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RESULTS OF THE JULY 12 - 15, 1994 AIR EMISSION COMPLIANCE TESTS AT THE LOUISIANA PACIFIC OSB PLANT IN HAYWARD, WISCONSIN

Submitted to:

LOUISIANA PACIFIC CORPORATION
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Approved by:

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SP/slp

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APPENDICES:

ABBREVIATIONS

ACFM	actual cubic feet per minute
cc (ml)	cubic centimeter (milliliter)
DSCFM	dry standard cubic foot of dry gas per minute
DSML	dry standard milliliter
DEG-F (°F)	degrees Fahrenheit
DIA.	diameter
FP	finished product for plant
FT/SEC	feet per second
g	gram
GPM	gallons per minute
GR/ACF	grains per actual cubic foot
GR/DSCF	grains per dry standard cubic foot
g/dscm	grams per dry standard cubic meter
HP	horsepower
HRS	hours
IN.	inches
IN.HG.	inches of mercury
IN.WC.	inches of water
LB	pound
LB/DSCF	pounds per dry standard cubic foot
LB/HR	pounds per hour
LB/10^6BTU	pounds per million British Thermal Units heat input
LB/MMBTU	pounds per million British Thermal Units heat input
LTPD	long tons per day
MW	megawatt
mg/Nm^3	milligrams per dry standard cubic meter
ug/Nm^3	micrograms per dry standard cubic meter
microns (um)	micrometer
MIN.	minutes
ng	nanograms
ohm-cm	ohm-centimeter
PM	particulate matter
PPH	pounds per hour
PPM	parts per million
ppmC	parts per million carbon
ppm,d	parts per million, dry
ppm,w	parts per million, wet
ppt	parts per trillion
PSI	pounds per square inch
SQ.FT.	square feet
TPD	tons per day
ug	micrograms
v/v	percent by volume
w/w	percent by weight
<	≤ (when following a number)

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

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1 INTRODUCTION

During the Period July 12 - 15, 1994 Interpoll Laboratories personnel conducted air emission compliance tests on the following sources at the Louisiana Pacific Corporation (LP) OSB Plant located in Hayward, Wisconsin.

Source	Parameters
Line 1 Dryer RTO Outlet	PM,NO_x,VE,CO,CH_2O,Benzene,Phenol,PAH's,THC's
Line 1 Surface Dryer RTO Inlet (Primary Cyclone Outlet)	PM,NO_x,CO,THC's
Line 1 Core Dryer RTO Inlet (Primary Cyclone Outlet)	PM,NO_x,CO,THC's
Line 2 Dryer RTO Outlet	PM,NO_x,VE,CO,CH_2O,Benzene,Phenol,PAH's,THC's
Line 2 Surface Dryer RTO Inlet (Multicyclone Outlet)	PM,NO_x,CO,THC's
Line 2 Core Dryer RTO Inlet (Multicyclone Outlet)	PM,NO_x,CO,THC's

On-site testing was performed by Ed Trowbridge, Ron Rosenthal, Mark Kaehler, Bob Aschenbach, Dennis Marso, Jon Johnson, Jeff Scripter, and Ken Nuessmeier. Coordination between testing activities and plant operation was provided by Sue Somers, Del Salquist, and Mark Becker of LP, and Gary Geisler of Wheelabrator Huntington Energy Systems. The test was witnessed by Jim Ross and Brad Pyle of the Wisconsin Department of Natural Resources.

The Line 1 Surface and Core Dryers tested are Model 1248T dryers manufactured by MEC Company. Each dryer is equipped with a wood-dust fired McConnell cyclonic suspension burner with a rated heat input capacity of 36 10^6BTU/HR. Emissions from each dryer are controlled by an electrified filter bed manufactured by E.F.B, Inc. installed in series with a regenerative thermal oxidizer manufactured by Huntington Energy Systems.

Testing on the Line 1 Dryer RTO Outlet was conducted from two test ports oriented at 90 degrees on the stack. These test ports are located 7 stack diameters downstream of the nearest flow disturbance and 5 stack diameters upstream of the stack exit. A 16-point traverse was used to collect the particulate, formaldehyde, and PAH samples. Each traverse point was sampled 4 minutes for a total of 64 minutes per run. A 3-point traverse was used to collect representative benzene and phenol samples. Each point was sampled for 20 minutes for a total of 60 minutes per run.

Testing at the site referred to as the Line 1 Surface Dryer RTO Inlet was conducted at the outlet of the primary cyclone. The purpose in testing this point was to determine removal efficiencies of the EFB and RTO.

Testing on the Line 1 Surface Dryer RTO Inlet (primary cyclone outlet) was conducted from two test ports oriented at 90 degrees. A 24-point traverse was used to collect the particulate samples. Each traverse point was sampled 2.5 minutes for a total of 60 minutes per run.

Testing at the site referred to as the Line 1 Core Dryer RTO Inlet was conducted at the outlet of the primary cyclone. The purpose in testing this point was to determine removal efficiencies of the EFB and RTO.

Testing on the Line 1 Core Dryer RTO Inlet (primary cyclone outlet) was conducted from two test ports oriented at 90 degrees. A 24-point traverse was used to collect the particulate samples. Each traverse point was sampled 2.5 minutes for a total of 60 minutes per run.

The Line 2 Surface and Core Dryers tested are Model 1248T dryers manufactured by MEC Company. Each dryer is equipped with a wood-dust fired McConnell cylconic suspension burner with a rated heat input capacity of 36 10^6BTU/HR. Particulate emissions from each dryer are controlled by a primary cyclone product separator followed by a secondary multicyclone in series with an electrified filter bed also manufactured by E.F.B., Inc. installed in series with a regenerative thermal oxidizer manufactured by Huntington Energy Systems.

Testing on the Line 2 Dryer RTO Outlet was conducted from two test ports oriented at 90 degrees on the stack. These test ports are located 7 stack diameters downstream of the nearest flow disturbance and 5 stack diameters upstream of the stack exit. A 16-point traverse was used to collect the particulate, formaldehyde, and PAH samples. Each traverse point was sampled 4 minutes for a total of 64 minutes per run. A 3-point traverse was used to collect representative benzene and phenol samples. Each point was sampled for 20 minutes for a total of 60 minutes per run.

Testing at the sites referred to as Line 2 Surface and Core Dryer Inlets was conducted at the outlet of the multicyclones. One goal of this testing program was to determine the efficiency of the total collection system (multicyclones, EFB and RTO) however a suitable test site prior to the multicyclone was not possible. Therefore a site at the multicyclone outlets was used. Total system particulate efficiencies were estimated by adding the multiclone dust catch to the test result.

Testing on the Line 2 Surface Dryer RTO Inlet (multicyclone outlet) was conducted from two test ports oriented at 90 degrees. A 24-point traverse was used to collect the particulate samples. Each traverse point was sampled 2.5 minutes for a total of 60 minutes per run.

Testing on the Line 2 Core Dryer RTO Inlet (multicyclone outlet) was conducted from two test ports oriented at 90 degrees. A 24-point traverse was used to collect the particulate samples. Each traverse point was sampled 2.5 minutes for a total of 60 minutes per run.

Particulate evaluations were performed in accordance with EPA Methods 2-5, CFR Title 40, Part 60, Appendix A (revised July 1, 1993). A preliminary determination of the gas linear velocity profile was made at each test location before the first particulate determination to allow selection of the appropriate nozzle diameter for isokinetic sample withdrawal. An Interpoll Labs sampling train which meets or exceeds specifications in the above-cited reference was used to isokinetically extract particulate samples by means of a heated glass-lined probe. Wet catch samples were collected in the back half of the Method 5 sampling train and analyzed in accordance with Wisconsin DNR protocol.

Carbon monoxide and oxides of nitrogen determinations were performed in accordance with Methods 7E and 10. A slip stream of sample gas was withdrawn from the exhaust gas stream using a heated stainless steel probe equipped with a filter to remove interfering particulate material. The particulate-free gas was transported to the analyzers by means of a heat-traced probe and filter assembly. After passing through the filter, the gas passed through a chilled condenser-type moisture removal system. The particulate-free dry gas was then transported to the analyzers with the excess exhausted to the atmosphere through a calibrated orifice which was used to ensure that the flow from the stack exceeds the requirements of the analyzers. A three-way valve on the probe was used to introduce standard gas for the "system bias check".

The analog response of the analyzers was recorded with a strip chart recorder. The analyzer was calibrated with Scott Specialty, National Specialty, and Linde Gases (EPA Protocol 1) and Certified Master standard gases. The instrument was calibrated before and after each run as per EPA Methods 7E and 10. The sample probe was moved through a three-point traverse (1/6, 3/6, 5/6 of the stack diameter) to measure oxides of nitrogen and carbon monoxide concentrations.

Formaldehyde samples were collected using EPA Method 0011 (SW 846 3rd Ed.). The samples were collected isokinetically using a Method 5 sampling train with an aqueous acidic 2,4-dinitrophenylhydrazine absorbing solution and analyzed by high performance liquid chromatography.

Total gaseous hydrocarbon concentrations were determined instrumentally using a Ratfisch Model RS55 heated flame ionization detector (HFID) calibrated against propane in air standards. The THC concentration was continuously monitored by extracting a slipstream of exhaust gas by means of a heated probe and filter holder. A heat-traced teflon line was used to transport the sample gas from the filter holder outlet to the analyzer inlet.

Phenol concentrations were determined from the Press Vent using a Method 5 sampling train with neutral buffered absorbing reagent followed by extraction with methylene chloride and direct analysis by GC/MS with no concentration (EPA Method 8270). The samples were field spiked with 5.33 mg of phenol d5.

Polyaromatic hydrocarbons sampling was conducted using the EPA Modified Method 5 sampling procedure as per EPA Method 0010 SW 846. The four-part sample and field blank were extracted, concentrated to 1000 ul and cleaned up as required (column chromatography as per Interpoll Labs Method II-8904-2 or GPC) prior to final concentration and analysis. The samples were then further concentrated to 100 ul and analyzed in accordance with EPA Method 8270 by HRGC/LRMS using electron impact (EI) with total ion monitoring (TIM). Quantification was performed using the six standard M-8270 internal standards. Each XAD-2 resin cartridge was field spiked with 20 ug of d_{10}-fluoroanthene in order to document overall collection and analytical efficiency and recovery. Analytical accuracy and recovery for extraction and cleanup was documented using the six m-8270-recommended surrogate standards.

Benzene samples were collected in accordance with EPA Method 18 Section 7.4. Charcoal tubes were used for sampling with analysis by GC/FID.

Integrated flue gas samples were extracted simultaneously with each of the above-referenced sampling trains at the dryer test site using a specially designed gas sampling system. Integrated flue gas samples were collected in 44-liter Tedlar bags housed in a protective aluminum container. After sampling was complete, the bags were sealed and returned to the laboratory for Orsat analysis. Prior to sampling, the Tedlar bags are leak checked at 15 IN.HG. vacuum with an in-line rotameter. Bags with any detectable inleakage are discarded. The integrated flue gas samples collected at the Line 1 and Line 2 Core Dryer RTO Inlet test sites were also analyzed for carbon monoxide in accordance with EPA Method 10. (NDIR)

The important results of the test are summarized in Section 2. Detailed results are presented in Section 3. Field data and all other supporting information are presented in the appendices.

2 SUMMARY AND DISCUSSION

The results of the air emission compliance tests are summarized in Tables 1 - 16. An overview of the results is presented in the Table below:

PARAMETER		MEASURED
Line 1 Surface Dryer RTO Inlet (Primary Cyclone Outlet)		
Particulate		
	(GR/DSCF)	0.244
	(LB/HR)	55
Oxides of Nitrogen		
	(ppm,d)	40
	(LB/HR)	7.7
Carbon Monoxide		
	(ppm,d)	433
	(LB/HR)	51
Total Hydrocarbons		
	(ppmC,w)	490
	(LB/HR)	32
Line 1 Core Dryer RTO Inlet (Primary Cyclone Outlet)		
Particulate		
	(GR/DSCF)	0.255
	(LB/HR)	51
Oxides of Nitrogen		
	(ppm,d)	24
	(LB/HR)	4.1
Carbon Monoxide		
	(ppm,d)	443
	(LB/HR)	46
Total Hydrocarbons		
	(ppmC,w)	339
	(LB/HR)	21

Line 1 Dryer RTO Outlet

PARAMETER		MEASURED
*PM Removal Efficiency**	(%)	86
*THC Removal Efficiency**	(%)	87
Particulate		
	(GR/DSCF)	0.0296
	(LB/HR)	14.8
Opacity	(%)	0
Oxides of Nitrogen		
	(ppm,d)	29
	(LB/HR)	12
Carbon Monoxide		
	(ppm,d)	152
	(LB/HR)	39
Total Hydrocarbons		
	(ppmC,w)	49
	(LB/HR)	7.1
Formaldehyde		
	(ppm,d)	4.7
	(LB/HR)	1.3
Phenol		
	(ppb,d)	< 176
	(10^{-3}LB/HR)	< 148
Benzene		
	(ppm,d)	0.067
	(LB/HR)	0.047

*** Efficiencies take into account the EFB and RTO. Testing was conducted prior to the EFB at the outlet of the primary cyclone.**

PARAMETER		MEASURED	
Line 2 Surface Dryer RTO Inlet (Multicyclone Outlet)			
Particulate			
	(GR/DSCF)	0.152	± 40.3
	(LB/HR)	43	
Oxides of Nitrogen			
	(ppm,d)	19	
	(LB/HR)	4.5	
Carbon Monoxide			
	(ppm,d)	164	
	(LB/HR)	23	
Total Hydrocarbons			
	(ppmC,w)	168	
	(LB/HR)	12.1	
Line 2 Core Dryer RTO Inlet (Multicyclone Outlet)			
Particulate			
	(GR/DSCF)	0.301	± 36.8
	(LB/HR)	65	
Oxides of Nitrogen			
	(ppm,d)	22	
	(LB/HR)	4	
Carbon Monoxide			
	(ppm,d)	635	
	(LB/HR)	69	
Total Hydrocarbons			
	(ppmC,w)	425	
	(LB/HR)	26.4	

Line 2 Dryer RTO Outlet

PARAMETER	MEASURED
*PM Removal Efficiency** (%)	87
*PM Removal Efficiency*** (%) *(total system efficiency)*	92
*THC Removal Efficiency** (%)	91
Particulate	
(GR/DSCF)	0.0281
(LB/HR)	15
Opacity (%)	0
Oxides of Nitrogen	
(ppm,d)	24
(LB/HR)	11
Carbon Monoxide	
(ppm,d)	146
(LB/HR)	40
Total Hydrocarbons	
(ppmC,w)	21
(LB/HR)	3.3
Formaldehyde	
(ppm,d)	3.9
(LB/HR)	1.2
Phenol	
(ppb,d)	< 174
(10^{-3}LB/HR)	< 166
Benzene	
(ppm,d)	0.018
(LB/HR)	0.014

**** Efficiency calculated considering the collection of the EFB and RTO only***

***** Efficiency estimated for the entire collection system, adding the multicyclone dust catch (36.8 LB/HR for the Core and 40.3 LB/HR for the Surface as reported by LP to the test result***

No difficulties were encountered in the field by Interpoll Labs or in the laboratory evaluation of the samples which were conducted by Interpoll Labs. On the basis of these facts and a complete review of the data and results, it is our opinion that the results reported herein are accurate and closely reflect the actual values which existed at the time the test was performed.

Table 1a. Summary of the Results of the July 12, 1994 Particulate Emission Compliance Test on the Line 2 Surface Dryer RTO Inlet*at the Louisiana Pacific Corporation Plant Located in Hayward, Wisconsin.

ITEM		Run 1	Run 2	Run 3	
Date of test		07-12-94	07-12-94	07-12-94	
Time runs were done	(HRS)	1017/1204	1305/1409	1500/1611	
Volumetric flow					
actual	(ACFM)	55681	55744	56059	55828
standard	(DSCFM)	32179	32898	33198	32758
Gas temperature	(DEG-F)	207	205	205	
Moisture content	(%V/V)	20.63	19.15	18.90	
Gas composition	(%V/V,dry)				
carbon dioxide		3.00	2.60	2.60	
oxygen		18.30	18.60	18.60	
nitrogen		78.70	78.80	78.80	
Isokinetic variation	(%)	97.8	96.3	98.8	
Particulate concentration					
actual	(GR/ACF)	0.106	.0890	.0714	
standard	(GR/DSCF)	0.184	0.151	0.121	
Part. emission rate	(LB/HR)	50.82	42.56	34.31	

Note: Dry + Organic/Inorganic Wet Catch

* Multicyclone Outlet

Table 1b. Summary of the Results of the July 12, 1994 Particulate Emission Compliance Test on the Line 2 Surface Dryer RTO Inlet*at the Louisiana Pacific Corporation Plant Located in Hayward, Wisconsin.

ITEM		Run 1	Run 2	Run 3
Date of test		07-12-94	07-12-94	07-12-94
Time runs were done	(HRS)	1017/1204	1305/1409	1500/1611
Volumetric flow				
actual	(ACFM)	55681	55744	56059
standard	(DSCFM)	32179	32898	33198
Gas temperature	(DEG-F)	207	205	205
Moisture content	(%V/V)	20.63	19.15	18.90
Gas composition	(%V/V,dry)			
carbon dioxide		3.00	2.60	2.60
oxygen		18.30	18.60	18.60
nitrogen		78.70	78.80	78.80
Isokinetic variation	(%)	97.8	96.3	98.8
Particulate concentration				
actual	(GR/ACF)	.0730	.0698	.0499
standard	(GR/DSCF)	0.126	0.118	.0843
Part. emission rate	(LB/HR)	34.84	33.38	23.99

Note: Dry Catch Only

* Multicyclone Outlet

Table 2a. Summary of the Results of the July 12, 1994 Particulate Emission Compliance Test on the Line 2 Core Dryer RTO Inlet*at the Louisiana Pacific Corporation Plant Located in Hayward, Wisconsin.

ITEM		Run 1	Run 2	Run 3	
Date of test		07-12-94	07-12-94	07-12-94	
Time runs were done	(HRS)	1017/1206	1303/1410	1500/1611	
Volumetric flow					
actual	(ACFM)	49342	47584	49047	48658
standard	(DSCFM)	26211	23955	25392	37779
Gas temperature	(DEG-F)	233	240	240	
Moisture content	(%V/V)	24.15	27.36	25.36	
Gas composition	(%V/V,dry)				
carbon dioxide		3.40	4.50	3.80	
oxygen		17.40	16.40	17.10	
nitrogen		79.20	79.10	79.10	
Isokinetic variation	(%)	104.9	107.4	101.5	
Particulate concentration					
actual	(GR/ACF)	0.173	0.147	0.149	
standard	(GR/DSCF)	0.325	0.292	0.287	
Part. emission rate	(LB/HR)	73.09	60.05	62.52	

Note: Dry + Organic/Inorganic Wet Catch

* Multicyclone Outlet

Table 2b. Summary of the Results of the July 12, 1994 Particulate Emission Compliance Test on the Line 2 Core Dryer RTO Inlet* at the Louisiana Pacific Corporation Plant Located in Hayward, Wisconsin.

ITEM		Run 1	Run 2	Run 3
Date of test		07-12-94	07-12-94	07-12-94
Time runs were done	(HRS)	1017/1206	1303/1410	1500/1611
Volumetric flow				
actual	(ACFM)	49342	47584	49047
standard	(DSCFM)	26211	23955	25392
Gas temperature	(DEG-F)	233	240	240
Moisture content	(%V/V)	24.15	27.36	25.36
Gas composition	(%V/V,dry)			
carbon dioxide		3.40	4.50	3.80
oxygen		17.40	16.40	17.10
nitrogen		79.20	79.10	79.10
Isokinetic variation	(%)	104.9	107.4	101.5
Particulate concentration				
actual	(GR/ACF)	0.105	.0952	.0899
standard	(GR/DSCF)	0.197	0.189	0.174
Part. emission rate	(LB/HR)	44.32	38.85	37.83

Note: Dry Catch Only

* Multicyclone Outlet

Table 3a. Summary of the Results of the July 12, 1994 Particulate Emission Compliance Test on the Line 2 Dryer RTO Outlet at the Louisiana Pacific Corporation Plant Located in Hayward, Wisconsin.

ITEM		Run 1	Run 2	Run 3
Date of test		07-12-94	07-12-94	07-12-94
Time runs were done	(HRS)	1000/1210	1305/1410	1500/1611
Volumetric flow				
actual	(ACFM)	129206	127531	127788
standard	(DSCFM)	64004	63029	63455
Gas temperature	(DEG-F)	340	339	345
Moisture content	(%V/V)	21.66	21.99	20.99
Gas composition	(%V/V,dry)			
carbon dioxide		3.41	3.56	3.43
oxygen		17.07	16.95	17.06
nitrogen		79.52	79.49	79.51
Isokinetic variation	(%)	99.5	100.1	98.7
Particulate concentration				
actual	(GR/ACF)	.0271	.00809	.00649
standard	(GR/DSCF)	.0548	.0164	.0131
Part. emission rate	(LB/HR)	30.07	8.84	7.12

Note: Dry + Organic/Inorganic Wet Catch

Table 3b. Summary of the Results of the July 12, 1994 Particulate Emission Compliance Test on the Line 2 Dryer RTO Outlet at the Louisiana Pacific Corporation Plant Located in Hayward, Wisconsin.

ITEM		Run 1	Run 2	Run 3
Date of test		07-12-94	07-12-94	07-12-94
Time runs were done	(HRS)	1000/1210	1305/1410	1500/1611
Volumetric flow				
actual	(ACFM)	129206	127531	127788
standard	(DSCFM)	64004	63029	63455
Gas temperature	(DEG-F)	340	339	345
Moisture content	(%V/V)	21.66	21.99	20.99
Gas composition	(%V/V,dry)			
carbon dioxide		3.41	3.56	3.43
oxygen		17.07	16.95	17.06
nitrogen		79.52	79.49	79.51
Isokinetic variation	(%)	99.5	100.1	98.7
Particulate concentration				
actual	(GR/ACF)	.0212	.00499	.00366
standard	(GR/DSCF)	.0429	.0101	.00737
Part. emission rate	(LB/HR)	23.54	5.46	4.01

Note: Dry Catch Only

Table 4a. Summary of the Results of the July 14, 1994 Particulate Emission Compliance Test on the Line 1 Surface Dryer RTO Inlet*at the Louisiana Pacific Corporation Plant Located in Hayward, Wisconsin.

ITEM	Run 1	Run 2	Run 3	
Date of test	07-14-94	07-14-94	07-15-94	
Time runs were done (HRS)	1625/1842	2230/2400	48/ 151	
Volumetric flow				
actual (ACFM)	51724	51456	49872	51,017
standard (DSCFM)	26310	27727	25659	
Gas temperature (DEG-F)	261	274	268	268
Moisture content (%V/V)	26.08	20.30	24.44	
Gas composition (%V/V,dry)				
carbon dioxide	4.30	3.50	3.80	
oxygen	16.50	17.40	17.10	
nitrogen	79.20	79.10	79.10	
Isokinetic variation (%)	103.9	95.9	104.2	
Particulate concentration				
actual (GR/ACF)	0.148	0.115	0.117	
standard (GR/DSCF)	0.290	0.213	0.228	
Part. emission rate (LB/HR)	65.43	50.61	50.15	

Note: Dry + Organic/Inorganic Wet Catch

* Primary Cyclone Outlet

Table 4b. Summary of the Results of the July 14, 1994 Particulate Emission Compliance Test on the Line 1 Surface Dryer RTO Inlet*at the Louisiana Pacific Corporation Plant Located in Hayward, Wisconsin.

ITEM		Run 1	Run 2	Run 3
Date of test		07-14-94	07-14-94	07-15-94
Time runs were done	(HRS)	1625/1842	2230/2400	48/ 151
Volumetric flow				
actual	(ACFM)	51724	51456	49872
standard	(DSCFM)	26310	27727	25659
Gas temperature	(DEG-F)	261	274	268
Moisture content	(%V/V)	26.08	20.30	24.44
Gas composition	(%V/V,dry)			
carbon dioxide		4.30	3.50	3.80
oxygen		16.50	17.40	17.10
nitrogen		79.20	79.10	79.10
Isokinetic variation	(%)	103.9	95.9	104.2
Particulate concentration				
actual	(GR/ACF)	0.109	.0731	.0887
standard	(GR/DSCF)	0.215	0.136	0.172
Part. emission rate	(LB/HR)	48.43	32.27	37.92

Note: Dry Catch Only

*Primary Cyclone Outlet

Table 5a. Summary of the Results of the July 14 & 15, 1994 Particulate Emission Compliance Test on the Line 1 Core Dryer RTO Inlet*at the Louisiana Pacific Corporation Plant Located in Hayward, Wisconsin.

