% NIST Directly Traceable

Balance

Do not use when cylinder pressure is less than 150 PSIG.

*Analytical uncertainty is inclusive of usual known error sources which at least includes reference standard error & precision of the measurement processes.

REFERENCE STANDARD

Type Expiration Date

NIRM # 18000 12-96

NIRM # 2659 11-96

Cylinder Number

ALM-047691

ALM-031720

Concentration

17.95% CO2 Balance in N2

20.72% O2 Balance in N2

INSTRUMENTATION

Instrument/Model/Serial #

Varian /3400/0160

Varian /3400/16804

Last Date Calibrated

09-19-95

10-06-95

Analytical Principle

Gas Chromatography

Gas Chromatography

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components

First Triad Analysis

Date: 10-16-95	Response Units: Area
STD-316772	SPL-303981
SPL-302958	STD-316629
STD-316806	SPL-303472

Second Triad Analysis

Date:	Response Units:
STD-	SPL-
SPL-	STD-
STD-	SPL-

Calibration Curve

Date: 09-19-95

Oxygen

Date: 10-16-95	Response Units: Area
STD-548878	SPL-539275
SPL-539161	STD-548978
STD-549013	SPL-538832

Date:	Response Units:
STD-	SPL-
SPL-	STD-
STD-	SPL-

Date: 10-06-95

Date:	Response Units:
STD-	SPL-
SPL-	STD-
STD-	SPL-

Date:	Response Units:
STD-	SPL-
SPL-	STD-
STD-	SPL-

B. Becton
Analyst B. Becton

Air Products and Chemicals, Inc.
SPECIALTY DEPARTMENT
12722 S. W. NORTH AVENUE
CHICAGO, IL 60628

Certificate of Analysis - EPA Protocol Gas Standard

Page 1 of 1

PERFORMED ACCORDING TO EPA TRACEABILITY PROTOCOL FOR ASSAY AND CERTIFICATION OF GASEOUS CALIBRATION STANDARDS (PROCEDURE #G1)

Customer:

AIR PRODUCTS AND CHEMICALS
LEHIGH DISTRICT
ROUTE 222
TREXLETON PA 18087

Notes:

Order No: LOG-000686-02
Batch No: 861-25968

Cylinder No: SG9134088BAL
Cylinder Pressure: 2000 psig
Certification Date: 06/01/95
Expiration Date: 06/01/98

PO: Rel:

*** Certified Concentration *** ***** Reference Standards ***** Analytical Instrumentation *****

Component	Concentration	Cylinder #	Standard	Number	Concentration	Make/Model	Instrument	Serial	Last	Measurement
CARBON DIOXIDE	17.4 ±0.03 %	SG9113405BAL	GMIS		17.9800 %	Horiba VIA-510	51135063	05/20/95	INFRARED	HORIBA
OXYGEN	21.3 ±0.11 %	SG9113445BAL	GMIS		22.7100 %	Shimadzu GC-8A	32029	05/20/95	INFRARED	HORIBA

Balance Gas: Nitrogen

* Standard should not be used below 150 psig

225

Analyst:

Richard Van Dyke
Richard VanDyke

Approved By:

Robert McNear
Robert McNear

INTERFERENCE RESPONSE

Analyzer Type..... FUJI 3300 DUAL RANGE Span..... 20
 Serial number..... N9B1794T Date..... 12-20-91
 EEI #..... 4

Gas Type	Concentration	Analyzer response	(a) % of span
CO/N2	437.2 ppm	0.000	0.0000
SO2/N2	240.0 ppm	0.000	0.0000
NO/N2	237.0 ppm	0.000	0.0000
O2/N2	20.9 %	0.000	0.0000
(b) Totals			0.0000

(a) % of span = ANALYZER RESPONSE/INSTRUMENT SPAN X 100

(b) SPECIFICATION (EPA METHOD 20): SUM OF INTERFERENCE RESPONSES MUST NOT EXCEED 2% OF SPAN.