ITEM		Run 1	Run 2	Run 3	
Date of test		07-14-94	07-14-94	07-15-94	
Time runs were done	(HRS)	1625/1840	2230/2400	48/ 151	
Volumetric flow					
actual	(ACFM)	44841	45337	46284	45,487
standard	(DSCFM)	23320	23138	23614	
Gas temperature	(DEG-F)	251	251	250	251
Moisture content	(%V/V)	25.82	27.13	27.34	
Gas composition	(%V/V,dry)				
carbon dioxide		4.30	4.50	3.70	
oxygen		16.60	16.30	17.10	
nitrogen		79.10	79.20	79.20	
Isokinetic variation	(%)	92.8	92.0	90.2	
Particulate concentration					
actual	(GR/ACF)	0.126	0.172	.0951	
standard	(GR/DSCF)	0.242	0.336	0.186	
Part. emission rate	(LB/HR)	48.42	66.69	37.73	

Note: Dry + Organic/Inorganic Wet Catch

* Primary Cyclone Outlet

Table 5b. Summary of the Results of the July 14 & 15, 1994 Particulate Emission Compliance Test on the Line 1 Core Dryer RTO Inlet* at the Louisiana Pacific Corporation Plant Located in Hayward, Wisconsin.

ITEM		Run 1	Run 2	Run 3
Date of test		07-14-94	07-14-94	07-15-94
Time runs were done	(HRS)	1625/1840	2230/2400	48/ 151
Volumetric flow				
actual	(ACFM)	44841	45337	46284
standard	(DSCFM)	23320	23138	23614
Gas temperature	(DEG-F)	251	251	250
Moisture content	(%V/V)	25.82	27.13	27.34
Gas composition	(%V/V,dry)			
carbon dioxide		4.30	4.50	3.70
oxygen		16.60	16.30	17.10
nitrogen		79.10	79.20	79.20
Isokinetic variation	(%)	92.8	92.0	90.2
Particulate concentration				
actual	(GR/ACF)	.0817	0.109	.0688
standard	(GR/DSCF)	0.157	0.214	0.135
Part. emission rate	(LB/HR)	31.41	42.41	27.29

Note: Dry Catch Only

* Primary Cyclone Outlet

Table 6a. Summary of the Results of the July 14 & 15, 1994 Particulate Emission Compliance Test on the Line 1 Dryer RTO Outlet at the Louisiana Pacific Corporation Plant Located in Hayward, Wisconsin.

ITEM		Run 1	Run 2	Run 3
Date of test		07-14-94	07-14-94	07-15-94
Time runs were done	(HRS)	1625/1840	2230/2358	48/ 154
Volumetric flow				
actual	(ACFM)	122399	121001	122342
standard	(DSCFM)	58322	57883	59575
Gas temperature	(DEG-F)	340	348	351
Moisture content	(%V/V)	25.05	23.97	22.37
Gas composition	(%V/V,dry)			
carbon dioxide		4.53	4.08	3.60
oxygen		16.42	16.71	17.17
nitrogen		79.05	79.21	79.23
Isokinetic variation	(%)	101.2	101.9	97.4
Particulate concentration				
actual	(GR/ACF)	.0240	.0127	.00564
standard	(GR/DSCF)	.0504	.0267	.0116
Part. emission rate	(LB/HR)	25.20	13.22	5.92

Note: Dry + Organic/Inorganic Wet Catch

Table 6b. Summary of the Results of the July 14 & 15, 1994 Particulate Emission Compliance Test on the Line 1 Dryer RTO Outlet at the Louisiana Pacific Corporation Plant Located in Hayward, Wisconsin.

ITEM		Run 1	Run 2	Run 3
Date of test		07-14-94	07-14-94	07-15-94
Time runs were done	(HRS)	1625/1840	2230/2358	48/ 154
Volumetric flow				
actual	(ACFM)	122399	121001	122342
standard	(DSCFM)	58322	57883	59575
Gas temperature	(DEG-F)	340	348	351
Moisture content	(%V/V)	25.05	23.97	22.37
Gas composition	(%V/V,dry)			
carbon dioxide		4.53	4.08	3.60
oxygen		16.42	16.71	17.17
nitrogen		79.05	79.21	79.23
Isokinetic variation	(%)	101.2	101.9	97.4
Particulate concentration				
actual	(GR/ACF)	.00928	.00576	.00466
standard	(GR/DSCF)	.0195	.0120	.00957
Part. emission rate	(LB/HR)	9.74	5.97	4.89

Note: Dry Catch Only

Table 7a. Summary of the Results of the July, 1994 **Oxides of Nitrogen** Emission Compliance Tests at the Louisiana Pacific OSB Plant in Hayward, Wisconsin.

Date	Time (HRS)	Concentration (ppm,d)	Emission Rate (LB/HR)
(Line 1 Surface Dryer RTO Inlet - Primary Cyclone Outlet)			
7-14-94	1625-1840	48	9.0
7-14-94	2230-2400	34	6.8
7-14-94	0048-0151	39	7.2
Avg		40	7.7
(Line 1 Core Dryer RTO Inlet - Primary Cyclone Outlet)			
7-14-94	1625-1840	23	3.8
7-14-94	2230-2400	28	4.6
7-14-94	0048-0151	22	3.9
Avg		24	4.1
(Line 1 Dryer RTO Outlet)			
7-14-94	1625-1840	29	12.1
7-14-94	2230-2400	29	12.0
7-14-94	0048-0151	28	11.9
Avg		29	12.0

Table 7b. Summary of the Results of the July, 1994 **Oxides of Nitrogen** Emission Compliance Tests at the Louisiana Pacific OSB Plant in Hayward, Wisconsin.

Date	**Time** (HRS)	**Concentration** (ppm,d)	**Emission Rate** (LB/HR)
(Line 2 Surface Dryer RTO Inlet - Multicyclone Outlet)			
7-12-94	1000-1210	17	3.9
7-12-94	1305-1410	25	5.9
7-12-94	1500-1611	16	3.8
Avg		19	4.5
(Line 2 Core Dryer RTO Inlet - Multicyclone Outlet)			
7-12-94	1000-1210	24	4.5
7-12-94	1305-1410	24	4.1
7-12-94	1500-1611	19	3.5
Avg		22	4.0
(Line 2 Dryer RTO Outlet)			
7-12-94	1000-1210	24	11.0
7-12-94	1305-1410	24	10.8
7-12-94	1500-1611	23	10.5
Avg		24	10.8

Table 8a. Summary of the Results of the July, 1994 **Carbon Monoxide** Emission Compliance Tests at the Louisiana Pacific OSB Plant in Hayward, Wisconsin.

Date	Time (HRS)	Concentration (ppm,d)	Emission Rate (LB/HR)
(Line 1 Surface Dryer RTO Inlet - Primary Cyclone Outlet)			
7-14-94	1625-1840	510	59
7-14-94	2230-2400	410	50
7-14-94	0048-0154	380	43
Avg		433	51
(Line 1 Core Dryer RTO Inlet - Primary Cyclone Outlet)			
7-14-94	1625-1840	480	49
7-14-94	2230-2400	580	59
7-14-94	0048-0154	270	29
Avg		443	46
(Line 1 Dryer RTO Outlet)			
7-14-94	1625-1840	191	49
7-14-94	2230-2400	174	44
7-14-94	0048-0154	92	24
Avg		152	39

Table 8b. Summary of the Results of the July, 1994 **Carbon Monoxide** Emission Compliance Tests at the Louisiana Pacific OSB Plant in Hayward, Wisconsin.

Date	Time (HRS)	Concentration (ppm,d)	Emission Rate (LB/HR)
(Line 2 Surface Dryer RTO Inlet - Multicyclone Outlet)			
7-12-94	1000-1210	210	29
7-12-94	1305-1410	140	20
7-12-94	1500-1611	142	21
Avg		164	23
(Line 2 Core Dryer RTO Inlet - Multicyclone Outlet)			
7-12-94	1000-1210	430	49
7-12-94	1305-1410	925	97
7-12-94	1500-1611	550	61
Avg		635	69
(Line 2 Dryer RTO Outlet)			
7-12-94	1000-1210	140	39
7-12-94	1305-1410	149	41
7-12-94	1500-1611	148	41
Avg		146	40

Table 9. Summary of the July, 1994 **Formaldehyde** Emission Compliance Tests at the Louisiana Pacific OSB Plant in Hayward, Wisconsin.

Date	**Time** (HRS)	**Concentration** (ppm,d)	**Emission Rate** (LB/HR)
(Line 1 Dryer RTO Outlet)			
7-13-94	1200-1307	2.6	0.72
7-13-94	1427-1533	3.7	0.99
7-13-94	1612-1720	7.9	2.16
Avg.		4.7	1.29
(Line 2 Dryer RTO Outlet)			
7-12-94	1830-1940	3.3	1.02
7-12-94	2015-2121	4.4	1.34
7-12-94	2155-2305	3.9	1.22
Avg.		3.9	1.19

Table 10. Summary of the July, 1994 **Phenol** Emission Compliance Tests at the Louisiana Pacific OSB Plant in Hayward, Wisconsin.

Date	**Time** (HRS)	**Concentration** (ppb,d)	**Emission Rate** (10^{-3}LB/HR)
(Line 1 Dryer RTO Outlet)			
7-15-94	0922-1025	< 175	< 151
7-15-94	1257-1357	< 175	< 146
7-15-94	1408-1508	< 177	< 147
Avg.		< 176	< 148
(Line 2 Dryer RTO Outlet)			
7-13-94	0856-0956	< 171	< 166
7-13-94	1120-1220	< 176	< 170
7-13-94	1301-1401	< 174	< 163
Avg.		< 174	< 166

Table 11a. Summary of the July, 1994 **Total Hydrocarbon** Emission Compliance Tests at the Louisiana Pacific Plant in Hayward, Wisconsin.

Date	Time (HRS)	Concentration (ppmC,w)	Emission Rate (LB/HR)
(Line 1 Surface Dryer RTO Inlet - Primary Cyclone Outlet)			
7-15-94	0841-0959	609	39
7-15-94	1313-1421	651	43
7-15-94	1445-1553	208	13
Avg.		490	32
(Line 1 Core Dryer RTO Inlet - Primary Cyclone Outlet)			
7-15-94	0841-0959	433	26
7-15-94	1313-1421	282	17
7-15-94	1445-1553	302	20
Avg.		339	21
(Line 1 Dryer RTO Outlet)			
7-15-94	0841-0959	64	9.33
7-15-94	1313-1421	50	7.19
7-15-94	1445-1553	34	4.80
Avg.		49	7.11

Table 11b. Summary of the July, 1994 **Total Hydrocarbon** Emission Compliance Tests at the Louisiana Pacific Plant in Hayward, Wisconsin.

Date	Time (HRS)	Concentration (ppmC,w)	Emission Rate (LB/HR)
(Line 2 Surface Dryer RTO Inlet - Multicyclone Outlet)			
7-12-94	1824-1932	112	8.0
7-12-94	2005-2120	175	12.7
7-12-94	2141-2300	218	15.7
Avg.		168	12.1
(Line 2 Core Dryer RTO Inlet - Multicyclone Outlet)			
7-12-94	1824-1932	408	26.8
7-12-94	2005-2120	496	28.9
7-12-94	2141-2300	371	23.5
Avg.		425	26.4
(Line 2 Dryer RTO Outlet)			
7-12-94	1824-1932	22	3.4
7-12-94	2005-2120	20	3.1
7-12-94	2141-2300	22	3.5
Avg.		21	3.3

Table 12. Summary of the July, 1994 **Benzene** Emission Compliance Tests at the Louisiana Pacific OSB Plant in Hayward, Wisconsin.

Date	Time (HRS)	Concentration (ppm,d)	Emission Rate (LB/HR)
(Line 1 Dryer RTO Outlet)			
7-15-94	0922-1025	0.075	0.054
7-15-94	1257-1357	0.076	0.053
7-15-94	1408-1508	0.051	0.035
Avg.		0.067	0.047
(Line 2 Dryer RTO Outlet)			
7-13-94	0856-0956	0.011	0.009
7-13-94	1120-1220	0.025	0.020
7-13-94	1301-1401	0.018	0.014
Avg.		0.018	0.014

Table 13 Summary of the Results of the July 15, 1994 PAH Determinations on the Line 1 Dryer RTO Outlet at the Louisiana Pacific Plant Located in Hayward, Wisconsin.

Item	RUN 1	RUN 2	RUN 3
(Concentration ug/Nm^3)			
Naphthalene	27	30	29
Acenaphthylene	1.6	1.7	.53<
Acenaphthene	.56<	.56<	.58<
Fluorene	.56<	.56<	.58<
Phenanthrene	1.1	.73	.53<
Anthracene	.44<	.45<	.47<
Fluoranthene	.67<	.68<	.70<
Pyrene	.83<	.84<	.88<
Benzo-a-anthracene	1<	1.0<	1.1<
Chrysene	.5<	.51<	.53<
Benzo-b-fluoranthene	.56<	.56<	.58<
Benzo-k-fluoranthene	.94<	.96<	.99<
Benzo-a-pyrene	.72	.79	.70
Dibenzo-a,h-anthracene	.5<	.51<	.53<
Benzo-g,h,i-perylene	.67<	.68<	.70<
Indeno,1,2,3-pyrene	.5<	.51<	.53<
1-Methyl naphthalene	1.7	1.2	.88
2-Methyl naphthalene	4.6<	4.7<	4.8<
(Emission Rate 10^{-6}g/sec)			
Naphthalene	742	818	778
Acenaphthylene	43	45	14<
Acenaphthene	15<	15<	16<
Fluorene	15<	15<	16<
Phenanthrene	29	20	14<
Anthracene	12<	12<	12<
Fluoranthene	19<	18<	19<
Pyrene	23<	23<	23<
Benzo-a-anthracene	28<	27<	28<
Chrysene	14<	14<	14<
Benzo-b-fluoranthene	15<	15<	16<
Benzo-k-fluoranthene	26<	26<	26<
Benzo-a-pyrene	20	21	19
Dibenzo-a,h-anthracene	14<	14<	14<
Benzo-g,h,i-perylene	19<	18<	19<
Indeno,1,2,3-pyrene	14<	14<	14<
1-Methyl naphthalene	48	33	23
2-Methyl naphthalene	128<	126<	129<

Table 14. Summary of the Results of the July 13, 1994 PAH Determinations on the Line 2 Dryer RTO Outlet at the Louisiana Pacific Plant in Hayward, Wisconsin.

Item	RUN 1	RUN 2	RUN 3
(Concentration ug/Nm^3)			
Naphthalene	11	20	13
Acenaphthylene	.45<	.44<	.45<
Acenaphthene	.50<	.49<	.51<
Fluorene	.50<	.49<	.51<
Phenanthrene	.45<	.44<	.45<
Anthracene	.40<	.39<	.40<
Fluoranthene	.60<	.59<	.61<
Pyrene	.75<	.74<	.76<
Benzo-a-anthracene	.90<	.88<	.90<
Chrysene	.45<	.44<	.45<
Benzo-b-fluoranthene	.50<	.49<	.51<
Benzo-k-fluoranthene	.85<	.84<	.86<
Benzo-a-pyrene	.60<	.59<	.61<
Dibenzo-a,h-anthracene	.45<	.44<	.45<
Benzo-g,h,i-perylene	.60<	.59<	.61<
Indeno,1,2,3-pyrene	.45<	.44<	.45<
1-Methyl naphthalene	.40<	.39<	.40<
2-Methyl naphthalene	4.2<	4.1<	4.2<
(Emission Rate 10^{-6}g/sec)			
Naphthalene	329	627	381
Acenaphthylene	14<	14<	14<
Acenaphthene	16<	15<	15<
Fluorene	16<	15<	15<
Phenanthrene	14<	14<	14<
Anthracene	13<	12<	12<
Fluoranthene	19<	18<	18<
Pyrene	23<	23<	23<
Benzo-a-anthracene	28<	28<	27<
Chrysene	14<	14<	14<
Benzo-b-fluoranthene	16<	15<	15<
Benzo-k-fluoranthene	27<	26<	26<
Benzo-a-pyrene	19<	18<	18<
Dibenzo-a,h-anthracene	14<	14<	14<
Benzo-g,h,i-perylene	19<	18<	18<
Indeno,1,2,3-pyrene	14<	14<	14<
1-Methyl naphthalene	13<	12<	12<
2-Methyl naphthalene	130<	127<	126<

3 RESULTS

The results of all field and laboratory evaluations are presented in this section. Gas composition (orsat and moisture) are presented first followed by the computer printout of the particulate, oxides of nitrogen, opacity, carbon monoxide, formaldehyde, phenol, and PAH sampling data. Preliminary measurements including test port locations are given in the appendices.

The results have been calculated on a personal computer using programs written in Extended BASIC specifically for source testing calculations. EPA-published equations have been used as the basis of the calculation techniques in these programs. The emission rates have been calculated using the product of the concentration times flow method.

3.1 Results of Orsat and Moisture Determinations

Test No. 1
Line 2 Dryer RTO Outlet
(PM/NOx/CO)

Results of Orsat & Moisture Analyses-----Methods 3 & 4(%v/v)

	Run 1	Run 2	Run 3
Date of run	07-12-94	07-12-94	07-12-94
Dry basis (orsat)			
carbon dioxide............	3.41	3.56	3.43
oxygen....................	17.07	16.95	17.06
nitrogen..................	79.52	79.49	79.51
Wet basis (orsat)			
carbon dioxide............	2.67	2.78	2.71
oxygen....................	13.37	13.22	13.48
nitrogen..................	62.29	62.01	62.82
water vapor...............	21.66	21.99	20.99
Dry molecular weight........	29.23	29.25	29.23
Wet molecular weight........	26.80	26.77	26.87
Specific gravity...........	0.926	0.925	0.928
Water mass flow......(LB/HR)	49653	49823	47286
FO	1.123	1.110	1.120

Test No. 2
Line 2 Surface Dryer RTO Inlet

(PM/NOx/CO)

Results of Orsat & Moisture Analyses-----Methods 3 & 4(%v/v)

	Run 1	Run 2	Run 3
Date of run	07-12-94	07-12-94	07-12-94
Dry basis (orsat)			
carbon dioxide...........	3.00	2.60	2.60
oxygen..................	18.30	18.60	18.60
nitrogen.................	78.70	78.80	78.80
Wet basis (orsat)			
carbon dioxide...........	2.38	2.10	2.11
oxygen..................	14.52	15.04	15.08
nitrogen.................	62.46	63.71	63.90
water vapor..............	20.63	19.15	18.90
Dry molecular weight........	29.21	29.16	29.16
Wet molecular weight........	26.90	27.02	27.05
Specific gravity...........	0.929	0.933	0.934
Water mass flow......(LB/HR)	23465	21852	21706
FO	0.867	0.885	0.885

Test No. 3
Line 2 Core Dryer RTO Inlet

(PM/NOx/CO)

Results of Orsat & Moisture Analyses-----Methods 3 & 4(%v/v)

	Run 1	Run 2	Run 3
Date of run	07-12-94	07-12-94	07-12-94
Dry basis (orsat)			
carbon dioxide............	3.40	4.50	3.80
oxygen....................	17.40	16.40	17.10
nitrogen..................	79.20	79.10	79.10
Wet basis (orsat)			
carbon dioxide............	2.58	3.27	2.84
oxygen....................	13.20	11.91	12.76
nitrogen..................	60.07	57.46	59.04
water vapor...............	24.15	27.36	25.36
Dry molecular weight........	29.24	29.38	29.29
Wet molecular weight........	26.53	26.26	26.43
Specific gravity............	0.916	0.907	0.913
Water mass flow......(LB/HR)	23414	25305	24202
FO	1.029	1.000	1.000

Test No. 7
Line 2 Dryer RTO Outlet

(Formaldehyde)

Results of Orsat & Moisture Analyses-----Methods 3 & 4(%v/v)

	Run 1	Run 2	Run 3
Date of run	07-12-94	07-12-94	07-12-94
Dry basis (orsat)			
carbon dioxide............	3.90	3.80	3.80
oxygen....................	17.00	17.00	17.00
nitrogen..................	79.10	79.20	79.20
Wet basis (orsat)			
carbon dioxide............	3.09	2.96	2.99
oxygen....................	13.45	13.23	13.36
nitrogen..................	62.59	61.65	62.22
water vapor...............	20.87	22.16	21.44
Dry molecular weight........	29.30	29.29	29.29
Wet molecular weight........	26.95	26.79	26.87
Specific gravity............	0.931	0.925	0.928
Water mass flow......(LB/HR)	0.00	0.00	0.00
FO	1.000	1.026	1.026

Test No. 8
Line 2 Dryer RTO Outlet
(PAH's)

Results of Orsat & Moisture Analyses-----Methods 3 & 4(%v/v)

	Run 1	Run 2	Run 3
Date of run	07-13-94	07-13-94	07-13-94
Dry basis (orsat)			
carbon dioxide............	3.20	3.50	3.70
oxygen....................	17.40	17.10	17.00
nitrogen..................	79.40	79.40	79.30
Wet basis (orsat)			
carbon dioxide............	2.57	2.78	2.89
oxygen....................	13.98	13.59	13.28
nitrogen..................	63.78	63.08	61.94
water vapor...............	19.68	20.55	21.89
Dry molecular weight........	29.21	29.24	29.27
Wet molecular weight........	27.00	26.93	26.80
Specific gravity............	0.933	0.930	0.926
Water mass flow......(LB/HR)	0.00	0.00	0.00
FO	1.094	1.086	1.054

Test No. 11
Line 1 Dryer RTO Outlet
(Formaldehyde)

Results of Orsat & Moisture Analyses-----Methods 3 & 4(%v/v)

	Run 1	Run 2	Run 3
Date of run	07-13-94	07-13-94	07-13-94
Dry basis (orsat)			
carbon dioxide...........	4.30	4.30	4.30
oxygen...................	16.60	16.60	16.50
nitrogen.................	79.10	79.10	79.20
Wet basis (orsat)			
carbon dioxide...........	3.28	3.23	3.21
oxygen...................	12.66	12.47	12.33
nitrogen.................	60.31	59.41	59.20
water vapor..............	23.75	24.89	25.25
Dry molecular weight........	29.35	29.35	29.35
Wet molecular weight........	26.66	26.53	26.48
Specific gravity...........	0.921	0.916	0.915
Water mass flow......(LB/HR)	0.00	0.00	0.00
FO	1.000	1.000	1.023

Test No. 13
Line 1 Surface Dryer RTO Inlet
(PM/NOx/CO)

Results of Orsat & Moisture Analyses-----Methods 3 & 4(%v/v)

	Run 1	Run 2	Run 3
Date of run	07-14-94	07-14-94	07-15-94
Dry basis (orsat)			
carbon dioxide............	4.30	3.50	3.80
oxygen....................	16.50	17.40	17.10
nitrogen..................	79.20	79.10	79.10
Wet basis (orsat)			
carbon dioxide............	3.18	2.79	2.87
oxygen....................	12.20	13.87	12.92
nitrogen..................	58.54	63.05	59.77
water vapor...............	26.08	20.30	24.44
Dry molecular weight........	29.35	29.26	29.29
Wet molecular weight........	26.39	26.97	26.53
Specific gravity............	0.912	0.932	0.916
Water mass flow......(LB/HR)	26039	19805	23281
FO	1.023	1.000	1.000

Test No. 14
Line 1 Dryer RTO Outlet

(PM/NOx/CO)

Results of Orsat & Moisture Analyses-----Methods 3 & 4(%v/v)

	Run 1	Run 2	Run 3
Date of run	07-14-94	07-14-94	07-15-94
Dry basis (orsat)			
carbon dioxide............	4.53	4.08	3.60
oxygen....................	16.42	16.71	17.17
nitrogen..................	79.05	79.21	79.23
Wet basis (orsat)			
carbon dioxide............	3.40	3.10	2.79
oxygen....................	12.31	12.70	13.33
nitrogen..................	59.24	60.22	61.51
water vapor...............	25.05	23.97	22.37
Dry molecular weight........	29.38	29.32	29.26
Wet molecular weight........	26.53	26.61	26.74
Specific gravity............	0.916	0.919	0.924
Water mass flow......(LB/HR)	54690	51193	48147
FO	0.989	1.027	1.036

Test No. 15
Line 1 Core Dryer RTO Inlet

(PM/NOx/CO)

Results of Orsat & Moisture Analyses-----Methods 3 & 4(%v/v)

	Run 1	Run 2	Run 3
Date of run	07-14-94	07-14-94	07-15-94
Dry basis (orsat)			
carbon dioxide...........	4.30	4.50	3.70
oxygen....................	16.60	16.30	17.10
nitrogen..................	79.10	79.20	79.20
Wet basis (orsat)			
carbon dioxide...........	3.19	3.28	2.69
oxygen....................	12.31	11.88	12.42
nitrogen..................	58.68	57.71	57.54
water vapor..............	25.82	27.13	27.34
Dry molecular weight........	29.35	29.37	29.28
Wet molecular weight........	26.42	26.29	26.19
Specific gravity...........	0.913	0.908	0.905
Water mass flow......(LB/HR)	22771	24164	24928
FO	1.000	1.022	1.027

Test No. 20
Line 1 Dryer RTO Outlet
(PAH's)

Results of Orsat & Moisture Analyses-----Methods 3 & 4(%v/v)

	Run 1	Run 2	Run 3
Date of run	07-15-94	07-15-94	07-15-94
Dry basis (orsat)			
carbon dioxide............	4.10	4.30	4.10
oxygen....................	16.60	16.30	16.50
nitrogen..................	79.30	79.40	79.40
Wet basis (orsat)			
carbon dioxide............	3.09	3.18	3.07
oxygen....................	12.50	12.05	12.37
nitrogen..................	59.71	58.68	59.50
water vapor...............	24.70	26.10	25.06
Dry molecular weight........	29.32	29.34	29.32
Wet molecular weight........	26.52	26.38	26.48
Specific gravity............	0.916	0.911	0.915
Water mass flow......(LB/HR)	0.00	0.00	0.00
FO	1.049	1.070	1.073

3.2 Results of Particulate Determinations

Test No. 13
Line 1 Surface Dryer RTO Inlet

Results of Particulate Loading Determinations-------Method 5

	Run 1	Run 2	Run 3
Date of run	07-14-94	07-14-94	07-15-94
Time run start/end.....(HRS)	1625/1842	2230/2400	48/ 151
Static pressure......(IN.WC)	-10.20	-10.20	-10.20
Cross sectional area (SQ.FT)	9.62	9.62	9.62
Pitot tube coefficient......	.840	.840	.840
Water in sample gas			
condenser.............(ML)	0.0	0.0	0.0
impingers..........(GRAMS)	246.0	181.0	237.0
desiccant..........(GRAMS)	36.0	17.0	16.0
total..............(GRAMS)	282.0	198.0	253.0
Total particulate material.. ....collected(grams)	0.7086	0.5060	0.5450
Gas meter coefficient.......	0.9930	0.9930	0.9930
Barometric pressure..(IN.HG)	28.85	28.85	28.85
Avg. orif.pres.drop..(IN.WC)	1.18	1.10	1.10
Avg. gas meter temp..(DEF-F)	83.8	86.0	81.0
Volume through gas meter....			
at meter conditions...(CF)	40.43	39.50	39.37
standard conditions.(DSCF)	37.68	36.66	36.88
Total sampling time....(MIN)	64.00	64.00	64.00
Nozzle diameter.........(IN)	.195	.195	.195
Avg.stack gas temp ..(DEG-F)	261	274	268
Volumetric flow rate........			
actual..............(ACFM)	51724	51456	49872
dry standard.......(DSCFM)	26310	27727	25659
Isokinetic variation.....(%)	103.9	95.9	104.2
Particulate concentration...			
actual............(GR/ACF)	0.14752	0.11471	0.11727
dry standard.....(GR/DSCF)	0.29014	0.21296	0.22803
Particle mass rate...(LB/HR)	65.429	50.612	50.151

Test No. 15
Line 1 Core Dryer RTO Inlet

Results of Particulate Loading Determinations-------Method 5

	Run 1	Run 2	Run 3
Date of run	07-14-94	07-14-94	07-15-94
Time run start/end.....(HRS)	1625/1840	2230/2400	48/ 151
Static pressure......(IN.WC)	-8.40	-8.40	-8.40
Cross sectional area (SQ.FT)	9.62	9.62	9.62
Pitot tube coefficient......	.840	.840	.840
Water in sample gas			
condenser............(ML)	0.0	0.0	0.0
impingers..........(GRAMS)	321.0	344.0	346.0
desiccant..........(GRAMS)	21.0	16.0	18.0
total..............(GRAMS)	342.0	360.0	364.0
Total particulate material.. ....collected(grams)	0.7272	0.9936	0.5509
Gas meter coefficient.......	0.9974	0.9974	0.9974
Barometric pressure..(IN.HG)	28.85	28.85	28.85
Avg. orif.pres.drop..(IN.WC)	1.76	1.66	1.66
Avg. gas meter temp..(DEF-F)	84.5	78.9	76.4
Volume through gas meter....			
at meter conditions...(CF)	49.47	48.20	47.99
standard conditions.(DSCF)	46.32	45.59	45.60
Total sampling time....(MIN)	64.00	64.00	64.00
Nozzle diameter.........(IN)	.243	.243	.243
Avg.stack gas temp ..(DEG-F)	251	251	250
Volumetric flow rate........			
actual..............(ACFM)	44841	45337	46284
dry standard.......(DSCFM)	23320	23138	23614
Isokinetic variation.....(%)	92.8	92.0	90.2
Particulate concentration...			
actual...........(GR/ACF)	0.12592	0.17155	0.09506
dry standard.....(GR/DSCF)	0.24222	0.33627	0.18639
Particle mass rate...(LB/HR)	48.417	66.691	37.727

Test No. 14
Line 1 Dryer RTO Outlet

Results of Particulate Loading Determinations-------Method 5

	Run 1	Run 2	Run 3
Date of run	07-14-94	07-14-94	07-15-94
Time run start/end.....(HRS)	1625/1840	2230/2358	48/ 154
Static pressure......(IN.WC)	-0.50	-0.50	-0.50
Cross sectional area (SQ.FT)	36.23	36.23	36.23
Pitot tube coefficient......	.840	.840	.840
Water in sample gas			
condenser............(ML)	0.0	0.0	0.0
impingers..........(GRAMS)	231.0	218.0	194.0
desiccant..........(GRAMS)	11.0	10.0	11.0
total..............(GRAMS)	242.0	228.0	205.0
Total particulate material.. ....collected(grams)	0.1115	0.0589	0.0252
Gas meter coefficient.......	0.9962	0.9962	0.9962
Barometric pressure..(IN.HG)	28.85	28.85	28.85
Avg. orif.pres.drop..(IN.WC)	1.03	1.01	0.98
Avg. gas meter temp..(DEF-F)	87.9	82.2	81.0
Volume through gas meter....			
at meter conditions...(CF)	36.79	36.37	35.71
standard conditions.(DSCF)	34.13	34.10	33.55
Total sampling time....(MIN)	64.00	64.00	64.00
Nozzle diameter..........(IN)	.245	.245	.245
Avg.stack gas temp ..(DEG-F)	340	348	351
Volumetric flow rate........			
actual..............(ACFM)	122399	121001	122342
dry standard.......(DSCFM)	58322	57883	59575
Isokinetic variation.....(%)	101.2	101.9	97.4
Particulate concentration...			
actual............(GR/ACF)	0.02401	0.01275	0.00564
dry standard.....(GR/DSCF)	0.05041	0.02666	0.01159
Particle mass rate...(LB/HR)	25.198	13.225	5.919

Test No. 2
Line 2 Surface Dryer RTO Inlet

Results of Particulate Loading Determinations-------Method 5

	Run 1	Run 2	Run 3
Date of run	07-12-94	07-12-94	07-12-94
Time run start/end.....(HRS)	1017/1204	1305/1409	1500/1611
Static pressure......(IN.WC)	-16.30	-16.30	-16.30
Cross sectional area (SQ.FT)	9.62	9.62	9.62
Pitot tube coefficient......	.840	.840	.840
Water in sample gas			
condenser.............(ML)	0.0	0.0	0.0
impingers..........(GRAMS)	203.0	169.0	179.0
desiccant..........(GRAMS)	26.0	41.0	35.0
total..............(GRAMS)	229.0	210.0	214.0
Total particulate material.. ....collected(grams)	0.4960	0.4090	0.3383
Gas meter coefficient.......	0.9947	0.9947	0.9947
Barometric pressure..(IN.HG)	28.72	28.72	28.72
Avg. orif.pres.drop..(IN.WC)	1.78	1.83	1.94
Avg. gas meter temp..(DEF-F)	82.5	91.3	92.8
Volume through gas meter....			
at meter conditions...(CF)	44.51	45.53	47.25
standard conditions.(DSCF)	41.53	41.81	43.29
Total sampling time....(MIN)	60.00	60.00	60.00
Nozzle diameter.........(IN)	.197	.197	.197
Avg.stack gas temp ..(DEG-F)	207	205	205
Volumetric flow rate........			
actual..............(ACFM)	55681	55744	56059
dry standard.......(DSCFM)	32179	32898	33198
Isokinetic variation.....(%)	97.8	96.3	98.8
Particulate concentration...			
actual............(GR/ACF)	0.10645	0.08904	0.07138
dry standard.....(GR/DSCF)	0.18426	0.15093	0.12059
Particle mass rate...(LB/HR)	50.823	42.560	34.314

Test No. 3
Line 2 Core Dryer RTO Inlet

Results of Particulate Loading Determinations-------Method 5

	Run 1	Run 2	Run 3
Date of run	07-12-94	07-12-94	07-12-94
Time run start/end.....(HRS)	1017/1206	1303/1410	1500/1611
Static pressure......(IN.WC)	-16.40	-16.40	-16.40
Cross sectional area (SQ.FT)	9.62	9.62	9.62
Pitot tube coefficient......	.840	.840	.840
Water in sample gas			
condenser.............(ML)	0.0	0.0	0.0
impingers..........(GRAMS)	199.0	233.0	203.0
desiccant..........(GRAMS)	17.0	6.0	13.0
total..............(GRAMS)	216.0	239.0	216.0
Total particulate material.. ....collected(grams)	0.6743	0.5672	0.5580
Gas meter coefficient.......	0.9962	0.9962	0.9962
Barometric pressure..(IN.HG)	28.71	28.71	28.71
Avg. orif.pres.drop..(IN.WC)	1.01	0.87	0.85
Avg. gas meter temp..(DEF-F)	78.1	89.7	91.3
Volume through gas meter....			
at meter conditions...(CF)	34.02	32.53	32.68
standard conditions.(DSCF)	31.98	29.92	29.97
Total sampling time....(MIN)	60.00	60.00	60.00
Nozzle diameter.........(IN)	.185	.185	.185
Avg.stack gas temp ..(DEG-F)	233	240	240
Volumetric flow rate........			
actual..............(ACFM)	49342	47584	49047
dry standard.......(DSCFM)	26211	23955	25392
Isokinetic variation.....(%)	104.9	107.4	101.5
Particulate concentration...			
actual...........(GR/ACF)	0.17276	0.14718	0.14866
dry standard.....(GR/DSCF)	0.32535	0.29248	0.28727
Particle mass rate...(LB/HR)	73.094	60.054	62.523

Test No. 1
Line 2 Dryer RTO Outlet

Results of Particulate Loading Determinations-------Method 5

	Run 1	Run 2	Run 3
Date of run	07-12-94	07-12-94	07-12-94
Time run start/end.....(HRS)	1000/1210	1305/1410	1500/1611
Static pressure......(IN.WC)	-0.61	-0.61	-0.61
Cross sectional area (SQ.FT)	36.23	36.23	36.23
Pitot tube coefficient......	.840	.840	.840
Water in sample gas			
condenser.............(ML)	0.0	0.0	0.0
impingers..........(GRAMS)	205.0	208.0	189.0
desiccant..........(GRAMS)	11.0	10.0	15.0
total..............(GRAMS)	216.0	218.0	204.0
Total particulate material.. ....collected(grams)	0.1308	0.0387	0.0307
Gas meter coefficient.......	0.9930	0.9930	0.9930
Barometric pressure..(IN.HG)	28.71	28.71	28.71
Avg. orif.pres.drop..(IN.WC)	1.12	1.13	1.11
Avg. gas meter temp..(DEF-F)	89.2	100.3	100.8
Volume through gas meter....			
at meter conditions...(CF)	40.10	40.52	40.26
standard conditions.(DSCF)	36.82	36.47	36.21
Total sampling time....(MIN)	64.00	64.00	64.00
Nozzle diameter.........(IN)	.245	.245	.245
Avg.stack gas temp ..(DEG-F)	340	339	345
Volumetric flow rate........			
actual..............(ACFM)	129206	127531	127788
dry standard.......(DSCFM)	64004	63029	63455
Isokinetic variation.....(%)	99.5	100.1	98.7
Particulate concentration...			
actual...........(GR/ACF)	0.02714	0.00809	0.00649
dry standard.....(GR/DSCF)	0.05481	0.01637	0.01308
Particle mass rate...(LB/HR)	30.067	8.845	7.116

3.3 Results of Oxides of Nitrogen Determinations

Test No. 2
Line 2 Surface Dryer RTO Inlet

Results of Oxides of Nitrogen (NOx) Determinations---------Method 7

	Run 1A	Run 1B	Run 1C	Run 1D
Date of run................	07-12-94	07-12-94	07-12-94	07-12-94
Time of run............(HRS)	1017	1034	1128	1150
Flask number................	1	2	3	4
Volume of flask.........(ML)	2086	2063	2055	2116
Data: time of sampling				
flask temperature..(DEG-F)	100.00	101.00	101.00	103.00
bar. press.........(IN.HG)	28.72	28.72	28.72	28.72
flask vacuum.......(IN.HG)	26.40	26.40	26.40	26.50
flask abs. press...(IN.HG)	2.32	2.32	2.32	2.22
Data: Time of Flask Opening				
flask temperature..(DEG-F)	75.00	75.00	75.00	75.00
lab. bar. press....(IN.HG)	28.96	28.96	28.96	28.96
flask static press.(IN.HG)	-3.00	-1.60	-0.40	-3.00
flask abs. press...(IN.HG)	25.96	27.36	28.56	25.96
Volume gas sampled....(DSML)	1613	1689	1763	1644
Moisture content......(%V/V)	20.63	20.63	20.63	20.63
Nitrate in gas sample...(JG)	71.0	83.0	73.0	62.0
NO2 in gas sample.......(JG)	52.7	61.6	54.2	46.0
NOx Concentration				
(GR/DSCF).................	0.0143	0.0159	0.0134	0.0122
(MG/DSCM).................	33	36	31	28
(PPM-DRY).................	17	19	16	15
(PPM-WET).................	14	15	13	12
NOX Emission rate....(LB/HR)	3.94	4.39	3.70	3.37

Test No. 2
Line 2 Surface Dryer RTO Inlet

Results of Oxides of Nitrogen (NOx) Determinations---------Method 7

	Run 2A	Run 2B	Run 2C	Run 2D
Date of run................	07-12-94	07-12-94	07-12-94	07-12-94
Time of run............(HRS)	1310	1330	1345	1400
Flask number................	5	6	7	9
Volume of flask.........(ML)	2057	2100	2081	2080
Data: time of sampling				
flask temperature..(DEG-F)	104.00	103.00	104.00	103.00
bar. press.........(IN.HG)	28.72	28.72	28.72	28.72
flask vacuum.......(IN.HG)	26.30	26.40	26.30	26.40
flask abs. press...(IN.HG)	2.42	2.32	2.42	2.32
Data: Time of Flask Opening				
flask temperature..(DEG-F)	75.00	75.00	75.00	75.00
lab. bar. press....(IN.HG)	28.96	28.96	28.96	28.96
flask static press.(IN.HG)	-0.20	-0.30	-4.60	-0.80
flask abs. press...(IN.HG)	28.76	28.66	24.36	28.16
Volume gas sampled....(DSML)	1773	1810	1495	1758
Moisture content......(%V/V)	19.15	19.15	19.15	19.15
Nitrate in gas sample...(JG)	130.0	140.0	80.0	98.0
NO2 in gas sample.......(JG)	96.5	103.9	59.4	72.7
<u>NOx Concentration</u>				
(GR/DSCF).................	0.0238	0.0251	0.0173	0.0181
(MG/DSCM).................	54	57	40	41
(PPM-DRY).................	28	30	21	22
(PPM-WET).................	23	24	17	17
NOX Emission rate....(LB/HR)	6.71	7.07	4.89	5.10

Test No. 2
Line 2 Surface Dryer RTO Inlet

Results of Oxides of Nitrogen (NOx) Determinations---------Method 7

	Run 3A	Run 3B	Run 3C	Run 3D
Date of run................	07-12-94	07-12-94	07-12-94	07-12-94
Time of run...........(HRS)	1505	1520	1545	1600
Flask number................	10	11	12	28
Volume of flask.........(ML)	2063	2062	2111	2031
Data: time of sampling				
flask temperature..(DEG-F)	101.00	101.00	100.00	100.00
bar. press.........(IN.HG)	28.72	28.72	28.72	28.72
flask vacuum.......(IN.HG)	26.40	26.30	26.30	26.20
flask abs. press...(IN.HG)	2.32	2.42	2.42	2.52
Data: Time of Flask Opening				
flask temperature..(DEG-F)	75.00	75.00	75.00	75.00
lab. bar. press....(IN.HG)	28.96	28.96	28.96	28.96
flask static press.(IN.HG)	-3.50	-1.60	-0.10	-3.90
flask abs. press...(IN.HG)	25.46	27.36	28.86	25.06
Volume gas sampled....(DSML)	1562	1682	1826	1498
Moisture content......(%V/V)	18.90	18.90	18.90	18.90
Nitrate in gas sample...(JG)	100.0	60.0	60.0	51.0
NO2 in gas sample.......(JG)	74.2	44.5	44.5	37.8
NOx Concentration				
(GR/DSCF).................	0.0208	0.0116	0.0107	0.0110
(MG/DSCM).................	48	26	24	25
(PPM-DRY).................	25	14	13	13
(PPM-WET).................	20	11	10	11
NOX Emission rate....(LB/HR)	5.91	3.29	3.03	3.14

Test No. 13
Line 1 Surface Dryer RTO Inlet

Results of Oxides of Nitrogen (NOx) Determinations---------Method 7

	Run 1A	Run 1B	Run 1C	Run 1D
Date of run................	07-14-94	07-14-94	07-14-94	07-14-94
Time of run............(HRS)	1630	1645	1715	1830
Flask number................	19	20	21	22
Volume of flask.........(ML)	2069	2060	2068	2031
Data: time of sampling				
flask temperature..(DEG-F)	97.00	97.00	95.00	95.00
bar. press.........(IN.HG)	28.85	28.85	28.85	28.85
flask vacuum.......(IN.HG)	26.30	26.30	26.20	26.10
flask abs. press...(IN.HG)	2.55	2.55	2.65	2.75
Data: Time of Flask Opening				
flask temperature..(DEG-F)	75.00	75.00	75.00	75.00
lab. bar. press....(IN.HG)	28.96	28.96	28.96	28.96
flask static press.(IN.HG)	-0.40	-0.70	-3.50	-0.90
flask abs. press...(IN.HG)	28.56	28.26	25.46	28.06
Volume gas sampled....(DSML)	1759	1732	1543	1680
Moisture content......(%V/V)	26.08	26.08	26.08	26.08
Nitrate in gas sample...(JG)	100.0	180.0	350.0	180.0
NO2 in gas sample.......(JG)	74.2	133.6	259.7	133.6
NOx Concentration				
(GR/DSCF).................	0.0184	0.0337	0.0736	0.0347
(MG/DSCM).................	42	77	168	79
(PPM-DRY).................	22	40	88	42
(PPM-WET).................	16	30	65	31
NOX Emission rate....(LB/HR)	4.16	7.60	16.59	7.83

Test No. 13
Line 1 Surface Dryer RTO Inlet

Results of Oxides of Nitrogen (NOx) Determinations---------Method 7

	Run 2A	Run 2B	Run 2C	Run 2D
Date of run................	07-14-94	07-14-94	07-14-94	07-14-94
Time of run............(HRS)	2035	2050	2110	2125
Flask number................	23	24	13	14
Volume of flask.........(ML)	2056	2031	2060	2048
Data: time of sampling				
flask temperature..(DEG-F)	77.00	77.00	77.00	77.00
bar. press.........(IN.HG)	28.85	28.85	28.85	28.85
flask vacuum.......(IN.HG)	26.10	26.20	26.30	26.30
flask abs. press...(IN.HG)	2.75	2.65	2.55	2.55
Data: Time of Flask Opening				
flask temperature..(DEG-F)	75.00	75.00	75.00	75.00
lab. bar. press....(IN.HG)	28.96	28.96	28.96	28.96
flask static press.(IN.HG)	-1.90	0.00	-1.00	-1.90
flask abs. press...(IN.HG)	27.06	28.96	27.96	27.06
Volume gas sampled....(DSML)	1628	1741	1705	1635
Moisture content......(%V/V)	20.30	20.30	20.30	20.30
Nitrate in gas sample...(JG)	110.0	200.0	140.0	140.0
NO2 in gas sample.......(JG)	81.6	148.4	103.9	103.9
NOx Concentration				
(GR/DSCF).................	0.0219	0.0373	0.0266	0.0278
(MG/DSCM).................	50	85	61	64
(PPM-DRY).................	26	45	32	33
(PPM-WET).................	21	36	25	26
NOX Emission rate....(LB/HR)	5.21	8.86	6.33	6.60

Test No. 13
Line 1 Surface Dryer RTO Inlet

Results of Oxides of Nitrogen (NOx) Determinations---------Method 7

	Run 3A	Run 3B	Run 3C	Run 3D
Date of run................				
Time of run............(HRS)	2235	2250	2310	2350
Flask number................	15	16	17	18
Volume of flask.........(ML)	2045	2067	2054	2045
Data: time of sampling				
flask temperature..(DEG-F)	72.00	71.00	70.00	70.00
bar. press.........(IN.HG)	28.85	28.85	28.85	28.85
flask vacuum.......(IN.HG)	26.30	26.20	26.30	26.40
flask abs. press...(IN.HG)	2.55	2.65	2.55	2.45
Data: Time of Flask Opening				
flask temperature..(DEG-F)	75.00	75.00	75.00	75.00
lab. bar. press....(IN.HG)	28.96	28.96	28.96	28.96
flask static press.(IN.HG)	-1.20	-1.10	-0.80	-0.40
flask abs. press...(IN.HG)	27.76	27.86	28.16	28.56
Volume gas sampled....(DSML)	1678	1696	1711	1737
Moisture content......(%V/V)	24.44	24.44	24.44	24.44
Nitrate in gas sample...(JG)	77.0	150.0	270.0	190.0
NO2 in gas sample.......(JG)	57.1	111.3	200.3	141.0
NOx Concentration				
(GR/DSCF).................	0.0149	0.0287	0.0512	0.0355
(MG/DSCM).................	34	66	117	81
(PPM-DRY).................	18	34	61	42
(PPM-WET).................	13	26	46	32
NOX Emission rate....(LB/HR)	3.27	6.31	11.25	7.80

3.4 Results of Opacity Observations

Test No. 14
Line 1 Dryer RTO Outlet

Results of Opacity Observations ------------ EPA Method 9

PERCENT OPACITY	OPTICAL DENSITY	RELATIVE FREQUENCY (%)
0	0.0000	100.00
5	0.0223	0.00
10	0.0458	0.00
15	0.0706	0.00
20	0.0969	0.00
25	0.1249	0.00
30	0.1549	0.00
35	0.1871	0.00
40	0.2219	0.00
45	0.2596	0.00
50	0.3010	0.00
55	0.3468	0.00
60	0.3979	0.00
65	0.4559	0.00
70	0.5229	0.00
75	0.6021	0.00
80	0.6690	0.00
85	0.8239	0.00
90	1.0000	0.00
95	1.3010	0.00
99	2.0000	0.00
Avg Opac 0.00	Avg OD 0.0000	Time average

Observer: Edward W. Trowbridge
Cert. Date: 04-07-94
Date of Observation: 07-14-94
Time of Observation: 1642/1742

Test No. 1
Line 2 Dryer RTO Outlet

Results of Opacity Observations ----------- EPA Method 9

PERCENT OPACITY	OPTICAL DENSITY	RELATIVE FREQUENCY (%)
0	0.0000	100.00
5	0.0223	0.00
10	0.0458	0.00
15	0.0706	0.00
20	0.0969	0.00
25	0.1249	0.00
30	0.1549	0.00
35	0.1871	0.00
40	0.2219	0.00
45	0.2596	0.00
50	0.3010	0.00
55	0.3468	0.00
60	0.3979	0.00
65	0.4559	0.00
70	0.5229	0.00
75	0.6021	0.00
80	0.6690	0.00
85	0.8239	0.00
90	1.0000	0.00
95	1.3010	0.00
99	2.0000	0.00
Avg Opac 0.00	Avg OD 0.0000	Time average

Observer: Edward W. Trowbridge
Cert. Date: 04-07-94
Date of Observation: 07-12-94
Time of Observation: 1500/1600

3.5 Results of Carbon Monoxide Determinations

Test No. 13
Line 1 Surface Dryer RTO Inlet

Results of CO Determinations ---------------------Method 10

	Run 1	Run 2	Run 3
Date of run	07-14-94	07-14-94	07-15-94
Time run start/end.....(HRS)	1625/1842	2230/2400	0048/0151
Total sampling time....(MIN)	64.0	64.0	64.0
Moisture content......(%V/V)	26.08	20.30	24.44
O2 Concentration......(%V/V)	16.50	17.40	17.10
Volumetric flow rate (DSCFM)	26310	27727	25659
CO concentration............			
(GR/DSCF).................	0.2595	0.2086	0.1934
(MG/DSCM).................	594.15	477.65	442.70
(PPM-WET).................	376.99	326.77	287.13
(PPM-DRY).................	510.00	410.00	380.00
(PPM-DRY @ 7% O2).........	%1586.67	%1594.44	%1364.10
CO emission rate.....(LB/HR)	58.521	49.580	42.525

CO = Carbon monoxide

A trailing '<' symbol indicates that the true value is less than or equal to the reported value