INTERFERENCE TEST PROCEDURES

ENTROPY followed the manufacturer's recommended set-up procedures contained in the analyzer manual. After the initial set-up procedures were completed, the electronics of the monitor were adjusted according to the manufacturer's guidelines. The monitor was calibrated by flowing CO2 calibration gases into the instrument. The SO2, CO, NOx and O2 calibration gases listed above were injected into the monitor and the responses were recorded with a data acquisition system, which was analyzed to determine if the gases caused interference (ie. deviations from a zero reading) in the CO2 monitor.

NOTE: This is a summary of the data collected. All supporting data will be provided upon request.

INTERFERENCE RESPONSE

Analyzer Type..... FUJI 3300 DUAL RANGE Span..... 20
 Serial number..... N1A5217T Date..... 12/12/91
 EEI #..... 8

Gas Type	Concentration	Analyzer response	(a) % of span
CO/N2	437.0 ppm	0.000	0.0000
SO2/N2	240.0 ppm	0.000	0.0000
NO/N2	238.0 ppm	0.000	0.0000
O2/N2	20.9 %	0.000	0.0000
(b) Totals			0.0000

(a) % of span = ANALYZER RESPONSE/INSTRUMENT SPAN X 100

(b) SPECIFICATION (EPA METHOD 20): SUM OF INTERFERENCE RESPONSES MUST NOT EXCEED 2% OF SPAN.

INTERFERENCE TEST PROCEDURES

ENTROPY followed the manufacturer's recommended set-up procedures contained in the analyzer manual. After the initial set-up procedures were completed, the electronics of the monitor were adjusted according to the manufacturer's guidelines. The monitor was calibrated by flowing CO2 calibration gases into the instrument. The SO2, CO, NOx and O2 calibration gases listed above were injected into the monitor and the responses were recorded with a data acquisition system, which was analyzed to determine if the gases caused interference (ie. deviations from a zero reading) in the CO2 monitor.

NOTE: This is a summary of the test data. The supporting data is available upon request.

INTERFERENCE RESPONSE

Analyzer Type..... FUJI 3300 DUAL RANGE Span..... 20
 Serial number..... N4A1133T Date..... 8/5/94
 EEI #..... 11

Gas Type	Concentration	Analyzer response	(a)	% of span
=====	=====	=====	=====	=====
CO/NO	601.0 ppm	0.000		0.0000
SO2/N2	455.0 ppm	0.000		0.0000
NO/N2	139.8 ppm	0.000		0.0000
O2/N2	10.0 %	0.000		0.0000
		(b) Totals		0.0000

(a) % of span = ANALYZER RESPONSE/INSTRUMENT SPAN X 100

(b) SPECIFICATION (EPA METHOD 20): SUM OF INTERFERENCE RESPONSES MUST NOT EXCEED 2% OF SPAN.

INTERFERENCE TEST PROCEDURES

ENTROPY followed the manufacturer's recommended set-up procedures contained in the analyzer manual. After the initial set-up procedures were completed, the electronics of the monitor were adjusted according to the manufacturer's guidelines. The monitor was calibrated by flowing CO2 calibration gases into the instrument. The SO2, CO, NOx and O2 calibration gases listed above were injected into the monitor and the responses were recorded with a data acquisition system, which was analyzed to determine if the gases caused interference (ie. deviations from a zero reading) in the CO2 monitor.

Note: This is a summary of the data collected, all corresponding data

INTERFERENCE RESPONSE

Analyzer Type..... TELEDYNE 320P-4 Span..... 25
 Serial number..... 122521 Date..... 10-21-91
 EEI #..... 4

Gas Type	Concentration	Analyzer response	(a) % of span
CO/N2	246.0 ppm	0.000	0.0000
SO2/N2	549.0 ppm	0.000	0.0000
NO/N2	240.0 ppm	0.000	0.0000
CO2/N2	17.5 %	0.000	0.0000
(b) Totals			0.0000

(a) % of span = ANALYZER RESPONSE/INSTRUMENT SPAN X 100

(b) SPECIFICATION (EPA METHOD 20): SUM OF INTERFERENCE RESPONSES MUST NOT EXCEED 2% OF SPAN.