Test No. 15
Line 1 Core Dryer RTO Inlet

Results of CO Determinations ---------------------Method 10

	Run 1	Run 2	Run 3
Date of run	07-14-94	07-14-94	07-15-94
Time run start/end.....(HRS)	1625/1840	2230/2400	0048/0151
Total sampling time....(MIN)	64.0	64.0	64.0
Moisture content......(%V/V)	25.82	27.13	24.21
O2 Concentration......(%V/V)	16.54	16.54	17.09
Volumetric flow rate (DSCFM)	23320	23138	24468
CO concentration............			
(GR/DSCF).................	0.2442	0.2951	0.1374
(MG/DSCM).................	559.20	675.70	314.55
(PPM-WET).................	356.06	422.65	204.63
(PPM-DRY).................	480.00	580.00	270.00
(PPM-DRY @ 7% O2).........	1506.	1820.	966.75
CO emission rate.....(LB/HR)	48.819	58.530	28.813

CO = Carbon monoxide

A trailing '<' symbol indicates that the true value is less than or equal to the reported value

Test No. 14
Line 1 Dryer RTO Outlet

Results of CO Determinations ----------------------Method 10

	Run 1	Run 2	Run 3
Date of run	07-14-94	07-14-94	07-15-94
Time run start/end.....(HRS)	1625/1840	2230/2358	0048/0154
Total sampling time....(MIN)	64.0	64.0	64.0
Moisture content......(%V/V)	25.05	23.97	22.37
02 Concentration......(%V/V)	16.42	16.71	17.17
Volumetric flow rate (DSCFM)	58322	57883	59575
CO concentration............			
(GR/DSCF).................	0.0972	0.0885	0.0468
(MG/DSCM).................	222.51	202.71	107.18
(PPM-WET).................	143.15	132.29	71.42
(PPM-DRY).................	191.00	174.00	92.00
(PPM-DRY @ 7% O2).........	583.84	567.83	336.29
CO emission rate.....(LB/HR)	48.583	43.926	23.904

CO = Carbon monoxide

A trailing '<' symbol indicates that the true value
is less than or equal to the reported value

Test No. 2
Line 2 Surface Dryer RTO Inlet

Results of CO Determinations ---------------------Method 10

	Run 1	Run 2	Run 3
Date of run	07-12-94	07-12-94	07-12-94
Time run start/end.....(HRS)	1017/1204	1305/1409	1500/1611
Total sampling time....(MIN)	60.0	60.0	60.0
Moisture content......(%V/V)	20.63	19.15	18.90
O2 Concentration......(%V/V)	18.30	18.60	18.60
Volumetric flow rate (DSCFM)	32179	32898	33198
CO concentration............			
(GR/DSCF).................	0.1069	0.0712	0.0723
(MG/DSCM).................	244.65	163.10	165.43
(PPM-WET).................	166.68	113.19	115.16
(PPM-DRY).................	210.00	140.00	142.00
(PPM-DRY @ 7% O2).........	%1088.89	816.67	828.33
CO emission rate.....(LB/HR)	29.472	20.087	20.560

CO = Carbon monoxide

A trailing '<' symbol indicates that the true value is less than or equal to the reported value

Test No. 3
Line 2 Core Dryer RTO Inlet

Results of CO Determinations ---------------------Method 10

	Run 1	Run 2	Run 3
Date of run	07-12-94	07-12-94	07-12-94
Time run start/end.....(HRS)	1017/1204	1305/1409	1500/1611
Total sampling time....(MIN)	60.0	60.0	60.0
Moisture content......(%V/V)	24.15	27.36	25.36
O2 Concentration......(%V/V)	17.45	16.57	16.90
Volumetric flow rate (DSCFM)	26211	23955	25392
CO concentration............			
(GR/DSCF).................	0.2188	0.4707	0.2799
(MG/DSCM).................	500.95	1077.	640.75
(PPM-WET).................	326.16	671.92	410.52
(PPM-DRY).................	430.00	925.00	550.00
(PPM-DRY @ 7% O2).........	1695.	2923.	1878.
CO emission rate.....(LB/HR)	49.156	96.640	60.909

CO = Carbon monoxide

A trailing '<' symbol indicates that the true value is less than or equal to the reported value

Test No. 1
Line 2 Dryer RTO Outlet

Results of CO Determinations ---------------------Method 10

	Run 1	Run 2	Run 3
Date of run	07-12-94	07-12-94	07-12-94
Time run start/end.....(HRS)	1000/1210	1305/1410	1500/1611
Total sampling time....(MIN)	64.0	64.0	64.0
Moisture content......(%V/V)	21.66	21.99	20.99
O2 Concentration......(%V/V)	17.07	16.95	17.06
Volumetric flow rate (DSCFM)	64004	63029	63455
CO concentration............			
(GR/DSCF).................	0.0712	0.0758	0.0753
(MG/DSCM).................	163.10	173.58	172.42
(PPM-WET).................	109.68	116.23	116.93
(PPM-DRY).................	140.00	149.00	148.00
(PPM-DRY @ 7% O2).........	498.73	515.06	525.89
CO emission rate.....(LB/HR)	39.080	40.959	40.959

CO = Carbon monoxide

A trailing '<' symbol indicates that the true value is less than or equal to the reported value

3.6 Results of Formaldehyde Determinations

Test No. 7
Line 2 Dryer RTO Outlet

Results of Formaldehyde Tests -------------- EPA Method 0011

	Run 1	Run 2	Run 3
Date of run	07-12-94	07-12-94	07-12-94
Time run start/end.....(HRS)	1830/1940	2015/2121	2155/2305
Static pressure......(IN.WC)	-0.61	-0.61	-0.61
Cross sectional area (SQ.FT)	36.23	36.23	36.23
Pitot tube coefficient......	.840	.840	.840
Water in sample gas			
condenser.............(ML)	0.0	0.0	0.0
impingers..........(GRAMS)	290.0	320.0	312.0
desiccant..........(GRAMS)	36.0	31.0	32.0
total..............(GRAMS)	326.0	351.0	344.0
Formaldehyde in sample..(uG)	6760	9010	8120
Gas meter coefficient.......	0.9930	0.9930	0.9930
Barometric pressure..(IN.HG)	28.71	28.71	28.71
Avg. orif.pres.drop..(IN.WC)	2.84	2.82	2.90
Avg. gas meter temp..(DEF-F)	97.3	96.1	90.0
Volume through gas meter....			
at meter conditions...(CF)	64.13	63.83	64.53
standard conditions.(DSCF)	58.29	58.14	59.44
Total sampling time....(MIN)	64.00	64.00	64.00
Nozzle diameter.........(IN)	.303	.303	.303
Avg.stack gas temp ..(DEG-F)	349	349	346
Volumetric flow rate........			
actual.............(ACFM)	133385	132901	136344
dry standard.......(DSCFM)	65964	64723	67196
Isokinetic variation.....(%)	100.0	101.6	100.1
CH2O concentration..........			
(GR/DSCF).................	0.0018	0.0024	0.0021
(MG/DSCM).................	4.13	5.51	4.86
(PPM-DRY).................	3.31	4.42	3.89
(PPM-WET).................	2.62	3.44	3.06
CH2O emission rate...(LB/HR)	1.01870	1.33560	1.22255

CH2O = Formaldehyde

A trailing '<' symbol indicates that the true value is less than or equal to the reported value

Test No. 11
Line 1 Dryer RTO Outlet

Results of Formaldehyde Tests -------------- EPA Method 0011

Date of run	Run 1 07-13-94	Run 2 07-13-94	Run 3 07-13-94
Time run start/end.....(HRS)	1200/1307	1427/1533	1612/1720
Static pressure......(IN.WC)	-0.48	-0.48	-0.48
Cross sectional area (SQ.FT)	36.23	36.23	36.23
Pitot tube coefficient......	.840	.840	.840
Water in sample gas			
condenser.............(ML)	0.0	0.0	0.0
impingers..........(GRAMS)	327.0	334.0	337.0
desiccant..........(GRAMS)	36.0	30.0	35.0
total..............(GRAMS)	363.0	364.0	372.0
Formaldehyde in sample..(uG)	4910	6650	14400
Gas meter coefficient.......	0.9962	0.9962	0.9962
Barometric pressure..(IN.HG)	28.94	28.94	28.94
Avg. orif.pres.drop..(IN.WC)	2.61	2.34	2.35
Avg. gas meter temp..(DEF-F)	79.0	85.3	84.4
Volume through gas meter....			
at meter conditions...(CF)	57.85	55.20	55.25
standard conditions.(DSCF)	54.95	51.79	51.92
Total sampling time....(MIN)	64.00	64.00	64.00
Nozzle diameter.........(IN)	.303	.303	.303
Avg.stack gas temp ..(DEG-F)	339	338	336
Volumetric flow rate........			
actual..............(ACFM)	123868	120823	122114
dry standard.......(DSCFM)	60324	57988	58497
Isokinetic variation.....(%)	103.0	101.0	100.4
CH2O concentration..........			
(GR/DSCF).................	0.0014	0.0020	0.0043
(MG/DSCM).................	3.18	4.56	9.87
(PPM-DRY).................	2.55	3.65	7.91
(PPM-WET).................	1.94	2.75	5.91
CH2O emission rate...(LB/HR)	0.71740	0.99028	2.16163

CH2O = Formaldehyde

A trailing '<' symbol indicates that the true value is less than or equal to the reported value

3.7 Results of Phenol Determinations

Test No. 19
Line 1 Dryer RTO Outlet

Results of Phenol Determinations ---------------------------

	Run 1	Run 2	Run 3
Date of run	07-15-94	07-15-94	07-15-94
Time run start/end.....(HRS)	0922/1025	1257/1357	1408/1508
Barometric pressure..(IN.HG)	28.86	28.86	28.86
Meter temperature....(DEG-F)	81.00	91.00	100.00
Meter correction coefficient	0.9974	0.9974	0.9974
Volume through gas meter....			
at meter conditions...(CF)	45.950	46.900	46.960
standard conditions (DSCF)	43.339	43.432	42.789
Total sampling time....(MIN)	60.0	60.0	60.0
Moisture content......(%V/V)	24.70	26.10	25.06
Volumetric flow rate (DSCFM)	59055	57018	56588
Phenol in sample........(uG)	840.00<	840.00<	840.00<
Phenol concentration........			
(GR/10³DSCF)..............	0.2991<	0.2984<	0.3029<
(uG/DSCM).................	684.96<	683.49<	693.77<
(PPB-DRY).................	175.04<	174.66<	177.29<
(PPB-WET).................	131.80<	129.07<	132.86<
Phenol emis. rate(10-³LB/HR)	151.375<	145.840<	146.916<

A trailing '<' symbol indicates that the true value is less than or equal to the reported value

Analysis performed according to NIOSH Method 3502

Test No. 10
Line 2 Dryer RTO Outlet

Results of Phenol Determinations ---------------------------

	Run 1	Run 2	Run 3
Date of run	07-13-94	07-13-94	07-13-94
Time run start/end.....(HRS)	0856/0956	1120/1220	1301/1401
Barometric pressure..(IN.HG)	28.94	28.94	28.94
Meter temperature....(DEG-F)	78.92	86.13	86.54
Meter correction coefficient	0.9974	0.9974	0.9974
Volume through gas meter....			
at meter conditions...(CF)	46.650	46.130	46.560
standard conditions (DSCF)	44.291	43.219	43.589
Total sampling time....(MIN)	60.0	60.0	60.0
Moisture content......(%V/V)	19.68	20.55	21.89
Volumetric flow rate (DSCFM)	66295	65988	63855
Phenol in sample........(uG)	840.00<	840.00<	840.00<
Phenol concentration........			
($GR/10^3DSCF$)..............	0.2926<	0.2999<	0.2973<
(uG/DSCM).................	670.24<	686.86<	681.03<
(PPB-DRY).................	171.27<	175.52<	174.03<
(PPB-WET).................	137.57<	139.45<	135.94<
Phenol emis. rate($10^{-3}LB/HR$)	166.281<	169.616<	162.740<

A trailing '<' symbol indicates that the true value is less than or equal to the reported value

Analysis performed according to NIOSH Method 3502

3.8 PAH Sampling Data

Test No. 8
Line 2 Dryer RTO Outlet

Sampling Data for PAH Determinations-------SW846 Method 0010

	Run 1	Run 2	Run 3
Date of run	07-13-94	07-13-94	07-13-94
Time run start/end.....(HRS)	848/1058	1150/1402	1505/1717
Static pressure......(IN.WC)	-0.40	-0.40	-0.40
Cross sectional area (SQ.FT)	36.23	36.23	36.23
Pitot tube coefficient......	0.840	0.840	0.840
Water in sample gas			
condenser.............(ML)	347.0	372.0	394.0
impingers..........(GRAMS)	0.0	0.0	0.0
desiccant..........(GRAMS)	20.0	23.0	22.0
total..............(GRAMS)	367.0	395.0	416.0
Gas meter coefficient.......	0.9930	0.9930	0.9930
Barometric pressure..(IN.HG)	28.94	28.94	28.94
Avg. orif.pres.drop..(IN.WC)	0.99	1.06	1.01
Avg. gas meter temp..(DEF-F)	79.9	91.1	94.0
Volume through gas meter....			
at meter conditions...(CF)	74.93	77.93	76.15
standard conditions.(DSCF)	70.53	71.88	69.86
standard conditions..(NM^3)	1.997	2.035	1.978
Total sampling time....(MIN)	128.00	128.00	128.00
Nozzle diameter.........(IN)	.237	.237	.237
Avg.stack gas temp ..(DEG-F)	338	345	344
Volumetric flow rate........			
actual..............(ACFM)	129160	131111	128877
dry standard.......(DSCFM)	66295	65988	63855
Isokinetic variation.....(%)	98.3	100.7	101.1

Test No. 20
Line 1 Dryer RTO Outlet

Sampling Data for PAH Determinations-------SW846 Method 0010

	Run 1	Run 2	Run 3
Date of run	07-15-94	07-15-94	07-15-94
Time run start/end.....(HRS)	800/1015	1258/1509	1545/1754
Static pressure......(IN.WC)	-0.54	-0.54	-0.54
Cross sectional area (SQ.FT)	36.23	36.23	36.23
Pitot tube coefficient......	0.840	0.840	0.840
Water in sample gas			
condenser.............(ML)	423.0	449.0	411.0
impingers..........(GRAMS)	0.0	0.0	0.0
desiccant..........(GRAMS)	20.0	21.0	19.0
total..............(GRAMS)	443.0	470.0	430.0
Gas meter coefficient.......	0.9962	0.9962	0.9962
Barometric pressure..(IN.HG)	28.87	28.87	28.87
Avg. orif.pres.drop..(IN.WC)	0.88	0.87	0.82
Avg. gas meter temp..(DEF-F)	82.2	94.7	99.5
Volume through gas meter....			
at meter conditions...(CF)	67.80	68.35	66.62
standard conditions.(DSCF)	63.58	62.65	60.53
standard conditions..(NM^3)	1.800	1.774	1.714
Total sampling time....(MIN)	128.00	128.00	128.00
Nozzle diameter.........(IN)	.237	.237	.237
Avg.stack gas temp ..(DEG-F)	350	356	360
Volumetric flow rate........			
actual..............(ACFM)	124823	123681	121693
dry standard.......(DSCFM)	59055	57018	56588
Isokinetic variation.....(%)	99.5	101.6	98.9

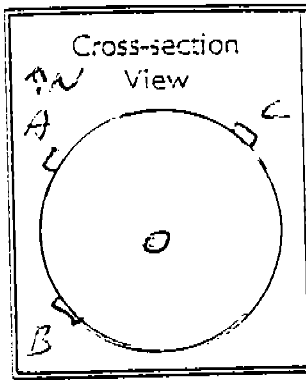
APPENDIX A

VOLUMETRIC FLOW RATE DETERMINATIONS

INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 2 Field Data Sheet

Drawing of Test Site

Cross-section View	Elevation View
	

Co. L.P. / Hayward, WI
ource Line 1 Dryer (DT) / Stack
Test 19 Run 0 Date 2-14-94
Stack Dimen. 81.5 IN.
Dry Bulb ____ °F Wet bulb ____ °F
Manometer ☒ Reg. ☐ Exp ☐ Elec.
Barometric Pressure ____ IN.HG
Static Pressure -.50 IN.WC
Operators M. Koehler + R. Meisenheimer
Pitot No. 28V-B Cp .84

PM/CO/NOx

Traverse Point No.	Fraction of Diameter	Distance From Stack Wall (IN.)	Distance From End of Port (IN.)	Velocity	Temp. of Gas (°F)
▨		Port Length: 6.25 IN.		Time Start: HRS	
A-1	.032	2.61	8.86		
2	.105	8.56	14.81		
3	.194	15.81	22.06		
4	.323	26.32	32.57		
5	.677	55.18	61.43		
6	.806	65.69	71.94		
7	.895	72.94	79.19		
8	.968	78.89	85.14		
B-1					
2					
3					
4					
5					
6					
7					
8					
Temp. Meas. Device & S/N: PDT-31 / TC				Time End: HRS	

R or nothing = reg. manometer; S = expanded; E = electronic

032594-G:\STACK\WP\FORMS\S-392.1

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job L.P. / Hayward, WI
Source Line 1 Dryer WESP / Stack
Method 5 Filter holder: Glass
Date 7-14-94 Test 14 Run 1
No. of traverse points 16
Filter type: 4" Glf.

Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Post test: <0.01 cfm at 9 in. Hg. (vac) ☒

Particulate Catch Data:

No. of filters used:
6745

Recovery solvent(s)
☒ acetone
☐ other(s)

No. of probe wash bottles: 1
Sample recovered by: M. Koehler + K. Nuessmeier

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1	737	506	231
Impinger No. 2			
Impinger No. 3			
Condenser			
Desiccant	1440	1429	11
Total	▨	▨	242

Integrated Gas Sampling Data:

Bag Pump No. 23B
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: 0 cc/min at 15 in. Hg.
Time start: 1825 (HRS)
Time end: 1940 (HRS)
Sampling rate: 400 cc/min
Box No. 12 Bag No. 1
Size: 44 L
Operator: M. Koehler

S/N of O_2 Analyzer used to monitor train outlet: 3

INTERPOLL LABORATORIES 'A METHOD 5 FIELD DATA SHEET

Job L.L.P. / Haywood, Ind.
Source Line 1 Dryer, RTO / Stack
Date 7-14-94 Test 1A Run 1

Operators M. Kaehler, LK Moosmeyer
Meter Box No. 4 ΔH@ 1.97 in WC
Calibr. coeff. .9962

Pitot No. 29C-8 Cp .84
Bar. Press. 28.85 in Hg H2O 24 %
Nozzle No. 3-4 Nozzle Dia .245 in.

Down 1631 Restart 1642

Down 1736 Restart 1805 Meter Down 1906 Restart 1927

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Dgc. Vol. (cf)	VAC. inHg	Temperatures (°F) Stack	Probe	Oven	Impg.	Gas/In	Gas/Out	Oxygen (%v/v)
	1625	378.10											
B-8	4	380.40	.61	1.04	0.39	4.5	335	242	250	48	94	94	16.2
7	8	382.73	.62	1.10	2.78	4.5	337	247	245	45	97	95	16.5
6	12	385.19	.64	1.14	5.23	5	336	240	252	45	97	95	15.9
5	16	387.53	.61	1.08	2.61	5	337	235	257	45	84	79	16.9
4	20	389.86	.60	1.04	9.91	5	335	233	251	44	86	80	17.0
3	24	392.20	.62	1.08	2.26	5	336	238	246	44	89	81	16.6
2	28	394.65	.64	1.11	4.65	5	338	235	257	44	90	84	16.6
1	32	396.66	.47	.82	6.71	4	335	233	257	44	91	85	16.6
A-8	36	398.80	.50	.86	8.83	4	340	232	252	39	89	85	16.8
7	40	401.17	.65	1.13	1.24	5	343	236	250	39	89	95	16.4
6	44	403.65	.68	1.17	3.20	5.5	348	241	247	41	91	85	16.4
5	48	406.07	.64	1.11	6.09	5	345	244	251	41	92	86	15.9
4	52	408.45	.60	1.04	8.42	5	344	240	254	41	94	87	16.1
3	56	410.65	.52	.92	0.60	4	335	245	256	40	84	83	16.7
2	60	412.73	.50	.86	2.20	4	344	249	258	40	87	84	17.0
1	64	414.89	.53	.91	4.66	4	348	247	252	40	89	84	16.1
	1840												
	θ = 64	Vm = 36.79		ΔH = 1.03							Avg. = 82.9		

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job L.P. / Hayward, WI
Source Line 1 Dryer RTO / Stack
Method 5 Filter holder: Glass
Date 7-14-94 Test 19 Run 2
No. of traverse points 16
Filter type: 4" G.F.

Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☑
Post test: <0.02 cfm at 6 in. Hg. (vac) ☑

Run VOIDED

Particulate Catch Data:

No. of filters used:
6746

Recovery solvent(s)
☑ acetone
☐ other(s)

No. of probe wash bottles: 1
Sample recovered by: M. Koehler + K. Moessmeier

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1	700	504	196
Impinger No. 2			
Impinger No. 3			
Condenser			
Desiccant	1496	1486	10
Total	▨	▨	206

Integrated Gas Sampling Data:

Bag Pump No. 23B
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: 0 cc/min at 15 in. Hg.
Time start: 2030 (HRS)
Sampling rate: 400 cc/min
Box No. 12 Bag No. 2
Size: 44 L
Time end: 2138 (HRS)
Operator: M. Koehler

S/N of O_2 Analyzer used to monitor train outlet: 3

INTERPOLL LABORATORIES - EPA METHOD 5 FIELD DATA SHEET

Job L.P. / Hayward, WI
Source Kiln 1 Dryer A10 / Stack
Date 2-14-94 Test 14 Run 2

Operators Musackler/Kalassmeyer
Meter Box No. 4 ΔH@ 1.89 in WC
Gasmeter coeff.: .9962

Pitot No. 19V-B Cp .84
Bar. Press. 28.65 in Hg H2O 2.5 %
Nozzle No. 4-4 Nozzle Dia .245 in.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Dev. Vol. (cf)	VAC. inHg	Temperatures (°F) Stack	Probe	Oven	Impg.	Gas/In	Gas/Out	Oxygen (%v/v)
	2030	415.40											
A-8	4	417.58	.52	.90	7.55	4	330	242	237	45	79	80	13.0
7	8	419.92	.64	1.09	9.90	4	332	247	244	45	82	80	12.7
6	12	422.29	.66	1.12	2.28	4	336	241	250	44	84	81	12.7
5	16	424.65	.65	1.11	4.66	4	333	249	247	45	86	81	12.9
4	20	426.94	.58	.99	6.92	4	330	254	238	44	88	82	12.8
3	24	429.10	.56	.95	9.13	4	335	250	241	44	89	83	12.4
2	28	431.32	.55	.94	1.33	4	339	247	244	44	90	84	12.4
1	32	433.42	.52	.88	3.46	3.5	341	245	249	44	90	84	12.1
B-8	36	435.73	.60	1.02	5.76	4	340	240	253	46	88	83	12.5
7	40	438.02	.61	1.04	8.07	4	339	250	256	46	90	84	12.3
6	44	440.30	.60	1.02	0.36	4	342	253	257	46	90	85	12.7
5	48	442.67	.61	1.04	2.67	4	343	249	257	47	91	85	12.4
4	52	444.99	.61	1.03	4.98	4	347	255	252	47	92	85	12.4
3	56	447.30	.62	1.05	7.31	4	348	251	250	45	91	85	12.4
2	60	449.53	.57	.96	9.53	4	350	253	247	44	91	85	12.4
1	64	451.71	.55	.93	1.72	4	350	250	245	44	91	85	12.6
	2138												
	θ = 64	Vm = 36.31		ΔH 1.00							Avg. = 85.7		

Run Voided

S-0037R

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job L.P. / Hayward, WI
Source Line 1 Dryer RTO/Stack
Method 5 Filter holder: Glass
Sample Train Leak Check:

Date 7-14-94 Test 14 Run 3
No. of traverse points 16
Filter type: 4" G.F.

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☑
Post test: <0.02 cfm at 7 in. Hg. (vac) ☑

Particulate Catch Data:

No. of filters used:
6747

Recovery solvent(s)
☑ acetone
☐ other(s)

No. of probe wash bottles: 1
Sample recovered by: M. Koehler + K. Niessmeier

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1	718	500	218
Impinger No. 2			
Impinger No. 3			
Condenser			
Desiccant	1450	1440	10
Total	▨	▨	228

Integrated Gas Sampling Data:

Bag Pump No. 23B
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: 0
Time start: 2230
Sampling rate: 400

Box No. 12 Bag No. 3
Size: 44 L
cc/min at 15 in. Hg.
(HRS) Time end: 2358 (HRS)
cc/min Operator: M. Koehler

S/N of O_2 Analyzer used to monitor train outlet: 3

123093-GASTACK\WP\METHODS\S-0046RR

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job L.P. / Hayward, WI
Source Line 1 Dryer RTO / Stack
Date 7-14-94 Test 14 Run 3

Operators M. Kuehler / K. Messmer
Meter Box No. 4 ΔH@ 1.89 IN WC
Gamma coeff. .9962

Pitot No. 24V-3 Cp .84
Bar. Press. 28.85 inHg H2O 22.3%
Nozzle No. 3-4 Nozzle Dia. .245 IN.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Dev. Vol. (cf)	VAC. inHg	Temperature (°F) Stack	Probe	Oven	Impg.	Gas/In	Gas/Out	Oxygen (%v/v)
	(2230)	452.00											
B-8	4	454.28	.57	1.02	4.28	4	349	240	247	45	78	78	17.2
7	8	456.50	.55	.97	6.50	4	348	243	251	45	80	78	17.5
6	12	458.76	.58	1.02	8.77	4	350	248	246	45	82	78	17.2
5	16	460.92	.53	.93	0.95	4	350	245	250	44	93	79	17.5
4	20	463.21	.58	1.02	3.24	4	351	247	256	44	84	80	17.1
3	24	465.54	.59	1.05	5.55	4	348	243	252	44	85	80	17.8
2	28	467.88	.60	1.06	7.88	4	349	244	257	45	86	80	17.2
1	32	470.18	.58	1.02	0.17	4	352	246	251	46	87	80	18.2
A-8	36	472.47	.58	1.03	2.46	4	350	242	255	46	85	81	17.7
7	40	474.86	.57	1.02	4.75	4	344	242	252	43	87	81	17.6
6	44	477.15	.64	1.14	7.17	4.5	345	243	256	43	88	82	17.8
5	48	479.50	.61	1.09	9.53	4	347	240	253	43	89	82	17.4
4	52	481.86	.60	1.07	1.87	4	350	237	250	43	89	82	17.5
3	56	484.03	.53	.95	4.08	4	344	242	246	45	93	81	17.7
2	60	486.25	.53	.94	6.28	4	345	245	246	45	82	80	17.7
1	64	488.37	.49	.87	8.39	4	348	241	249	45	93	80	17.1
	(2358)												
	θ = 64	Vm = 36.37		ΔH 1.01							Avg. = 82.2		

Down 2324
Restart 2332
Down 2338
Restart 2350

INTERPOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job L.P. / Hayward, WI
Date 7-14-94 Test 14 Run 4
Source Line 1 Dryer RTO / Stack
No. of traverse points 16
Method 5 Filter holder: Glass
Filter type: 4" G.F.F.

Sample Train Leak Check:

Pretest: < 0.02 cfm at 15 in. Hg. (vac) ☒
Postest: <0.02 cfm at 7 in. Hg. (vac) ☒

Particulate Catch Data:

No.s of filters used: 6749

Recovery solvent(s)
☒ acetone
☐ other(s)

No. of probe wash bottles: 1
Sample recovered by: M. Kaehler + K. Nuessmeier

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1	685	491	194
Impinger No. 2			
Impinger No. 3			
Condenser			
Desiccant	1507	1496	11
Total	▨	▨	205

Integrated Gas Sampling Data:

Bag Pump No. 23B Box No. 28 Bag No. 1

Bag Material: 5-layer Aluminized Tedlar Size: 44 L

Pretest leak check: 0 cc/min at 15 in. Hg.

Time start: 0043 (HRS) Time end: 0154 (HRS)

Sampling rate: 400 cc/min Operator: M. Kaehler

S/N of O_2 Analyzer used to monitor train outlet: 3

CF-023

INTERPOLL LABORATORIES - EPA METHOD 5 FIELD DATA SHEET

Job L.P. / Hayward, WI
Source Line 1 Dryer RTO / Stack
Date 2-15-94 Test 14 Run 4

Operators [illegible] / K. Wasserman
Meter Box No. 4 ΔH@ 1.84 IN WC
Gasmeter coeff. .9962

Pitot No. 24V-8 Cp .84
Bar. Press. 28.85 inHg H2O 24.7 %
Nozzle No. 3-4 Nozzle Dia .245 IN.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Des. Vol. (cf)	VAC. inHg	Temperatures (°F) Stack	Probe	Oven	Impg.	Gas/In	Gas/Out	Oxygen (xv/v)
	0049	488.60											18.2
A-8	4	490.61	.50	.84	0.67	3.5	350	237	240	48	75	75	18.1
7	8	492.93	.55	.91	2.81	4	347	242	245	48	78	76	17.9
6	12	495.12	.65	1.08	5.15	4	350	248	250	47	79	76	17.9
5	16	497.51	.63	1.04	7.45	4	352	252	243	46	81	77	19.2
4	20	499.69	.62	1.03	9.74	4	351	253	240	46	93	77	17.9
3	24	501.80	.54	.90	1.89	4	352	250	245	46	84	77	18.4
2	28	503.91	.52	.87	3.99	4	353	247	249	46	84	78	17.9
1	32	506.01	.51	.85	6.07	4	351	249	249	45	94	79	18.5
B-8	36	508.74	.54	.90	8.22	4	350	253	245	45	94	79	17.9
7	40	510.47	.58	.97	0.45	4	349	254	247	45	96	79	18.3
6	44	512.78	.62	1.04	2.76	4	349	247	250	43	96	80	18.4
5	48	515.08	.64	1.08	5.11	4	350	244	253	43	97	80	18.1
4	52	517.40	.64	1.08	7.46	4	350	247	251	42	97	80	18.1
3	56	519.71	.61	1.02	9.75	4	351	250	255	42	97	80	18.2
2	60	522.00	.62	1.04	2.06	4	352	253	250	42	87	80	18.0
1	64	524.31	.59	.99	4.31	4	353	249	245	42	99	80	18.1
	(0154)												
	Θ = 64	Vm = 35.71		ΔH = .98							Avg. = 81.0		

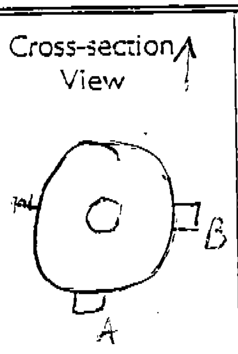
INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 2 Field Data Sheet

Job LP/HAYWARD
Source LINE 1 CAKE DRYER INLET
Test 15 Run ___ Date 7-14-94
Stack Dimen. 42 IN.
Dry Bulb 355 °F Wet bulb 143 °F
Manometer ☒ Reg. ☐ Exp ☐ Elec.
Barometric Pressure 28.85 IN.HG
Static Pressure -8.4 IN.WC
Operators DM + JT
Pitot No. 230-G Cp .840
PM/CO/NOx

Drawing of Test Site

Cross-section View



Elevation View

Traverse Point No.	Fraction of Diameter	Distance From Stack Wall (IN.)	Distance From End of Port (IN.)	Velocity	Temp. of Gas (°F)
▨		Port Length:	8 IN.	Time Start: 1445 HRS	
A 1	.032	1.34	9.34	1.00	
2	.105	4.41	12.41	1.10	
3	.194	8.15	16.15	1.20	
4	.323	13.57	21.57	1.30	
5	.677	28.43	36.43	1.55	247
6	.806	33.85	41.85	1.50	
7	.895	37.59	45.59	1.60	
8	.968	40.66	48.66	1.30	
B 1	.032	1.34	9.34	.82	
2	.105	4.41	12.41	.98	
3	.194	8.15	16.15	1.0	
4	.323	13.57	21.57	1.1	
5	.677	28.43	36.43	1.5	247
6	.806	33.85	41.85	1.65	
7	.895	37.59	45.59	1.4	
8	.968	40.66	48.66	1.3	
Temp. Meas. Device & S/N: PDT 38				Time End: 1455 HRS	

R or nothing = reg. manometer; S = expanded; E = electronic

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DII

INTERPOLL LABORATORIES METHOD 5 FIELD DATA SHEET

Job LP/HAYWARD
Source LINE 1 COKE DRYER INLET
Date 7-14-94 Test 15 Run 1

Operators Cal + JJ
Meter Box No. 2 ΔH@ 1.77 in WC
Gas meter coeff. .9974

Pitot No. 23V-4 Cp .81
Bar. Press. 29.33 in Hg H2O 3.3 %
Nozzle No. ~~2-1~~ 8-4 Nozzle Dia .245 in.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)*	Velocity Head (inWC)	Orifice Meter (inWC)	Dev. Vol. (cf)	VAC. (inHg)	Temperatures (°F) Stack	Probe	Oven	Impg.	Gas/In	Gas/Out	Oxygen (%v/v)
	(1625)	(346.80)											
A 8	4	349.93	1.60	2.03	0.08	8	247	237		42	78	76	17.3
7	8	353.10	1.40	1.99	3.35	9	247	240		42	84	76	16.3
6	12	356.45	1.55	2.22	6.81	10	250	240		42	87	76	15.8
5	16	359.68	1.30	1.85	9.92	10	258	241		43	89	77	17.0
4	20	362.63	1.10	1.56	2.89	9	257	245		43	91	77	16.8
3	24	365.52	1.15	1.64	5.88	9	255	250		43	93	78	16.3
2	28	368.60	1.10	1.57	8.81	10	256	250		44	93	78	16.5
1	32	371.74	1.20	1.72	1.87	11	255	248		44	94	79	16.5
B 8	36	375.26	1.60	2.29	5.41	14	255	251		43	94	79	16.4
7	40	378.75	1.50	2.15	8.84	14	255	251		43	90	79	16.2
6	44	381.95	1.30	1.85	2.01	13	256	242		45	90	80	16.4
5	48	384.87	1.10	1.58	4.95	12	250	250		45	92	80	16.4
4	52	387.95	.98	1.42	7.74	9	246	255		44	93	80	16.0
3	56	390.76	1.0	1.46	0.57	10	241	242		46	96	82	15.7
2	60	393.54	1.0	1.47	3.41	10	243	245		46	98	82	15.8
1	64	396.27	.93	1.35	6.13	10	242	245		46	90	82	16.2
	(1840)												
	θ = 64	Vm = 49.47		ΔH = 1.76							Avg. = 84.5		

C-31

S-0037R

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job LP/HAYWARD
Source LINE 1 CAKE DRYER INLET
Method 5 Filter holder: SS
Date 7-14-94 Test 15 Run 1
No. of traverse points 16
Filter type: SS

Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Post test: ≤0.02 cfm at 15 in. Hg. (vac) ☒

Particulate Catch Data:

No. of filters used:
SS # 37

Recovery solvent(s)
☒acetone
☐other(s)

No. of probe wash bottles: 1
Sample recovered by: DM

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1	1116	795	321
Impinger No. 2			
Impinger No. 3			
Condenser			
Desiccant	~~1490~~ 1511	1490	21
Total	▨		342

Integrated Gas Sampling Data:

Bag Pump No. 29 A
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: 0 cc/min at 15 in. Hg.
Time start: 1625 (HRS)
Sampling rate: 400 cc/min
Box No. 33 Bag No. 1
Size: 44 L
Time end: 1840 (HRS)
Operator: 0.11

S/N of O_2 Analyzer used to monitor train outlet: 5

123093-G:\STACK\WP\METHODS\S-0046RR

031
535

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job LP / Hayward
Source Line 1 Core Dryer Inlet
Method 5 Filter holder: SS
Date 7-14-94 Test 15 Run 2
No. of traverse points 16
Filter type: SS

Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Post test: 0 cfm at 12 in. Hg. (vac) ☒

Run VOIDED

Particulate Catch Data:

No. of filters used:
SS#35

Recovery solvent(s)
☒ acetone
☐ other(s)

No. of probe wash bottles: 1
Sample recovered by: DM

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2			297
Impinger No. 3			
Condenser			
Desiccant	1405	1385	20
Total	▨	▨	317

Integrated Gas Sampling Data:

Bag Pump No. 294
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: 0
Time start: 2031 (HRS)
Sampling rate: 400 cc cc/min
Box No. 30 Bag No. 2
Size: 44 L
cc/min at 15 in. Hg.
Time end: 2136 (HRS)
Operator: DM

S/N of O_2 Analyzer used to monitor train outlet: 5

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INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job LP / Hayward
Source Line 1 Core Dryer ~~[illegible]~~ RTO Inlet
Date 7-14-84 Test 15 Run 2

Operators DM + JJ
Meter Box No. 2 ΔH@ 1.22 in WC
Gasmeter coeff. .9924

Pitot No. 230-6 Cp .84
Bar. Press. 28.83 in Hg H2O 22 %
Nozzle No. ~~[illegible]~~ 8-4 Nozzle Dia .243 in.

Traverse Point No.	Sampling Time (min)	Sample* Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Dev. Vol. (cf)	VAC. inHg	Temperatures (°F) Stack	Probe	Oven	Impg.	Gas/In	Gas/Out	Oxygen (%v/v)
	2030	397.10											
B 8	4	400.31	1.50	1.92	0.32	7	251	240		43	81	78	17.5
7	8	403.59	1.60	2.10	3.74	9	247	241		43	85	78	17.5
6	12	406.84	1.40	1.84	6.89	10	248	239		43	85	78	17.2
5	16	409.85	1.20	1.58	9.82	9	248	245		44	87	77	17.4
4	20	412.58	1.10	1.44	2.62	9	250	245		45	88	77	17.0
3	24	415.30	1.05	1.38	5.36	9	247	243		44	89	77	17.0
2	28	417.94	1.00	1.32	8.09	9	246	250		46	90	77	17.1
1	32	420.67	.96	1.27	0.68	9	245	250		46	82	77	16.5
A 8	36	423.78	1.50	1.98	3.95	13	245	245		46	82	77	17.0
7	40	426.90	1.30	1.71	7.00	14	248	251		47	88	78	16.6
6	44	429.95	1.30	1.71	0.05	14	250	250		46	87	77	16.6
5	48	433.02	1.35	1.77	3.15	15	249	247		46	86	77	16.4
4	52	436.00	1.10	1.45	5.96	15	247	245		48	85	77	16.4
3	56	438.95	1.20	1.58	8.88	15	246	245		49	84	78	16.5
2	60	441.89	1.20	1.57	1.80	16	249	250		48	83	77	16.6
1	64	444.86	1.20	1.57	4.71	16	250	255		49	83	77	15.9
	(2132)												
avg	θ = 64	Vm = 47.76		ΔH = 1.64							Avg. = 86.5		

Run VOIDED

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job LP / Hayward
Source Line 1 Core Dryer RTO Inlet
Method 5 Filter holder: SS

Date 2-14-94 Test 15 Run 3
No. of traverse points 16
Filter type: SS

Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Post test: 0 cfm at 17 in. Hg. (vac) ~~☐~~

Particulate Catch Data:

No. of filters used:
SS# 38

Recovery solvent(s)
☒ acetone
☐ other(s)

No. of probe wash bottles: 1
Sample recovered by: DM

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1	1144	800	344
Impinger No. 2			
Impinger No. 3			
Condenser			
Desiccant	1526	1510	16
Total	▒		360

Integrated Gas Sampling Data:

Bag Pump No. 29A
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: 0 cc/min at 15 in. Hg.
Time start: 2251 (HRS)
Sampling rate: 400 cc cc/min

Box No. 30 Bag No. 3
Size: 44 L
Time end: 2351 (HRS)
Operator: DM

S/N of O₂ Analyzer used to monitor train outlet: 5

705
539

123093-G:\STACK\WP\METHODS\S-0046RR

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job LP / Hayward
Source Line [illegible] Core Dryer RTO Inlet
Date 3-14-94 Test 15 Run 3

Operators DM & SS
Meter Box No. 2 ΔH@ 1.22 in WC
Gasmeter coeff. .9924

Pitot No. 230-6 Cp .840
Bar. Press. 28.85 in Hg H2O [illegible] %
Nozzle No. 2-4 Nozzle Dia .243 in.

Traverse Point No.	Sampling Time (min)	Sample* Volume (cf)	Velocity Head (in H2O)	Orifice Meter (in H2O)	Dev. Vol. (cf)	VAC. in Hg	Temperatures (°F) Stack	Probe	Oven	Impg.	Gas/In	Gas/Out	Oxygen (%v/v)
	2230	445.30											
8	4	448.53	1.60	2.16	8.73	8	249	240		43	74	78	16.3
7	8	451.69	1.40	1.85	1.89	9	250	242		43	80	77	16.2
6	13	454.78	1.40	1.84	5.04	10	255	250		44	84	77	16.1
5	16	457.77	1.20	1.59	7.97	10	255	250		44	86	76	16.7
4	20	460.75	1.10	1.46	0.75	11	253	247		44	88	76	16.2
3	24	463.67	1.20	1.60	3.73	11	250	251		45	88	76	16.2
2	28	466.62	1.10	1.47	6.56	11	251	247		44	88	76	16.3
1	32	469.60	1.20	1.60	9.50	12	250	255		46	87	76	17.1
8	36	472.77	1.50	2.00	2.80	14	250	257		46	86	76	16.8
7	40	475.55	1.40	1.87	5.97	16	250	248		45	84	75	16.4
6	44	479.15	1.40	1.85	9.14	17	253	251		45	83	75	16.7
5	48	482.23	1.20	1.59	2.06	17	253	250		45	81	75	16.7
4	52	485.18	1.10	1.46	4.87	15	251	255		44	79	74	17.0
3	56	488.01	1.10	1.45	7.66	15	251	254		44	79	75	16.7
2	60	490.73	1.10	1.46	0.46	13	247	247		45	74	74	16.5
1	64	493.50	1.05	1.37	3.17	14	254	248		46	77	71	17.0
	(2400)												
	θ = 64	Vm = 48.20		ΔH = 1.66							Avg. = 78.9		

C-36

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job LP / Hayward
Source Line 1 Conv Dryer RTO Inlet
Method 5 Filter holder: 33
Date 7-14-94 Test 15 Run 4
No. of traverse points 16
Filter type: SS

Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Post test: ≤0.02 cfm at 15 in. Hg. (vac) ☒

Particulate Catch Data:

No. of filters used:
SS #33

Recovery solvent(s)
☒ acetone
☐ other(s)

No. of probe wash bottles: 1
Sample recovered by: DM

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1	[illegible]	502	[illegible]
Impinger No. 2	1148		346
Impinger No. 3			
Condenser			
Desiccant	1378	1360	18
Total	▨	▨	[illegible] 364

Integrated Gas Sampling Data:

Bag Pump No. 29A
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: 0
Time start: [illegible] 0048
Sampling rate: 400
Box No. 25 Bag No. [illegible] 1
Size: 44 L
cc/min at 15 in. Hg.
(HRS) Time end: 0151 (HRS)
cc/min Operator: DM

S/N of O_2 Analyzer used to monitor train outlet: 5

692 503
501 300

LF-011

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job LP/Hayward
Source Line 1 Core Dryer RTO Inlet
Date 7-15-92 Test 15 Run 2

Operators D.M & TS
Meter Box No. 2 ΔH@ 1.77 in WC
Gasmeter coeff. .9924

Pitot No. 230-6 Cp .840
Bar. Press. 29.52 inHg H2O 3.2 %
Nozzle No. 5-4 Nozzle Dia .243 in.

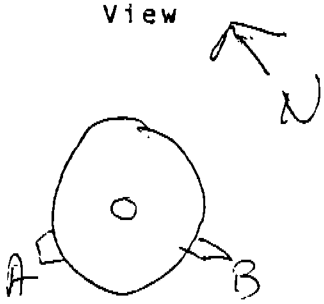
Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Dev. Vol. (cf)	VAC. inHg	Temperatures (°F) Stack	Probe	Oven	Impg.	Gas/In	Gas/Out	Oxygen (%v/v)
	(0049)	(494.20)											
8	4	497.28	1.40	1.78	7.30	7	250	241		43	72	70	17.9
7	8	500.30	1.30	1.69	0.25	7	248	242		43	72	70	17.8
6	12	503.27	1.40	1.76	3.31	7	249	243		43	77	69	17.3
5	16	506.27	1.35	1.70	6.22	8	251	252		44	81	70	17.6
4	20	509.06	1.05	1.33	9.00	7	250	255		44	83	70	17.4
3	24	511.66	1.0	1.27	1.61	7	249	241		45	84	70	17.7
2	28	514.20	.98	1.25	4.21	7	248	239		45	84	70	17.5
1	32	517.26	.98	1.25	6.80	7	249	251		44	84	71	18.0
8	36	520.29	1.50	1.90	0.00	9	250	255		43	84	71	17.8
7	40	523.52	1.60	2.04	3.31	11	249	247		43	84	71	17.7
6	44	526.75	1.50	1.91	6.51	11	252	250		45	85	72	18.1
5	48	529.97	1.40	1.78	9.61	11	250	257		47	85	72	17.4
4	52	532.90	1.30	1.66	2.59	10	250	261		47	84	72	17.7
3	56	536.00	1.50	1.91	5.80	11	245	257		48	83	72	17.9
2	60	539.14	1.35	1.72	8.84	11	249	255		48	82	73	17.4
1	64	542.19	1.30	1.65	1.83	11	250	250		48	82	73	17.4
	(0151)												
	θ =	Vm = 47.99		ΔH = 1.66							Avg. = 76.4		

S-0037R

INTERPOLL LABORATORIES - EPA METHOD 2 FIELD DATA SHEET

Job LP/ HAYWARD
Source Line 1 Surface Dryer RTO Duct
Test 16 Run 1 Date 7-15-94
Stack dimen. 42.0 IN.
Dry bulb 269 °F Wet bulb 55 °F
Manometer: ☐ Reg. ☐ Exp. ☒ Elec.
Barometric pressure 28.57 in Hg
Static pressure -10.80 in WC
Operators B Achenbach J Johnson
Pitot No. 270-6 C_p .84

Cross-section View



Elevation View

Drawing of Test Site

Traverse Point No.		Fraction of Diameter	Distance from Stack Wall (in)	Distance from End of Port (in)	Velocity Pressure (in WC)	Temperature of gas (°F)
			Port length: 8 in.		Time start: 1000 hrs	
A	1				1.50	
	2				1.32	
	3				1.47	
	4				1.24	
	5				1.42	
	6				1.58	
	7				1.82	
	8				1.50	
B	1				1.27	
	2				1.38	
	3				1.34	
	4				1.50	
	5				1.67	
	6				2.21	
	7				1.85	
	8				1.12	
Temp. meas. device & S/N: DDT 32					Time end: 1010 hrs	

C-39

R or nothing = reg. manometer; S= expanded; E=electronic

S-3921

INTERPOLL LABORATORIES - EPA METHOD 2 FIELD DATA SHEET

Job CP HAYWARD

Source LINE 1 Surface Dryer RTO Inle

Test 16 Run 2 Date 7-15-94

Stack dimen. 42 IN.

Dry bulb 274 °F Wet bulb 162 °F

Manometer: ☐ Reg. ☐ Exp. ☒ Elec.