INTERFERENCE TEST PROCEDURES

ENTROPY followed the manufacturer's recommended set-up procedures contained in the analyzer manual. After the initial set-up procedures were completed, the electronics of the monitor were adjusted according to the manufacturer's guidelines. The monitor was calibrated by flowing O2 calibration gases into the instrument. The SO2, CO, NOx and CO2 calibration gases listed above were injected into the monitor and the responses were recorded with a data acquisition system, which was analyzed to determine if the gases caused interference (ie. deviations from a zero reading) in the O2 monitor.

INTERFERENCE RESPONSE

Analyzer Type..... TELEDYNE 320P-4 Span..... 25
 Serial number..... 126300 Date..... 1-15-92
 EEI #..... 13

Gas Type	Concentration	Analyzer response	(a) % of span
CO/N2	683.9 ppm	0.000	0.0000
SO2/N2	237.0 ppm	0.000	0.0000
NO/N2	240.0 ppm	0.000	0.0000
CO2/N2	11.1 %	0.000	0.0000
(b) Totals			0.0000

(a) % of span = ANALYZER RESPONSE/INSTRUMENT SPAN X 100

(b) SPECIFICATION (EPA METHOD 20): SUM OF INTERFERENCE RESPONSES MUST NOT EXCEED 2% OF SPAN.

INTERFERENCE TEST PROCEDURES

ENTROPY followed the manufacturer's recommended set-up procedures contained in the analyzer manual. After the initial set-up procedures were completed, the electronics of the monitor were adjusted according to the manufacturer's guidelines. The monitor was calibrated by flowing O2 calibration gases into the instrument. The SO2, CO, NOx and CO2 calibration gases listed above were injected into the monitor, and the responses were recorded with a data acquisition system, which was analyzed to determine if the gases caused interference (i.e. deviations from a zero reading) in the O2 monitor.

INTERFERENCE RESPONSE

Analyzer Type.....	TELEDYNE 320P-4	Span.....	25%
Serial number.....	144344	Date.....	10/19/94
EEL #.....	20		

Gas Type	Concentration	Analyzer response	(a) % of span
=====	=====	=====	=====
CO/N2	301.0 ppm	0.000	ERR
SO2/N2	206.0 ppm	0.000	ERR
NO/N2	238.0 ppm	0.000	ERR
CO2/N2	5.02 %	0.000	ERR
		(b) Totals	ERR

(a) % of span = ANALYZER RESPONSE/INSTRUMENT SPAN X 100

(b) SPECIFICATION (EPA METHOD 20): SUM OF INTERFERENCE RESPONSES MUST NOT EXCEED 2% OF SPAN.

INTERFERENCE TEST PROCEDURES

ENTROPY followed the manufacturer's recommended set-up procedures contained in the analyzer manual. After the initial set-up procedures were completed, the electronics of the monitor were adjusted according to the manufacturer's guidelines. The monitor was calibrated by flowing O2 calibration gases into the instrument. The SO2, CO, NOx and CO2 calibration gases listed above were injected into the monitor and the responses were recorded with a data acquisition system, which was analyzed to determine if the gases caused interference (ie. deviations from a zero reading) in the O2 monitor.

INTERFERENCE RESPONSE

Analyzer Type.....	TECO 48 CO	Span.....	50
Serial number.....	48-32225-241	Date.....	5-9-91
EEl#.....	3		

Gas Type	Concentration	Analyzer response	(a) % of span
=====	=====	=====	=====
CO2/N2	11.0 %	0.000	0.0000
NO/N2	25.7 ppm	0.100	0.2000
SO2/N2	89.90 ppm	0.200	0.4000
O2/N2	12.5 %	0.200	0.4000
(b) Totals			1.0000

(a) % of span = ANALYZER RESPONSE/INSTRUMENT SPAN X 100

(b) SPECIFICATION (EPA METHOD 20): SUM OF INTERFERENCE RESPONSES MUST NOT EXCEED 2% OF SPAN.