Barometric pressure 28.87 in Hg

Static pressure -10.48 in WC

Operators B Schuler

Pitot No. 27L-6 Cp .86

Cross-section View	Elevation View
SEE Run 1	

Drawing of Test Site

Traverse Point No.		Fraction of Diameter	Distance from Stack Wall (in)	Distance from End of Port (in)	Velocity Pressure (in WC)	Temperature of gas (°F)
			Port length: 8.0 in.		Time start: 1320 hrs	
B	1				1.31	
	2				1.28	
	3				1.36	
	4				1.21	274
	5				1.22	
	6				1.30	
	7				1.50	
	8				1.90	
A	1				1.60	
	2				2.21	
	3				2.07	
	4				1.31	276
	5				1.84	
	6				1.85	
	7				1.73	
	8				1.89	
Temp. meas. device & S/N: DDT 22					Time end: 1330 hrs	

C-40

R or nothing = reg. manometer; S= expanded; E=electronic

S-3921

Test No. 1
Line 2 Dryer RTO Outlet

Results of Volumetric Flow Rate Determination-------Method 2

Date of Determination............	07-12-94
Time of Determination.......(HRS)	752
Barometric pressure.......(IN.HG)	28.71
Pitot tube coefficient...........	.84
Number of sampling ports.........	2
Total number of points...........	16
Shape of duct....................	Round
Stack diameter..............(IN)	81.5
Duct area.................(SQ.FT)	36.23
Direction of flow................	UP
Static pressure...........(IN.WC)	-.61
Avg. gas temp.............(DEG-F)	324
Moisture content..........(% V/V)	21.66
Avg. linear velocity.....(FT/SEC)	59.4
Gas density..............(LB/ACF)	.04490
Molecular weight......(LB/LBMOLE)	29.23
Mass flow of gas..........(LB/HR)	347932
Volumetric flow rate.............	
actual....................(ACFM)	129156
dry standard.............(DSCFM)	65280

Test No. 2
Line 2 Surface Dryer RTO Inlet

Results of Volumetric Flow Rate Determination-------Method 2

Date of Determination............	07-12-94
Time of Determination.......(HRS)	846
Barometric pressure.......(IN.HG)	28.72
Pitot tube coefficient...........	.84
Number of sampling ports.........	2
Total number of points...........	24
Shape of duct....................	Round
Stack diameter...............(IN)	42
Duct area.................(SQ.FT)	9.62
Direction of flow................	UP
Static pressure...........(IN.WC)	-16.3
Avg. gas temp.............(DEG-F)	199
Moisture content..........(% V/V)	20.63
Avg. linear velocity.....(FT/SEC)	94.5
Gas density..............(LB/ACF)	.05148
Molecular weight......(LB/LBMOLE)	29.21
Mass flow of gas..........(LB/HR)	168433
Volumetric flow rate.............	
actual...................(ACFM)	54530
dry standard............(DSCFM)	31896

Test No. 3
Line 2 Core Dryer RTO Inlet

Results of Volumetric Flow Rate Determination-------Method 2

Date of Determination............	07-12-94
Time of Determination.......(HRS)	846
Barometric pressure.......(IN.HG)	28.71
Pitot tube coefficient...........	.84
Number of sampling ports.........	2
Total number of points...........	24
Shape of duct....................	Round
Stack diameter...............(IN)	42
Duct area.................(SQ.FT)	9.62
Direction of flow................	UP
Static pressure...........(IN.WC)	-16.4
Avg. gas temp.............(DEG-F)	235
Moisture content..........(% V/V)	24.15
Avg. linear velocity.....(FT/SEC)	87.7
Gas density..............(LB/ACF)	.04811
Molecular weight......(LB/LBMOLE)	29.24
Mass flow of gas..........(LB/HR)	146123
Volumetric flow rate.............	
actual...................(ACFM)	50626
dry standard............(DSCFM)	26816

Test No. 5
Line 2 Surface Dryer RTO Inlet

Results of Volumetric Flow Rate Determination-------Method 2

Date of Determination	07-12-94
Time of Determination (HRS)	1854
Barometric pressure (IN.HG)	28.72
Pitot tube coefficient	.84
Number of sampling ports	2
Total number of points	24
Shape of duct	Round
Stack diameter (IN)	42
Duct area (SQ.FT)	9.62
Direction of flow	UP
Static pressure (IN.WC)	-17.1
Avg. gas temp (DEG-F)	209
Moisture content (% V/V)	21.36
Avg. linear velocity (FT/SEC)	91.8
Gas density (LB/ACF)	.05039
Molecular weight (LB/LBMOLE)	29.17
Mass flow of gas (LB/HR)	160247
Volumetric flow rate	
actual (ACFM)	53003
dry standard (DSCFM)	30194

Test No. 5
Line 2 Surface Dryer RTO Inlet

Results of Volumetric Flow Rate Determination-------Method 2

Date of Determination............	07-12-94
Time of Determination.......(HRS)	2018
Barometric pressure.......(IN.HG)	28.72
Pitot tube coefficient...........	.84
Number of sampling ports.........	2
Total number of points...........	24
Shape of duct....................	Round
Stack diameter...............(IN)	42
Duct area.................(SQ.FT)	9.62
Direction of flow................	UP
Static pressure...........(IN.WC)	-17.1
Avg. gas temp.............(DEG-F)	210
Moisture content..........(% V/V)	22.63
Avg. linear velocity.....(FT/SEC)	93.1
Gas density..............(LB/ACF)	.05005
Molecular weight......(LB/LBMOLE)	29.17
Mass flow of gas..........(LB/HR)	161380
Volumetric flow rate.............	
actual...................(ACFM)	53741
dry standard...........(DSCFM)	30077

Test No. 5
Line 2 Surface Dryer RTO Inlet

Results of Volumetric Flow Rate Determination-------Method 2

Date of Determination............	07-12-94
Time of Determination.......(HRS)	2100
Barometric pressure.......(IN.HG)	28.72
Pitot tube coefficient...........	.84
Number of sampling ports.........	2
Total number of points...........	24
Shape of duct....................	Round
Stack diameter...............(IN)	42
Duct area.................(SQ.FT)	9.62
Direction of flow................	UP
Static pressure...........(IN.WC)	-16.4
Avg. gas temp............(DEG-F)	211
Moisture content..........(% V/V)	20.00
Avg. linear velocity.....(FT/SEC)	92.1
Gas density.............(LB/ACF)	.05062
Molecular weight......(LB/LBMOLE)	29.17
Mass flow of gas..........(LB/HR)	161416
Volumetric flow rate.............	
actual...................(ACFM)	53147
dry standard............(DSCFM)	30767

Test No. 6
Line 2 Core Dryer RTO Inlet

Results of Volumetric Flow Rate Determination-------Method 2

Date of Determination............	07-12-94
Time of Determination.......(HRS)	1834
Barometric pressure.......(IN.HG)	28.72
Pitot tube coefficient...........	.84
Number of sampling ports.........	2
Total number of points...........	24
Shape of duct....................	Round
Stack diameter...............(IN)	42
Duct area.................(SQ.FT)	9.62
Direction of flow................	UP
Static pressure...........(IN.WC)	-15.4
Avg. gas temp.............(DEG-F)	225
Moisture content..........(% V/V)	24.72
Avg. linear velocity.....(FT/SEC)	85.7
Gas density..............(LB/ACF)	.04893
Molecular weight......(LB/LBMOLE)	29.30
Mass flow of gas..........(LB/HR)	145194
Volumetric flow rate.............	
actual....................(ACFM)	49461
dry standard.............(DSCFM)	26463

Test No. 6
Line 2 Core Dryer RTO Inlet

Results of Volumetric Flow Rate Determination-------Method 2

Date of Determination............	07-12-94
Time of Determination.......(HRS)	2039
Barometric pressure.......(IN.HG)	28.72
Pitot tube coefficient...........	.84
Number of sampling ports.........	2
Total number of points...........	24
Shape of duct....................	Round
Stack diameter..............(IN)	42
Duct area................(SQ.FT)	9.62
Direction of flow................	UP
Static pressure...........(IN.WC)	-15.3
Avg. gas temp.............(DEG-F)	253
Moisture content..........(% V/V)	20.29
Avg. linear velocity.....(FT/SEC)	79.0
Gas density..............(LB/ACF)	.04791
Molecular weight......(LB/LBMOLE)	29.30
Mass flow of gas..........(LB/HR)	131085
Volumetric flow rate.............	
actual...................(ACFM)	45605
dry standard............(DSCFM)	24829

Test No. 6
Line 2 Core Dryer RTO Inlet

Results of Volumetric Flow Rate Determination-------Method 2

Date of Determination............	07-12-94
Time of Determination.......(HRS)	2159
Barometric pressure.......(IN.HG)	28.72
Pitot tube coefficient...........	.84
Number of sampling ports.........	2
Total number of points...........	24
Shape of duct....................	Round
Stack diameter..............(IN)	42
Duct area.................(SQ.FT)	9.62
Direction of flow................	UP
Static pressure...........(IN.WC)	-15.2
Avg. gas temp.............(DEG-F)	239
Moisture content..........(% V/V)	24.92
Avg. linear velocity.....(FT/SEC)	84.4
Gas density..............(LB/ACF)	.04793
Molecular weight......(LB/LBMOLE)	29.30
Mass flow of gas..........(LB/HR)	140084
Volumetric flow rate.............	
actual..................(ACFM)	48710
dry standard...........(DSCFM)	25486

Test No. 11
Line 1 Dryer RTO Outlet

Results of Volumetric Flow Rate Determination-------Method 2

Date of Determination............	07-13-94
Time of Determination.......(HRS)	820
Barometric pressure.......(IN.HG)	28.94
Pitot tube coefficient...........	.84
Number of sampling ports.........	2
Total number of points...........	16
Shape of duct....................	Round
Stack diameter..............(IN)	81.5
Duct area................(SQ.FT)	36.23
Direction of flow................	UP
Static pressure...........(IN.WC)	-.48
Avg. gas temp............(DEG-F)	342
Moisture content..........(% V/V)	23.75
Avg. linear velocity.....(FT/SEC)	49.2
Gas density.............(LB/ACF)	.04403
Molecular weight......(LB/LBMOLE)	29.35
Mass flow of gas..........(LB/HR)	282777
Volumetric flow rate.............	
actual....................(ACFM)	107049
dry standard............(DSCFM)	51914

Test No. 13
Line 1 Surface Dryer RTO Inlet

Results of Volumetric Flow Rate Determination-------Method 2

Date of Determination............	07-14-94
Time of Determination.......(HRS)	1445
Barometric pressure.......(IN.HG)	28.85
Pitot tube coefficient...........	.84
Number of sampling ports.........	2
Total number of points...........	16
Shape of duct....................	Round
Stack diameter...............(IN)	42
Duct area.................(SQ.FT)	9.62
Direction of flow................	UP
Static pressure...........(IN.WC)	-10.2
Avg. gas temp.............(DEG-F)	262
Moisture content..........(% V/V)	26.08
Avg. linear velocity.....(FT/SEC)	85.6
Gas density..............(LB/ACF)	.04707
Molecular weight......(LB/LBMOLE)	29.35
Mass flow of gas..........(LB/HR)	139553
Volumetric flow rate.............	
actual....................(ACFM)	49418
dry standard.............(DSCFM)	25089

Test No. 15
Line 1 Core Dryer RTO Inlet

Results of Volumetric Flow Rate Determination-------Method 2

Date of Determination............	07-14-94
Time of Determination.......(HRS)	1445
Barometric pressure.......(IN.HG)	28.85
Pitot tube coefficient...........	.84
Number of sampling ports.........	2
Total number of points...........	16
Shape of duct....................	Round
Stack diameter...............(IN)	42
Duct area.................(SQ.FT)	9.62
Direction of flow................	UP
Static pressure...........(IN.WC)	-8.399999
Avg. gas temp.............(DEG-F)	247
Moisture content..........(% V/V)	25.82
Avg. linear velocity.....(FT/SEC)	78.4
Gas density..............(LB/ACF)	.04835
Molecular weight......(LB/LBMOLE)	29.35
Mass flow of gas..........(LB/HR)	131248
Volumetric flow rate.............	
actual...................(ACFM)	45242
dry standard............(DSCFM)	23650

Test No. 16
Line 1 Surface Dryer RTO Inlet

Results of Volumetric Flow Rate Determination-------Method 2

Date of Determination............	07-15-94
Time of Determination.......(HRS)	1000
Barometric pressure.......(IN.HG)	28.87
Pitot tube coefficient...........	.84
Number of sampling ports.........	2
Total number of points...........	16
Shape of duct....................	Round
Stack diameter...............(IN)	42
Duct area.................(SQ.FT)	9.62
Direction of flow................	UP
Static pressure...........(IN.WC)	-10.8
Avg. gas temp.............(DEG-F)	269
Moisture content..........(% V/V)	26.34
Avg. linear velocity.....(FT/SEC)	87.4
Gas density..............(LB/ACF)	.04646
Molecular weight......(LB/LBMOLE)	29.30
Mass flow of gas..........(LB/HR)	140623
Volumetric flow rate.............	
actual...................(ACFM)	50441
dry standard............(DSCFM)	25252

Test No. 16
Line 1 Surface Dryer RTO Inlet

Results of Volumetric Flow Rate Determination-------Method 2

Date of Determination............	07-15-94
Time of Determination.......(HRS)	1320
Barometric pressure.......(IN.HG)	28.87
Pitot tube coefficient...........	.84
Number of sampling ports.........	2
Total number of points...........	16
Shape of duct....................	Round
Stack diameter...............(IN)	42
Duct area.................(SQ.FT)	9.62
Direction of flow................	UP
Static pressure...........(IN.WC)	-10.48
Avg. gas temp.............(DEG-F)	275
Moisture content..........(% V/V)	31.96
Avg. linear velocity.....(FT/SEC)	91.2
Gas density..............(LB/ACF)	.04501
Molecular weight......(LB/LBMOLE)	29.30
Mass flow of gas..........(LB/HR)	142135
Volumetric flow rate.............	
actual...................(ACFM)	52629
dry standard............(DSCFM)	24160

Test No. 16
Line 1 Surface Dryer RTO Inlet

Results of Volumetric Flow Rate Determination-------Method 2

Date of Determination	07-15-94
Time of Determination (HRS)	1340
Barometric pressure (IN.HG)	28.87
Pitot tube coefficient	.84
Number of sampling ports	2
Total number of points	16
Shape of duct	Round
Stack diameter (IN)	42
Duct area (SQ.FT)	9.62
Direction of flow	UP
Static pressure (IN.WC)	-8.3
Avg. gas temp (DEG-F)	272
Moisture content (% V/V)	25.20
Avg. linear velocity (FT/SEC)	84.0
Gas density (LB/ACF)	.04681
Molecular weight (LB/LBMOLE)	29.30
Mass flow of gas (LB/HR)	136212
Volumetric flow rate	
actual (ACFM)	48502
dry standard (DSCFM)	24718

Test No. 18
Line 1 Core Dryer RTO Inlet

Results of Volumetric Flow Rate Determination-------Method 2

Date of Determination............	07-15-94
Time of Determination.......(HRS)	1010
Barometric pressure.......(IN.HG)	28.87
Pitot tube coefficient...........	.84
Number of sampling ports.........	2
Total number of points...........	16
Shape of duct....................	Round
Stack diameter..............(IN)	42
Duct area................(SQ.FT)	9.62
Direction of flow................	UP
Static pressure...........(IN.WC)	-7.21
Avg. gas temp.............(DEG-F)	234
Moisture content..........(% V/V)	21.02
Avg. linear velocity.....(FT/SEC)	77.4
Gas density..............(LB/ACF)	.05045
Molecular weight......(LB/LBMOLE)	29.34
Mass flow of gas..........(LB/HR)	135271
Volumetric flow rate.............	
actual...................(ACFM)	44691
dry standard...........(DSCFM)	25437

Test No. 18
Line 1 Core Dryer RTO Inlet

Results of Volumetric Flow Rate Determination-------Method 2

Date of Determination............	07-15-94
Time of Determination.......(HRS)	1330
Barometric pressure.......(IN.HG)	28.87
Pitot tube coefficient...........	.84
Number of sampling ports.........	2
Total number of points...........	16
Shape of duct....................	Round
Stack diameter...............(IN)	42
Duct area.................(SQ.FT)	9.62
Direction of flow................	UP
Static pressure...........(IN.WC)	-8.82
Avg. gas temp.............(DEG-F)	252
Moisture content..........(% V/V)	18.51
Avg. linear velocity.....(FT/SEC)	80.6
Gas density..............(LB/ACF)	.04948
Molecular weight......(LB/LBMOLE)	29.34
Mass flow of gas..........(LB/HR)	138086
Volumetric flow rate.............	
actual...................(ACFM)	46510
dry standard............(DSCFM)	26512

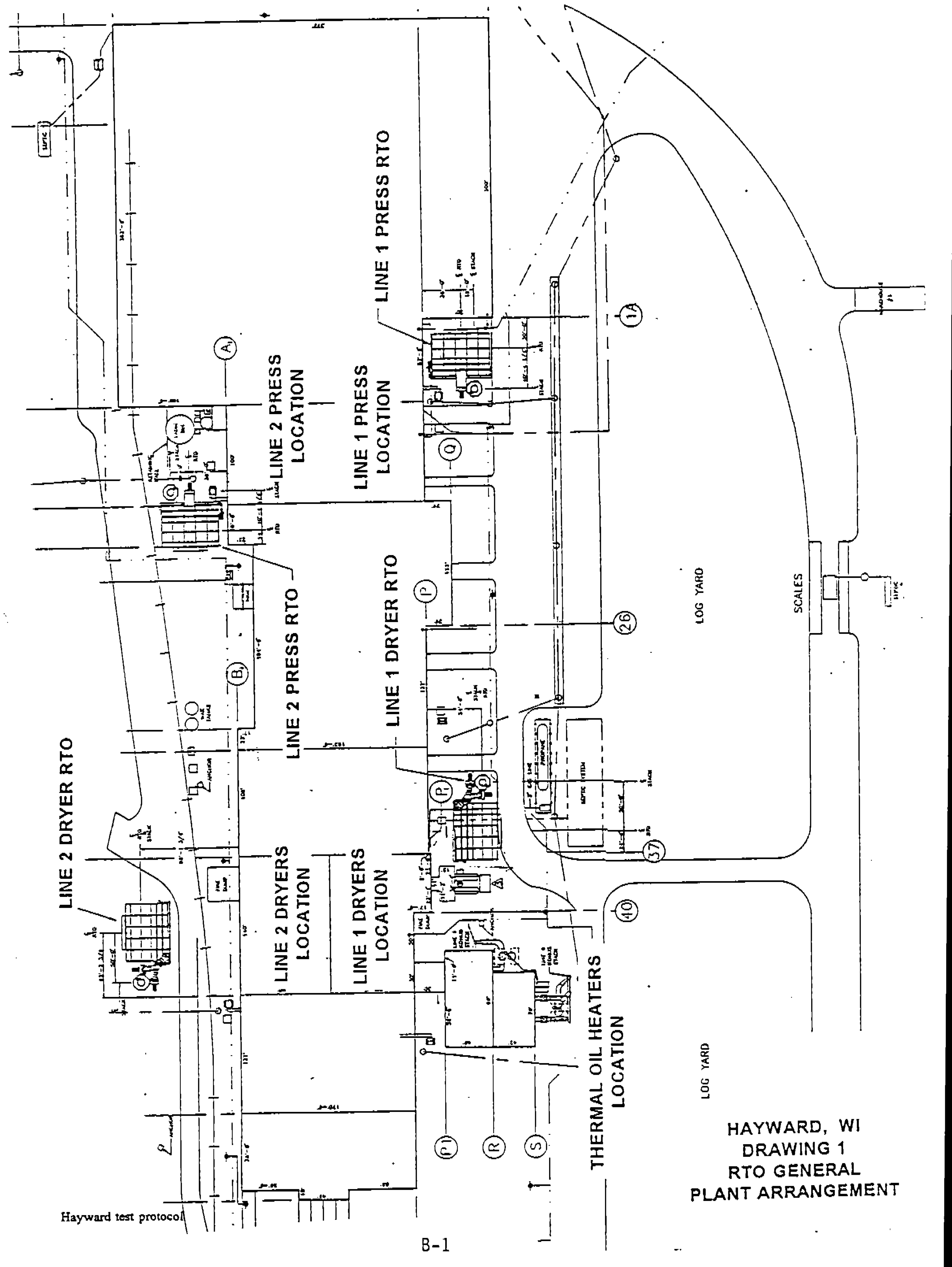
Test No. 18
Line 1 Core Dryer RTO Inlet

Results of Volumetric Flow Rate Determination-------Method 2

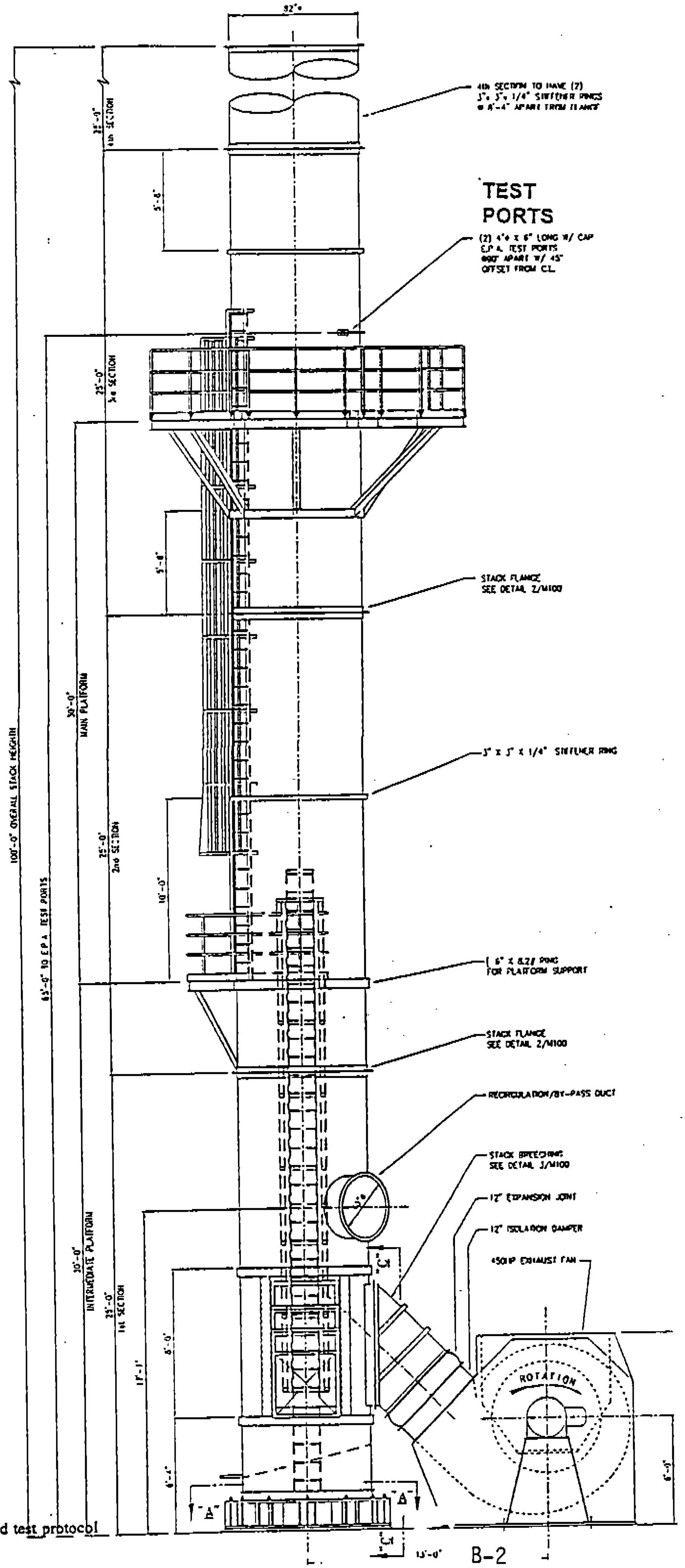
Date of Determination............	07-15-94
Time of Determination.......(HRS)	1350
Barometric pressure.......(IN.HG)	28.87
Pitot tube coefficient...........	.84
Number of sampling ports.........	2
Total number of points...........	16
Shape of duct....................	Round
Stack diameter...............(IN)	42
Duct area.................(SQ.FT)	9.62
Direction of flow................	UP
Static pressure...........(IN.WC)	-9.58
Avg. gas temp.............(DEG-F)	260
Moisture content..........(% V/V)	18.91
Avg. linear velocity.....(FT/SEC)	90.2
Gas density..............(LB/ACF)	.04875
Molecular weight......(LB/LBMOLE)	29.34
Mass flow of gas..........(LB/HR)	152244
Volumetric flow rate.............	
actual...................(ACFM)	52046
dry standard............(DSCFM)	29134

APPENDIX B

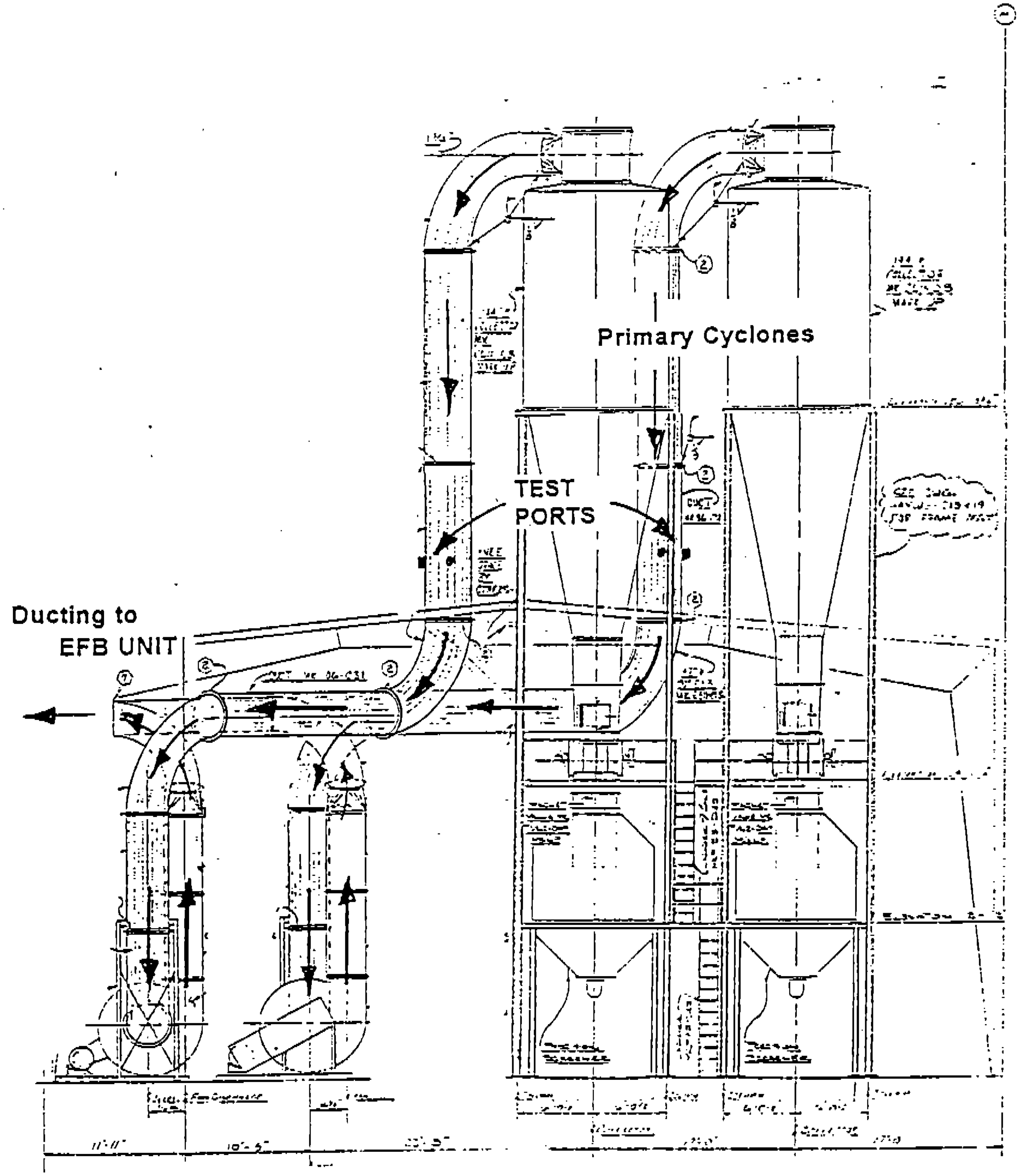
LOCATION OF TEST PORTS



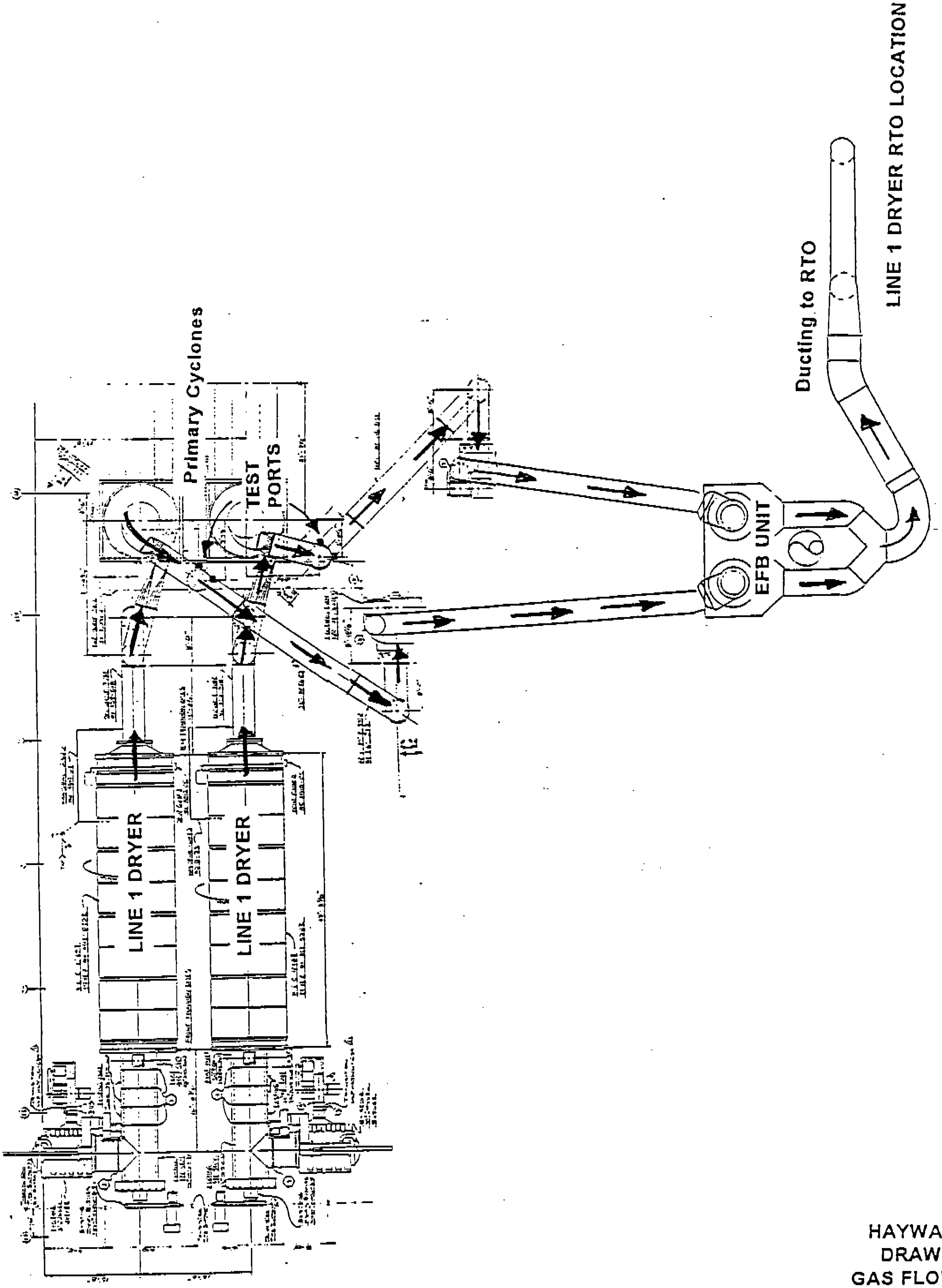
HAYWARD, WI
DRAWING 1
RTO GENERAL
PLANT ARRANGEMENT



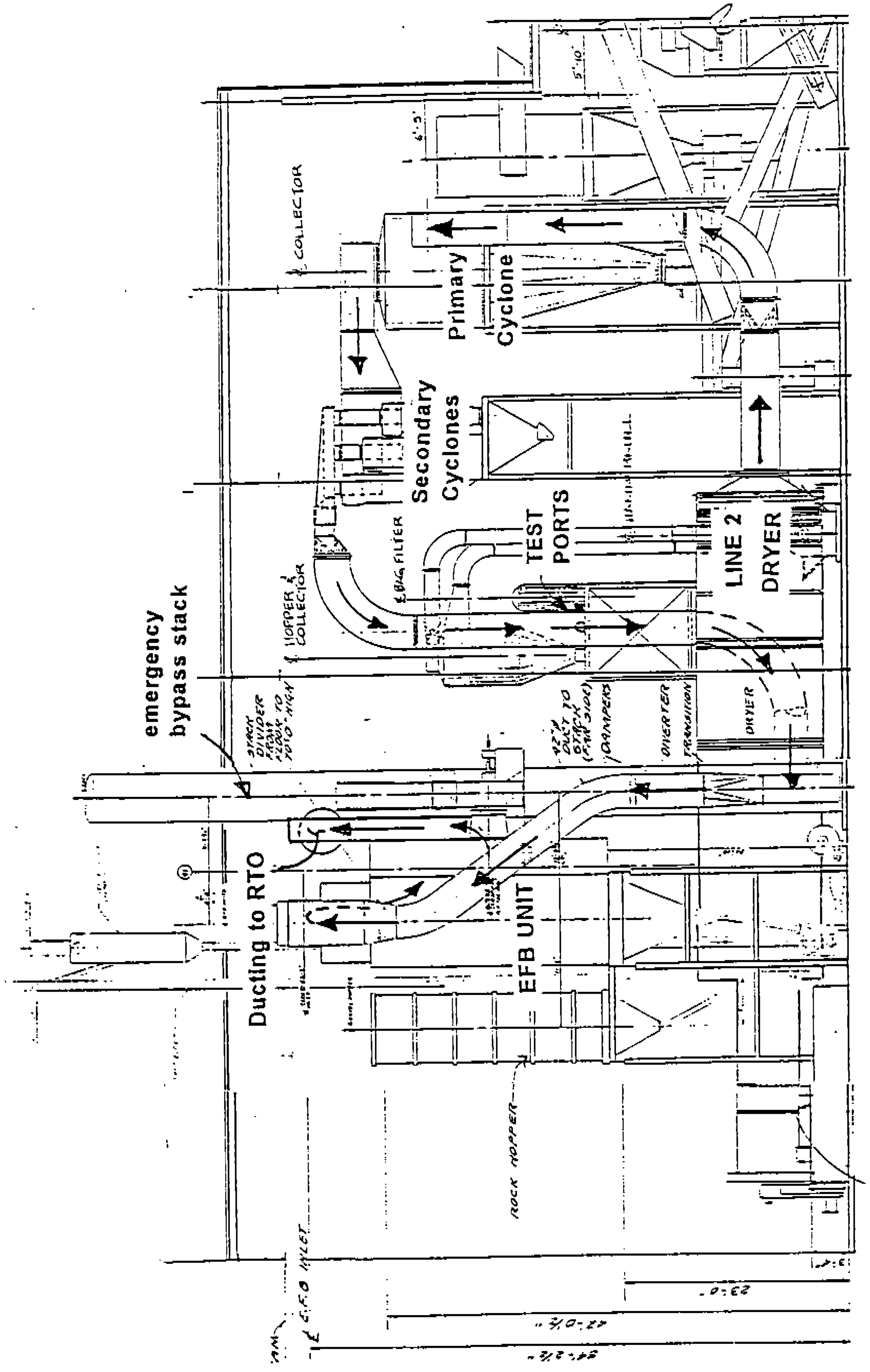
HAYWARD, WI
DRAWING 2
DRYER RTO STACK
(TYPICAL FOR BOTH LINES)
ELEVATION



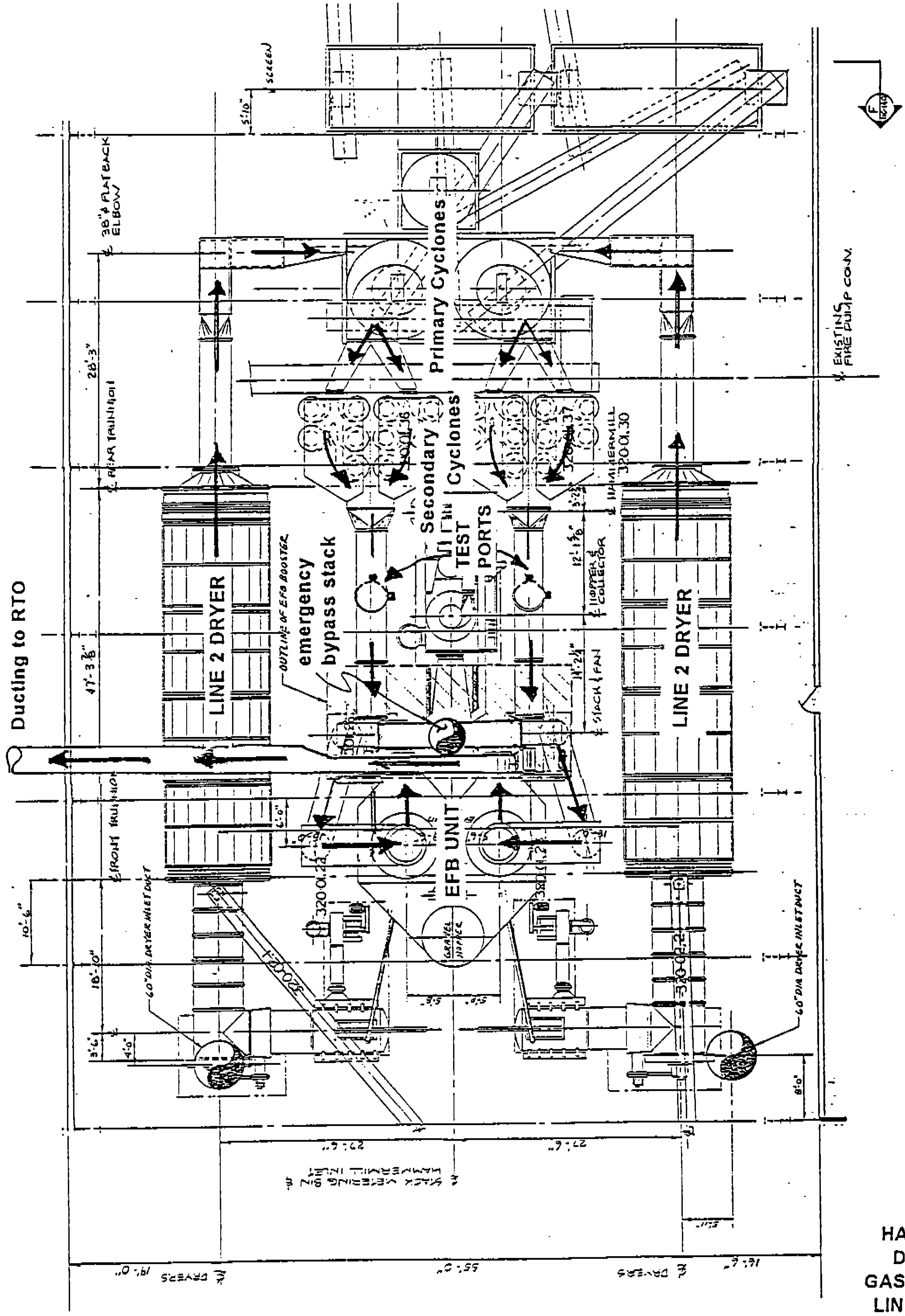
**HAYWARD, WI
DRAWING 3
GAS FLOW FROM
LINE 1 DRYERS
TO RTO
ELEVATION**



HAYWARD,
DRAWING 4
GAS FLOW FROM
LINE 1 DRYERS
TO RTO
PLAN



HAYWARD, WI
DRAWING 5
GAS FLOW FROM
LINE 1 DRYERS
TO RTO
ELEVATION



HAYWARD
DRAWING 6
GAS FLOW FRO
LINE 2 DRYERS
TO RTO
PLAN

APPENDIX C

LINE 1 RTO FIELD DATA SHEETS

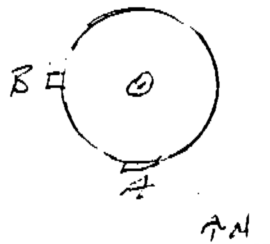
INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 2 Field Data Sheet

Job LP/HAYWARD
Source LINE 1 DRYER RTO - STACK
Test 11 Run 2 Date 7-13-94
Stack Dimen. 81.5 IN.
Dry Bulb 342 °F Wet bulb 154 °F
Manometer ☒ Reg. ☐ Exp ☐ Elec.
Barometric Pressure 28.94 IN.HG
Static Pressure -.48 IN.WC
Operators E. TROWBRIDGE T. S
Pitot No. 445-8 C_p .840
CH2O

Drawing of Test Site

Cross-section View | Elevation View



Traverse Point No.	Fraction of Diameter	Distance From Stack Wall (IN.)	Distance From End of Port (IN.)	Velocity	Temp. of Gas (°F)
▨		Port Length: 6.25 IN.		Time Start: 0820 HRS	
A 1	.032	2.61	8.85	.40	
2	.105	8.56	14.80	.55	
3	.194	15.81	22.06	.60	
4	.323	26.32	32.51	.59	342
5	.677	55.17	61.42	.61	
6	.806	65.68	71.93	.60	
7	.895	72.94	79.19	.57	
8	.968	78.89	85.14	.55	
B 1				.30	
2				.25	
3				.28	
4				.40	342
5				.40	
6				.43	
7				.42	
8				.41	
Temp. Meas. Device & S/N: PDT-38				Time End: 0833 HRS	

R or nothing = reg. manometer; S = expanded; E = electronic

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INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job LP/HAYWARD
Source LINE 1 DRYER RTO-STACK
Method S0011 Filter holder: NA

Date 7-13-94 Test 11 Run 1
No. of traverse points 16
Filter type: N.A

Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Post test: 0 cfm at 7 in. Hg. (vac) ☒

Particulate Catch Data:

No. of filters used: N/A

Recovery solvent(s)
☐acetone
☒other(s) $MeCl_2$

No. of probe wash bottles: 1
Sample recovered by: ET

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2	527	{200}	327
Impinger No. 3			
Condenser			
Desiccant	1504	1468	36
Total	▨		363

Integrated Gas Sampling Data:

Bag Pump No. 23B
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: 0
Time start: 1201
Sampling rate: 400

Box No. 6 Bag No. 1
Size: 44 L
cc/min at 15 in. Hg.
(HRS) Time end: 1306 (HRS)
cc/min Operator: ET

S/N of O_2 Analyzer used to monitor train outlet: 3

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INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job LP/Hayward
Source Lines Dryer RTO Stack
Date 7-13-94 Test II Run 1

Operators ET-JS
Meter Box No. 4 ^H@ 1.84 IN WC
Gasmeter coeff. .9962

Pitot No. 9AB-S Cp .84
Bar. Press. 28.94 inHg H2O ____ %
Nozzle No. 4(25-5 Nozzle Dia .303 IN.

Traverse Point No.		Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Des. Vol. (cf)	VAC. inHg	Temperatures (°F) Stack	Probe	Oven	Impg.	Gas/In	Gas/Out	Oxygen (%v/v)
		0.00	197.90											
B	8	4	201.60	.65	2.77	1.62	6	335	228	248	45	71	70	16.8
	7	8	205.40	.70	2.90	5.40	7	353	230	251	45	74	71	16.8
	6	12	209.15	.68	2.90	9.20	7	332	230	253	45	76	71	16.9
	5	16	212.80	.66	2.85	2.91	7	323	228	249	42	77	72	17.0
	4	20	216.40	.58	2.49	6.49	6	331	229	251	42	80	73	17.0
	3	24	219.90	.54	2.30	9.89	6	338	230	248	43	81	74	17.4
	2	28	223.15	.50	2.14	3.17	5	336	230	252	43	83	74	16.6
	1	32	226.45	.50	2.15	6.46	5	336	228	250	43	83	75	16.6
A	8	36	229.98	.57	2.45	9.97	6	334	231	252	48	83	75	16.7
	7	40	233.74	.68	2.91	3.80	7	358	233	251	48	86	78	17.0
	6	44	237.60	.68	2.92	7.64	7	341	230	250	48	87	79	17.2
	5	48	241.38	.66	2.82	1.42	7	346	235	255	52	87	79	16.7
	4	52	245.18	.64	2.78	5.17	7	334	233	253	52	87	79	16.5
	3	56	248.90	.62	2.67	8.85	7	339	234	250	51	88	80	16.9
	2	60	252.39	.56	2.40	2.34	6	345	232	249	51	88	80	17.1
	1	64	255.75	.53	2.25	5.72	6	555	230	247	50	89	81	16.7
		(1307)												
		θ = 64	Vm = 57.85		^H = 2.61							Avg. = 79.0		

S-0037R

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job LP/HAYWARD
Source LINE 1 DRYER RTO STACK
Method S001/ Filter holder: NA
Date 7-15-94 Test 11 Run 2
No. of traverse points 16
Filter type: NA

Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Post test: 0 cfm at 7 in. Hg. (vac) ☒

Particulate Catch Data:

No. of filters used: NA

Recovery solvent(s)
☐ acetone
☒ other(s) MeCl2

No. of probe wash bottles: 1
Sample recovered by: ET

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1		100	
Impinger No. 2	554	100	334
Impinger No. 3		0	
Condenser			
Desiccant	1535	1505	30
Total	▨	▨	364

Integrated Gas Sampling Data:

Bag Pump No. 23B
Box No. 6 Bag No. 2
Bag Material: 5-layer Aluminized Tedlar
Size: 44 L
Pretest leak check: 0 cc/min at 15 in. Hg.
Time start: 1428 (HRS) Time end: 1532 (HRS)
Sampling rate: 400 cc/min Operator: ET

S/N of O_2 Analyzer used to monitor train outlet: 3

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INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job LP/HAYWARD
Source LINE 1, DRYR RTO STACK
Date 7-13-00 Test 11 Run 2

Operators ST-TS
Meter Box No. 4 ^H@ 1.87 IN WC
Gasmeter coeff. .9962

Pitot No. 4125-8 Cp .84
Bar. Press. 28.74 inHg H2O X
Nozzle No. GLASS Nozzle Dia .303 IN.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Des. Vol. (cf)	VAC. inHg	Temperatures (°F) Stack	Probe	Oven	Impg.	Gas/In	Gas/Out	Oxygen (%v/v)
	1427	258.60											
A 8	4	261.94	.54	2.15	1.89	5	346	232	248	46	83	78	15.9
7	8	265.40	.58	2.32	5.31	6	344	232	251	46	85	79	15.5
6	12	268.80	.60	2.41	8.80	6	344	235	249	46	88	80	16.2
5	16	272.30	.62	2.51	2.37	6	339	230	252	45	88	81	15.7
4	20	275.75	.58	2.34	5.82	6	343	232	250	45	89	81	15.7
3	24	279.29	.62	2.50	9.39	6	343	230	253	46	89	81	17.4
2	28	282.77	.55	2.24	2.77	6	338	230	251	46	89	82	16.4
1	32	286.04	.52	2.11	6.05	5	339	231	250	46	89	82	18.0
B 8	36	289.65	.60	2.46	9.59	6	332	228	251	51	90	83	17.3
7	40	293.25	.68	2.75	3.34	6.5	342	232	260	51	90	83	16.7
6	44	297.00	.66	2.70	7.05	6.5	335	232	259	52	90	83	16.0
5	48	300.62	.64	2.61	0.70	4	337	229	257	50	90	83	16.7
4	52	304.01	.54	2.20	4.05	6	337	231	254	51	90	83	16.9
3	56	307.31	.52	2.14	7.36	5	332	230	255	51	90	83	16.8
2	60	310.62	.50	2.06	0.60	5	331	228	252	50	91	83	12.1
1	64	313.80	.48	1.98	3.78	5	330	229	250	50	91	83	17.1
	(1533)												
	θ = 64	Vm = 55.20		^H = 2.34							Avg. = 85.3		

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job LP/HAYWARD
Source LN21 DRYER RTO STACK
Method S0011 Filter holder: NA
Date 7-13-94 Test 11 Run 3
No. of traverse points 16
Filter type: NA

Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☑
Post test: 0 cfm at 6 in. Hg. (vac) ☒

Particulate Catch Data:

No. of filters used:
NA

Recovery solvent(s)
☐ acetone
☒ other(s) MeCl2

No. of probe wash bottles: 1
Sample recovered by: ET

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1		100	337
Impinger No. 2		100	
Impinger No. 3		0	
Condenser			
Desiccant	1427	1392	35
Total	▩	▩	372

Integrated Gas Sampling Data:

Bag Pump No. 23B
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: 0 cc/min at 15 in. Hg.
Time start: 1613 (HRS)
Sampling rate: 400 cc/min
Box No. 6 Bag No. 3
Size: 44 L
Time end: 1719 (HRS)
Operator: ET

S/N of O_2 Analyzer used to monitor train outlet: 3

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INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job (P) HAYWARD
Source LINE 1 DRYER RTO-STACK
Date 3-15-94 Test 11 Run 3

Operators ET-TS
Meter Box No. 4 ΔH@ 1.84 IN WC
Gasmeter coeff. .9962

Pitot No. 4/83-3 Cp .84
Bar. Press. 29.74 inHg H2O ___ x
Nozzle No. 4255 Nozzle Dia .33 IN.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Des. Vol. (cf)	VAC. inHg	Temperatures (°F) Stack	Probe	Oven	Impg.	Gas/In	Gas/Out	Oxygen (xv/v)
	1612	314.10											
B 8	4	317.80	.165	2.59	7.73	6	335	231	248	48	81	79	17.3
7	8	321.45	.18	2.70	1.42	6	332	232	253	48	82	79	16.3
6	12	325.17	.70	2.74	5.13	6	344	235	250	49	85	80	16.5
5	16	328.84	.64	2.53	8.71	6	338	235	252	51	84	81	16.5
4	20	332.05	.52	2.05	1.84	6	344	234	251	51	87	81	16.0
3	24	335.25	.50	1.98	5.11	5	340	232	250	52	87	81	16.3
2	28	338.28	.48	1.92	8.24	5	332	230	253	51	88	81	16.6
1	32	341.40	.48	1.92	1.37	5	331	230	251	51	88	82	16.5
A 8	36	344.90	.58	2.31	4.80	6	336	235	248	50	88	82	16.2
7	40	348.40	.62	2.47	9.34	6	337	231	249	51	88	82	16.6
6	44	351.90	.64	2.55	1.94	6	337	233	255	51	88	82	16.1
5	48	355.50	.64	2.55	5.54	6	336	230	253	51	89	83	16.0
4	52	359.06	.60	2.41	9.05	6	331	234	250	50	90	83	16.4
3	56	362.65	.62	2.41	2.40	6	337	231	248	50	90	83	16.3
2	60	366.10	.58	2.33	6.05	6	333	229	247	50	90	83	16.6
1	64	369.35	.52	2.04	9.32	5	332	230	246	50	90	83	15.8
	(1720)												
	θ = 64	Vm = 55.25		ΔH = 2.35							Avg. = 84.4		

INTERPOLL LABORATORIES

Method 18 Field Data Sheet

Job LP/Hayward
Source Line 1 Dryer RTO Stack
Date 7-15-94 Test 12 Run 1

Operator(s) DM + KN
Meter Box No. 25 Meter coef. 1.0078
Barometric Pressure 29.96 in.Hg

Sample Train Leak Check:
Pretest: 0 cc/min at 20 in.Hg
Posttest: 0 cc/min at 15 in.Hg