INTERFERENCE TEST PROCEDURES

ENTROPY followed the manufacturer's recommended set-up procedures contained in the analyzer manual. After the initial set-up procedures were completed, the electronics of the monitor were adjusted according to the manufacturer's guidelines. The monitor was calibrated by flowing CO calibration gases into the instrument. The SO₂, NO_x, CO₂ and O₂ calibration gases listed above were injected into the monitor and the responses were recorded with a data acquisition system, which was analyzed to determine if the gases caused interference (ie. deviations from a zero reading) in the CO monitor.

INTERFERENCE RESPONSE

Analyzer Type.....	TECO 48 CO	Span.....	500
Serial number.....	48-32404-241	Date.....	5/9/91
EEI#.....	4		

Gas Type	Concentration	Analyzer response	(a)	% of span
CO2/N2	11.04 %	0.000		0.0000
NO/N2	470.0 ppm	0.000		0.0000
SO2/N2	454.0 ppm	3.100		0.6200
O2/N2	20.6 %	0.100		0.0200
		(b) Totals		0.6400

(a) % of span = ANALYZER RESPONSE/INSTRUMENT SPAN X 100

(b) SPECIFICATION (EPA METHOD 20): SUM OF INTERFERENCE RESPONSES MUST NOT EXCEED 2% OF SPAN.

INTERFERENCE TEST PROCEDURES

ENTROPY followed the manufacturer's recommended set-up procedures contained in the analyzer manual. After the initial set-up procedures were completed, the electronics of the monitor were adjusted according to the manufacturer's guidelines. The monitor was calibrated by flowing CO calibration gases into the instrument. The SO₂, NO_x, CO₂ and O₂ calibration gases listed above were injected into the monitor and the responses were recorded with a data acquisition system, which was analyzed to determine if the gases caused interference (i.e. deviations from a zero reading) in the CO monitor.

Analyzer Type.....	TECO 48 CO	Span.....	500
Serial number.....	48-36790-255	Date.....	3-30-92
EEI#.....	7		

Gas Type	Concentration	Analyzer response	(a)	% of span
CO ₂ /N ₂	11.06 %	2.564		0.5128
NO/N ₂	238.0 ppm	0.004		0.0008
SO ₂ /N ₂	241.0 ppm	2.556		0.5112
O ₂ /N ₂	20.09 %	0.007		0.0014
(b) Totals				1.0262

(a) % of span = ANALYZER RESPONSE/INSTRUMENT SPAN X 100

(b) SPECIFICATION (EPA METHOD 20): SUM OF INTERFERENCE RESPONSES MUST NOT EXCEED 2% OF SPAN.

(c) SPECIFICATION (BIF METHODS MANUAL): INTERFERENCE RESPONSE TO EACH GAS MUST BE LESS THAN 1% OF SPAN.

INTERFERENCE TEST PROCEDURES

ENTROPY followed the manufacturer's recommended set-up procedures contained in the analyzer manual. After the initial set-up procedures were completed, the electronics of the monitor were adjusted according to the manufacturer's guidelines. The monitor was calibrated by flowing CO calibration gases into the instrument. The SO₂, NO_x, CO₂ and O₂ calibration gases listed above were injected into the monitor and the responses were recorded with a data acquisition system, which was analyzed to determine if the gases caused interference (i.e. deviations from a zero reading) in the CO monitor.

NOTE: This is a summary of the data collected. All supporting data will be provided upon request.

INTERFERENCE RESPONSE

Analyzer Type..... TECO 10 NOX EEI#5 Span..... 250
 Serial number..... 10AR-32543-242 Date..... 2/20/91

Gas Type	Concentration	Analyzer response	(a) % of span
CO/N2	457.5 ppm	0.016	0.0064
SO2/N2	243.0 ppm	0.220	0.0880
CO2/N2	11.01 %	0.000	0.0000
O2/N2	20.6 %	0.100	0.0400
(b) Totals			0.1344

(a) % of span = ANALYZER RESPONSE/INSTRUMENT SPAN X 100

(b) SPECIFICATION (EPA METHOD 20): SUM OF INTERFERENCE RESPONSES MUST NOT EXCEED 2% OF SPAN.

INTERFERENCE TEST PROCEDURES

ENTROPY followed the manufacturer's recommended set-up procedures contained in the analyzer manual. After the initial set-up procedures were completed, the electronics of the monitor were adjusted according to the manufacturer's guidelines. The monitor was calibrated by flowing NO calibration gases into the instrument. The SO2, CO, CO2 and O2 calibration gases listed above were injected into the monitor and the responses were recorded with a data acquisition system, which was analyzed to determine if the gases caused interference (ie. deviations from a zero reading) in the NOx monitor.

Note: This is a summary of the data collected, all corresponding data will be provided upon request.

INTERFERENCE RESPONSE

Analyzer Type..... TECO 10 NOX EEI#7 Span..... 1000
 Serial number..... 10S-32784-243 Date..... 4/30/91

Gas Type	Concentration	Analyzer response	(a) % of span
CO/N2	457.3 ppm	0.020	0.0020
SO2/N2	243.0 ppm	0.020	0.0020
CO2/N2	11.04 %	0.000	0.0000
O2/N2	20.6 %	0.000	0.0000
(b) Totals			0.0040

(a) % of span = ANALYZER RESPONSE/INSTRUMENT SPAN X 100

(b) SPECIFICATION (EPA METHOD 20): SUM OF INTERFERENCE RESPONSES MUST NOT EXCEED 2% OF SPAN.

INTERFERENCE TEST PROCEDURES

ENTROPY followed the manufacturer's recommended set-up procedures contained in the analyzer manual. After the initial set-up procedures were completed, the electronics of the monitor were adjusted according to the manufacturer's guidelines. The monitor was calibrated by flowing NO calibration gases into the instrument. The SO2, CO, CO2 and O2 calibration gases listed above were injected into the monitor and the responses were recorded with a data acquisition system, which was analyzed to determine if the gases caused interference (ie. deviations from a zero reading) in the NOx monitor.

* INTERFERENCE RESPONSE

Analyzer Type..... TECO 10 NOX EEI#11 Span..... 250
 Serial number..... 10S-50496-285 Date..... 10-4-84

Gas Type	Concentration	Analyzer response	(a) % of span
CO/N2	801.1 ppm	0.100	0.0400
SO2/N2	141.3 ppm	0.000	0.0000
CO2/N2	5.02 %	0.000	0.0000
O2/N2	9.1 %	0.000	0.0000
(b) Totals			0.0400

(a) % of span = ANALYZER RESPONSE/INSTRUMENT SPAN X 100

(b) SPECIFICATION (EPA METHOD 20): SUM OF INTERFERENCE RESPONSES MUST NOT EXCEED 2% OF SPAN.

INTERFERENCE TEST PROCEDURES

ENTROPY followed the manufacturer's recommended set-up procedures contained in the analyzer manual. After the initial set-up procedures were completed, the electronics of the monitor were adjusted according to the manufacturer's guidelines. The monitor was calibrated by flowing NO calibration gases into the instrument. The SO2, CO, CO2 and O2 calibration gases listed above were injected into the monitor and the responses were recorded with a data acquisition system, which was analyzed to determine if the gases caused interference (ie. deviations from a zero reading) in the NOx monitor.

Note: This is a summary of the data collected, all corresponding data will be provided upon request.

NO2-NO CONVERSION EFFICIENCY

Analyzer Type.....	TECO 10 NOX EEI #5	Span.....	250
Serial number.....	10AR-32543-242	Date.....	1/19/96

PEAK RESPONSE RECORDED DURING CONVERTER EFFICIENCY TEST 118.98 ppm

RESPONSE RECORDED AT THE END OF THE 30-MINUTE TEST..... 117.88 ppm

PERCENT DECREASE FROM PEAK RESPONSE..... 0.92 %

CONVERTER EFFICIENCY..... 99.1 %

SPECIFICATIONS (EPA METHOD 20): RESPONSE AT 30 MINUTES MUST NOT DECREASE BY MORE THAN 2% OF THE PEAK RESPONSE VALUE.

NO2-NO CONVERTER EFFICIENCY TEST PROCEDURES

ENTROPY followed the manufacturer's recommended set-up procedures contained in the analyzer manual. After the initial set-up procedures were completed, the electronics of the monitor were adjusted according to the manufacturer's guidelines. The monitor was then calibrated by flowing NO calibration gases into the instrument. A calibration gas was then diluted (1:1) with purified compressed air. The gas mixture was routed through a manifold into a Tedlar bag, which was previously leak tested and evacuated. This arrangement afforded sufficient volume to allow the sampling system to operate for the required 30 minutes. Immediately after the bag was filled, the manifold was connected to the sampling system. The system was turned on and the analyzer response was recorded on a data acquisition system. The one minute averages from the data acquisition system was analyzed for the peak response and the response at the end of the 30-minute sampling period.

NO2-NO CONVERSION EFFICIENCY

Analyzer Type.....	TECO 10 NOX EEI#7	Span.....	1000
Serial number.....	10S-32784-243	Date.....	5/3/96

PEAK RESPONSE RECORDED DURING CONVERTER EFFICIENCY TEST..	130.72	ppm
RESPONSE RECORDED AT THE END OF THE 30-MINUTE TEST.....	128.47	ppm
PERCENT DECREASE FROM PEAK RESPONSE.....	1.72	%
CONVERTER EFFICIENCY.....	98.3	%

SPECIFICATIONS (EPA METHOD 20): RESPONSE AT 30 MINUTES MUST NOT DECREASE BY MORE THAN 2% OF THE PEAK RESPONSE VALUE.

NO2-NO CONVERTER EFFICIENCY TEST PROCEDURES

ENTROPY followed the manufacturer's recommended set-up procedures contained in the analyzer manual. After the initial set-up procedures were completed, the electronics of the monitor were adjusted according to the manufacturer's guidelines. The monitor was then calibrated by flowing NO calibration gases into the instrument. A calibration gas was then diluted (1:1) with purified compressed air. The gas mixture was routed through a manifold into a Tedlar bag, which was previously leak tested and evacuated. This arrangement afforded sufficient volume to allow the sampling system to operate for the required 30 minutes. Immediately after the bag was filled, the manifold was connected to the sampling system. The system was turned on and the analyzer response was recorded on a data acquisition system. The one minute averages from the data acquisition system was analyzed for the peak response and the response at the end of the 30-minute sampling period.

NO2-NO CONVERSION EFFICIENCY

Analyzer Type.....	TECO 10 NOX EEI#11	Span.....	250
Serial number.....	10S-50496-285	Date.....	10-25-95

PEAK RESPONSE RECORDED DURING CONVERTER EFFICIENCY TEST..	250.33	pp
RESPONSE RECORDED AT THE END OF THE 30-MINUTE TEST.....	247.29	pp
PERCENT DECREASE FROM PEAK RESPONSE.....	1.21	%
CONVERTER EFFICIENCY.....	98.8	%

SPECIFICATIONS (EPA METHOD 20): RESPONSE AT 30 MINUTES MUST NOT DECREASE BY MORE THAN 2% OF THE PEAK RESPONSE VALUE.

NO2-NO CONVERTER EFFICIENCY TEST PROCEDURES

ENTROPY followed the manufacturer's recommended set-up procedures contained in the analyzer manual. After the initial set-up procedures were completed, the electronics of the monitor were adjusted according to the manufacturer's guidelines. The monitor was then calibrated by flowing NO calibration gases into the instrument. A calibration gas was then diluted (1:1) with purified compressed air. The gas mixture was routed through a manifold into a Tedlar bag, which was previously leak tested and evacuated. This arrangement afforded sufficient volume to allow the sampling system to operate for the required 30 minutes. Immediately after the bag was filled, the manifold was connected to the sampling system. The system was turned on and the analyzer response was recorded on a data acquisition system. The one minute averages from the data acquisition system was analyzed for the peak response and the response at the end of the 30-minute sampling period.