Trav. Point No.	Samp. Time (min)	Sample Volume (cf)	Sample Rate (cc/min)	VAC. (inHg)	Temperature (oF)		
					Stack	Probe	Gasmeter
	(0922)	(483.200)					
A 3	5	483.401	1000	4	350	240	74
3	10	483.608	1000	4	351	242	74
3	15	483.750	1000	4	353	247	75
3	20	483.929	1000	4	353	245	77
2	25	484.165	1000	4	353	250	79
2	30	484.282	1000	4	352	251	80
2	35	484.462	1000	4	342	241	82
2	40	484.646	1000	4	342	241	84
1	45	484.827	1000	4	342	257	85
1	50	484.990	1000	4	345	255	87
1	55	485.164	1000	4	345	250	88
(1025)	60	485.338	1000	4	345	251	90
	θ= 60	Vm=2.138					tm= 81

VSTD= 2.029

S-476

INTERPOLL LABORATORIES

Method 18 Field Data Sheet

Job LP/Hayward
Source Line 1 Dryer RTO Stack
Date 7-15-94 Test 12 Run 2

Operator(s) DM + KN
Meter Box No. 25 Meter coef. 1.0079
Barometric Pressure 28.86 in.Hg

Sample Train Leak Check:
Pretest: 6 cc/min at 20 in.Hg
Posttest: 0 cc/min at 15 in.Hg

Trav. Point No.	Samp. Time (min)	Sample Volume (cf)	Sample Rate (cc/min)	VAC. (inHg)	Temperature (oF)		
					Stack	Probe	Gasmeter
	(1257)	(485.530)					
0 3	5	485.685	1000	4	357	251	88
3	10	485.839	1000	5	357	249	88
3	15	486.982	1000	6	348	245	88
3	20	486.135	1000	6	348	245	90
2	25	486.285	1000	6	353	250	93
2	30	486.455	1000	6	348	252	94
2	35	486.579	1000	8	348	252	94
2	40	486.744	1000	8	351	248	96
1	45	486.918	1000	7	362	250	96
1	50	487.053	1000	8	363	251	97
1	55	487.215	1000	8	360	248	99
1	60	487.384	1000	8	360	250	100
	θ= 60	Vm= 1.854					tm= 94

(1357)

VSTD = 1.718

S-476

INTERPOLL LABORATORIES

Method 18 Field Data Sheet

Job LP / Hayward
Source Line 1 Dryer RTO Stack
Date 2-15-94 Test 12 Run 3

Operator(s) DM + KN
Meter Box No. 23 Meter coef. 1.0078
Barometric Pressure 28.86 in.Hg

Sample Train Leak Check:
Pretest: 0 cc/min at 20 in.Hg
Posttest: 0 cc/min at 15 in.Hg

Trav. Point No.	Samp. Time (min)	Sample Volume (cf)	Sample Rate (cc/min)	VAC. (inHg)	Temperature (oF)		
					Stack	Probe	Gasmeter
	(1408)	(487.500)					
C 3	5	487.665	1000	4	351	248	104
3	10	487.829	1000	4	366	250	104
3	15	487.990	1000	7	366	250	104
3	20	488.159	1000	7	346	255	105
2	25	488.327	1000	7	348	256	105
2	30	488.491	1000	8	351	247	106
2	35	488.659	1000	8	366	250	106
2	40	488.841	1000	8	351	248	108
1	45	488.991	1000	7	351	248	108
1	50	489.156	1000	7	355	251	108
1	55	489.325	1000	7	357	249	110
1	60	489.477	1000	7	353	255	110
	θ= 60	Vm= 1.977					tm= 106.5

(1508

VSTD = 1.791

S-476

EPA Method 2 Field Data Sheet

ob LP / HAYWARD
ource LDVE 1 Surface Dryer RTO Inlet
est 13 Run 0 Date 7-14-94
tack Dimen. 42 IN.
ry Bulb 262 °F Wet bulb ______ °F
anometer ☒ Reg. ☐ Exp ☐ Elec.
arometric Pressure 28.85 IN.HG
tatic Pressure -10.2 IN.WC
Operators B Aschenbach
Pitot No. 296-5 C_p .84

Drawing of Test Site

Cross-section View	Elevation View

Traverse Point No.	Fraction of Diameter	Distance From Stack Wall (IN.)	Distance From End of Port (IN.)	Velocity	Temp. of Gas (°F)
		Port Length: 8.0	IN.	Time Start: 1445	HRS
A - 8	.032	1.344	9.344	220	
7	.105	4.410	12.410	2.20	
6	.194	8.148	16.148	2.10	
5	.323	13.566	21.566	2.00	
4	.677	28.434	36.434	1.50	262
3	.806	33.852	41.852	1.26	
2	.895	37.590	45.590	.68	
1	.968	40.656	48.656	1.20	
B - 8				2.00	
7				220	
6				1.80	
5				1.50	262
4				1.60	
3				.85	
2				.70	
1				.65	
					Time End: 1500 HRS

Temp. Meas. Device & S/N: TM POT 33

R or nothing = reg. manometer; E = expanded; E = electronic

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job CP / HAYWARD
Source Line 1 Surface Dryer RTO Duct
Method 5 Filter holder: SS
Date 7-14-94 Test 13 Run 1
No. of traverse points 16
Filter type: SS tm 61p

Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Post test: 0 cfm at 26 in. Hg. (vac) ☒

Particulate Catch Data:

No. of filters used:
29; 26; 44; 17 } SS filters (4)

Recovery solvent(s)
☒ acetone
☐ other(s)

No. of probe wash bottles:
Sample recovered by: Bob

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1	446	200	246
Impinger No. 2			
Impinger No. 3			
Condenser			
Desiccant	1473	1442	36
Total	▨	▨	282

Integrated Gas Sampling Data:

Bag Pump No. 29B
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: 0.0 cc/min at
Time start: 1605 (HRS)
Sampling rate: 400 cc/min
Box No. 6 Bag No. 1
Size: 44 L
15 in. Hg.
Time end: 1841 (HRS)
Operator: Bob

S/N of O_2 Analyzer used to monitor train outlet: 6

123093-G:\STACK\WP\METHODS\S-0046RR

INTERPOLL LABORATORIES   METHOD 5 FIELD DATA SHEET

Job CP / HAYWARD
Source Line 1 Scrubber Dryer RTO Exhaust
Date 2-24-94 Test 23 Run 2

Operators SA JS
Meter Box No. 16 ΔH@ 1.77 IN WC
Gasmeter coeff. .9930

Pitot No. 29u-5 Cp .87
Bar. Press. 28.85 inHg H2O 22 %
Nozzle No. 5-3 Nozzle Dia .185 IN.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Dev. Vol. (cf)	VAC. (inHg)	Temperatures (°F) Stack	Probe	Oven	Impg.	Gas/In	Gas/Out	Oxygen (%v/v)
	(1625)	(81.80)											
B-8	4	84.40	2.10	1.48	4.61	9	265	255		48	78	77	16.5
7	8	87.40	2.00	1.44	7.40	8	262				85	78	17.5
6	12	90.12	2.10	1.52	0.29	13	262	253		47	88	78	16.8
5	16	92.89	1.70	1.23	2.89	14	261				89	79	16.7
4	20	95.37	1.50	1.09	5.34	15	261	253		47	89	79	16.9
3	24	97.80	1.50	1.09	2.80	16	260				89	80	16.5
2	28	100.10	1.30	.95	100.09	16	260	250		46	88	80	16.6
1	32	102.37	1.30	.95	2.32	12	259				88	80	16.5
A-8	36	105.16	2.00	1.46	5.26	11	260	251		45	86	81	16.9
7	40	107.72	2.10	1.53	8.10	14	257				92	82	16.6
6	44	110.61	1.80	1.32	0.81	17	259	250		44	92	82	15.8
5	48	113.41	1.70	1.25	3.43	20	260				90	82	16.0
4	52	115.61	1.40	1.02	5.81	6	260	249		45	86	84	16.8
3	56	117.53	1.30	.95	8.10	17	260				84	83	16.6
2	60	120.00	1.15	.83	0.25	20	262	250		45	84	83	17.6
1	64	122.23	1.00	.73	2.25	22	266				84	83	16.6
	(1842)												
	θ = 64	Vm = 40.43		ΔH = 1.18							Avg. 83.8		

S-0037R

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Date 7-19-94 Test 13 Run 2
Job CPI HAYWARD
No. of traverse points 16
Source Line 1 Surface Dryer RTO Duct
Filter type: 4" GFF
Method 5 Filter holder: Glass
Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Post test: 0 cfm at 10 in. Hg. (vac) ☒

RUN VOIDED

Particulate Catch Data:

No. of filters used:
1 (5743)

Recovery solvent(s)
☒ acetone
☐ other(s)

No. of probe wash bottles: 1
Sample recovered by: Bob

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1		200	80
Impinger No. 2	280		
Impinger No. 3			
Condenser	1415	1405	10
Desiccant			
			90
Total	▨	▨	

Integrated Gas Sampling Data:

Bag Pump No. 29B
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: 0.0 cc/min at 15 in. Hg.
Time start: 2030 (HRS)
Sampling rate: 400 cc/min
Box No. 6
Bag No. 2
Size: 44 L
Time end: 2136 (HRS)
Operator: GS

S/N of O₂ Analyzer used to monitor train outlet: 6

123093-G:\STACK\WP\METHODS\S-0046RR

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job CT / HAYWARD
Source Line 1 Surface Dryer RTO Outlet
Date 2-14-94 Test 13 Run 2

Operators WA JS
Meter Box No. 10 ΔH@ 1.77 IN HC
Gas Meter coeff. .9930

Pitot No. 39-5 Cp
Bar. Press. 29.55 inHg H2O %
Nozzle No. 5-3 Nozzle Dia .195 IN.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inHC)	Orifice Meter (inHC)	Dry. Vol. (cf)	VAC. inHg	Temperatures (°F) Stack	Probe	Oven	Impg.	Gas/In	Gas/Out	Oxygen (%v/v)
	(2030)	(122.40)											
A-8	4	125.21	2.00	1.33	5.10	5	261	245	253	45	81	81	19.3
7	8	127.95	2.16	1.39	7.86	5	268				84	80	19.2
6	12	130.42	1.80	1.19	0.42	4	261	248	250	45	88	81	19.4
5	16	132.80	1.56	1.00	2.78	4	268				90	81	19.7
4	20	135.15	1.50	1.00	5.12	4	264	249	251	45	92	81	19.3
3	24	137.48	1.40	.93	7.40	4	265				93	81	19.3
2	28	140.20	1.50	1.06	0.15	4	265	247	253	43	92	82	20.1
1	32	142.20	1.16	.73	2.17	3	265				94	83	20.8
B-8	36	144.85	2.10	1.41	4.96	4	263	250	248	43	94	83	19.3
7	40	147.67	2.00	1.33	7.68	5	268				96	83	18.3
6	44	150.20	1.80	1.26	0.26	5	269	248	251	43	97	83	19.4
5	48	152.78	1.60	1.07	2.70	5	268				97	85	18.9
4	52	155.26	1.55	1.03	5.10	4.5	269	248	249	42	98	85	19.4
3	56	157.60	1.50	1.05	7.47	4	267				98	86	20.2
2	60	159.98	1.60	1.07	9.92	4	268	247	252	41	98	86	20.2
1	64	162.34	1.50	1.00	2.29	4	268				98	86	20.3
	(2136)												
	θ = 64	Vm =		ΔH = 1.0							Avg. = 88		

Run VOIDED

4

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job LP / HAYWARD
Date 2-14-94 Test 13 Run 3
Source Line 1 Surface Vapor DTO DUCT
No. of traverse points 16
Method 5 Filter holder: Glass
Filter type: 4" GFF.

Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Post test: 0 cfm at 15 in. Hg. (vac) ☒

Particulate Catch Data:

No. of filters used: ( )

Recovery solvent(s)
☐acetone
☐other(s)

No. of probe wash bottles:
Sample recovered by: Bob

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2	381	200	181
Impinger No. 3			
Condenser			
Desiccant	1490	1473	17
Total			198

Integrated Gas Sampling Data:

Bag Pump No. 29B
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: 0.0 cc/min at 15 in. Hg.
Time start: 2230 (HRS)
Sampling rate: 400 cc/min

Box No. 6 Bag No. 3
Size: 44 L
Time end: 2400 (HRS)
Operator: Bob

S/N of O_2 Analyzer used to monitor train outlet: 6

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CF-011

INTERPOLL LABORATORIES PA METHOD 5 FIELD DATA SHEET

Job CP / Hayward
Source Cao / Sludge Dryer RTO Outlet
Date 2-14-84 Test 13 Run 3

Operators 64 JS
Meter Box No. 10 ΔH@ 1.72 IN WC
Gasmeter coeff. .9930

Pitot No. 29-5 Cp .84
Bar. Press. 29.85 inHg H2O 25 %
Nozzle No. 5-3 Nozzle Dia .195 IN.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Ovs. Vol. (cf)	VAC. inHg	Temperatures (°F) Stack	Probe	Oven	Impg.	Gas/In	Gas/Out	Oxygen (xv/v)
	(2230)	(163.10)											
B-8	4	165.85	2.00	1.31	5.74	5	272	250	246	42	82	83	17.4
7	8	168.34	1.80	1.20	8.31	5	274				84	82	17.6
6	12	170.93	1.90	1.27	0.95	5	274	248	249	42	87	82	16.5
5	16	173.16	1.30	.87	3.15	4.5	275				89	81	17.1
4	20	175.30	1.30	.87	5.34	4.5	275	250	251	41	90	82	17.6
3	24	177.60	1.40	.94	7.62	5	274				91	82	17.7
2	28	179.72	1.20	.81	9.73	5	275	248	252	40	92	81	17.0
1	32	181.76	1.10	.74	1.76	5	274				92	81	17.6
A-8	36	184.62	2.10	1.41	4.55	6	274	250	249	41	91	81	17.5
7	40	187.22	2.05	1.38	7.31	7	275				93	82	17.4
6	44	189.90	1.90	1.28	9.97	7	273	251	252	40	93	82	17.1
5	48	192.60	1.80	1.22	2.57	7	272				93	82	17.5
4	52	195.23	1.70	1.14	5.09	6.5	275	248	250	41	93	83	18.8
3	56	197.55	1.50	1.01	7.46	6	275				90	83	18.5
2	60	200.50	1.80	1.41	0.55		269	250	249	40	89	83	
1	64	202.60	.95	.74	2.58		270				91	83	
	(2400)												
	θ = 64	Vm =		ΔH = ~~1.10~~ 1.10							Avg. = 86.0		

.30

S-0037R

INTERPOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job CP / HAYWARD
Date 7-14-94 Test 15 Run 4
Source Line 1 Surface RTO Duct
No. of traverse points 16
Method 5 Filter holder: GLASS
Filter type: 4" GFF

Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Postest: 0 cfm at 10 in. Hg. (vac) ☒

Particulate Catch Data:

No.s of filters used: ______ Recovery solvent(s)

☐ acetone ______
☐ other(s) ______

No. of probe wash bottles: ______
Sample recovered by: ______

Condensate Data:

Item	Weight(g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2	437	200	237
Impinger No. 3			
Condenser			
Desiccant	1431	1415	
			16
Total			253

Integrated Gas Sampling Data:

Bag Pump No. 29B Box No. 25 Bag No. 1
Bag Material: 5-layer Aluminized Tedlar Size: 44 L
Pretest leak check: 0.0 cc/min at 15 in. Hg.
Time start: ______ (HRS) Time end: ______ (HRS)
Sampling rate: 400 cc/min Operator: SOB
S/N of O_2 Analyzer used to monitor train outlet: 6

CF-023

S-0046RR

CF-011

INTERPOLL LABORATORIES   A METHOD 5 FIELD DATA SHEET

Job CPI Hayward
Source Line 1 Surface RTO Duct
Date 7-14-94   Test 13   Run 4

Operators BA SS
Meter Box No. 10   ΔH@ 1.77 IN WC
Gasmeter coeff. .9930

Pitot No. 290-5   Cp .84
Bar. Press. 28.85 inHg   H2O 21 %
Nozzle No. 5-3   Nozzle Dia .195 IN.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Dec. Vol. (cf)	VAC. inHg	Temperatures (°F) Stack	Probe	Oven	Impg.	Gas/In	Gas/Out	Oxygen (%v/v)
	(1248)	(204.50)											
A-8	4	207.30	1.90	1.41	7.28	5	265	250	249	42	81	81	17.5
7	8	209.90	1.70	1.25	9.90	5	264				85	80	17.6
6	12	212.45	1.56	1.10	2.37	5	266	249	252	41	87	80	17.2
5	16	214.80	1.45	1.07	4.79	5	268				89	80	17.2
4	20	217.08	1.30	.96	7.09	5	268	247	250	40	90	80	17.1
3	24	219.36	1.30	.96	9.38	5	270				91	80	17.7
2	28	221.76	1.40	1.03	1.77	5	269	249	249	41	91	80	16.6
1	32	224.25	1.50	1.11	4.24	5.5	269				92	80	17.4
B-8	36	226.07	1.70	1.25	6.88	5	269	251	252	40	91	81	17.3
7	40	229.60	2.10	1.55	9.80	5	268				92	81	17.2
6	44	232.30	1.50	1.11	2.28	7	269	250	250	39	92	81	17.0
5	48	234.55	1.30	.96	4.58	6	270				93	82	17.1
4	52	236.85	1.30	.96	6.89	6	269	248	249	40	93	82	17.2
3	56	239.25	1.40	1.03	9.29	6	271				93	82	17.2
2	60	241.53	1.30	.96	1.60	6.5	270	251	248	39	93	82	17.2
1	64	243.87	1.20	.89	3.82	6	267				92	82	17.5
	(0151)												
	θ = 64	Vm =		ΔH = 0.98							Avg. = 81.0		

1.10

C-19

S-0037R

Interpoll Laboratories
(612)786-6020

EPA Method 7 Sample Collection
Field Data Sheet

Job LP Hayward Wis. Date 7/12/04 Bar. Pressure 285 IN.HG.
Test Location Line 1 Fuel Type (Wood) Sample Train No. Green
Flake Dryer RTO Inlet Technician [illegible] Pump No. 27B

No.	Test Run Point	Flask No.	Time (HRS)	Vacuum (IN.HG.)	Flask Temp. (°F)	Leak Rate <0.4 IN.HG./MIN.
1	13-1-1	19	1630	26.3	97	☑ Yes ☐ No
2	13-1-2	20	1645	26.3	97	☑ Yes ☐ No
3	13-1-3	21	1715	26.2	95	☑ Yes ☐ No
4	13-1-4	22	1830	26.1	95	☑ Yes ☐ No
5	13-2-1	23	2035	26.1	77	☑ Yes ☐ No
6	13-2-2	24	2050	26.2	77	☑ Yes ☐ No
7	13-2-3	13	2110	26.3	77	☑ Yes ☐ No
8	13-2-4	14	2125	26.3	72	☑ Yes ☐ No
9	13-3-1	15	2235	26.3	72	☑ Yes ☐ No
10	13-3-2	16	2250	26.2	71	☑ Yes ☐ No
11	13-3-3	17	2310	26.3	70	☑ Yes ☐ No
12	13-3-4	18	2350	26.4	70	☑ Yes ☐ No
13						☐ Yes ☐ No
14						☐ Yes ☐ No
15						☐ Yes ☐ No
16						☐ Yes ☐ No
17						☐ Yes ☐ No
18						☐ Yes ☐ No
19						☐ Yes ☐ No
20						☐ Yes ☐ No
21						☐ Yes ☐ No
22						☐ Yes ☐ No
23						☐ Yes ☐ No
24						☐ Yes ☐ No
25						☐ Yes ☐ No
26						☐ Yes ☐ No
27						☐ Yes ☐ No

S-263R

INTERPOLL LABORATORIES - EPA METHOD 2 FIELD DATA SHEET

Job CP / HAYWARD
Source Line 1 Core Dryer RTO Inlet
Test 16 Run 3 Date 7-15-96
Stack dimen. 42.0 IN.
Dry bulb 224 °F Wet bulb 154 °F
Manometer: ☐ Reg. ☐ Exp. ☑ Elec.
Barometric pressure 28.87 in Hg
Static pressure -8.30 in WC
Operators [illegible] J Johnson
Pitot No. 270-6 Cp .84

Cross-section View

Elevation View

Drawing of Test Site

Traverse Point No.		Fraction of Diameter	Distance from Stack Wall (in)	Distance from End of Port (in)	Velocity Pressure (in WC)	Temperature of gas (°F)
			Port length: 6.0 in.		Time start: hrs	
A	1				1.35	
	2				1.49	
	3				1.62	
	4				1.54	
	5				1.33	272
	6				1.12	
	7				1.26	
	8				1.42	
B	1				1.34	
	2				1.39	
	3				1.20	
	4				1.21	
	5				1.30	
	6				1.59	
	7				1.54	
	8				1.75	

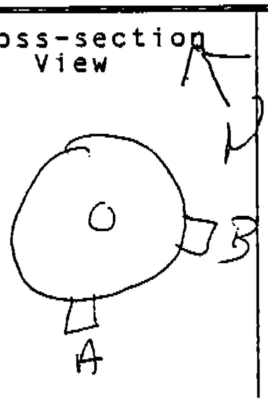
Temp. meas. device & S/N: DDT 32 | Time end: hrs

R or nothing = reg. manometer; S= expanded; E=electronic

INTERPOLL LABORATORIES - EPA METHOD 2 FIELD DATA SHEET

Job LP / HAYWARD
Source CILE / Core Dryer RTO Inlet
Test 18 Run 1 Date 7-15-96
Stack dimen. 42 IN.
Dry bulb 233 °F Wet bulb 146 °F
Manometer: ☐ Reg. ☐ Exp. ☑ Elec.
Barometric pressure 28.57 in Hg
Static pressure -7.21 in WC
Operators B Aschenbach J Johnson
Pitot No. 27U-6 Cp .84

Cross-section View | Elevation View



Drawing of Test Site

Traverse Point No.		Fraction of Diameter	Distance from Stack Wall (in)	Distance from End of Port (in)	Velocity Pressure (in WC)	Temperature of gas (°F)
			Port length: 80 in.		Time start: 1010 hrs	
A	1				1.18	
	2				1.30	
	3				1.50	
	4				1.21	
	5				1.20	233
	6				1.40	
	7				1.20	
	8				1.07	
B	1				1.12	
	2				1.10	
	3				1.22	
	4				1.30	235
	5				1.43	
	6				1.25	
	7				1.33	
	8				1.74	
Temp. meas. device & S/N: POT					Time end: 1020 hrs	

R or nothing = reg. manometer; S= expanded; E=electronic

INTERPOLL LABORATORIES - EPA METHOD 2 FIELD DATA SHEET

Job LP HAYWARD
Source Line 1 Core Dryer RTO Inlet
Test 18 Run 2 Date 2-15-94
Stack dimen. 42.0 IN.
Dry bulb 253 °F Wet bulb 143 °F
Manometer: ☐ Reg. ☐ Exp. ☒ Elec.
Barometric pressure 28.87 in Hg
Static pressure -8.82 in WC
Operators B Aschenbach J Scripter
Pitot No. 276-6 Cp .84

Cross-section View	Elevation View

Drawing of Test Site

Traverse Point No.		Fraction of Diameter	Distance from Stack Wall (in)	Distance from End of Port (in)	Velocity Pressure (in WC)	Temperature of gas (°F)
▨	▨	▨	Port length: in.		Time start: 1330 hrs	
B	1				1.10	
	2				1.54	
	3				1.22	
	4				1.04	251
	5				1.37	
	6				1.65	
	7				1.46	
	8				1.47	
A	1				1.15	
	2				1.35	
	3				1.30	
	4				1.24	253
	5				1.41	
	6				1.28	
	7				1.44	
	8				1.47	
Temp. meas. device & S/N: PDT 32					Time end: 1340 hrs	

R or nothing = reg. manometer; S= expanded; E=electronic

INTERPOLL LABORATORIES - EPA METHOD 2 FIELD DATA SHEET

Job LD / HAYWARD
Source CAVE / Core Dryer RTO INLET
Test 18 Run 3 Date 7-15-94
Stack dimen. 42 IN.
Dry bulb 260 °F Wet bulb 144 °F
Manometer: ☐ Reg. ☐ Exp. ☐ Elec.
Barometric pressure 28.87 in Hg
Static pressure -9.58 in WC
Operators GABEITZUBACH
Pitot No. 27U-6 C_p .84

Cross-section View	Elevation View

Drawing of Test Site

Traverse Point No.		Fraction of Diameter	Distance from Stack Wall (in)	Distance from End of Port (in)	Velocity Pressure (in WC)	Temperature of gas (°F)
			Port length: 80 in.		Time start: hrs	
A	8				1.80	
	7				2.15	
	6				2.02	
	5				1.63	
	4				1.79	
	3				1.63	
	2				1.84	
	1				1.40	
B	8				1.40	
	7				2.20	
	6				2.00	
	5				1.55	
	4				1.66	
	3				1.50	
	2				1.35	
	1				1.12	
Temp. meas. device & S/N: PDT 32					Time end: hrs	

R or nothing = reg. manometer; S= expanded; E=electronic

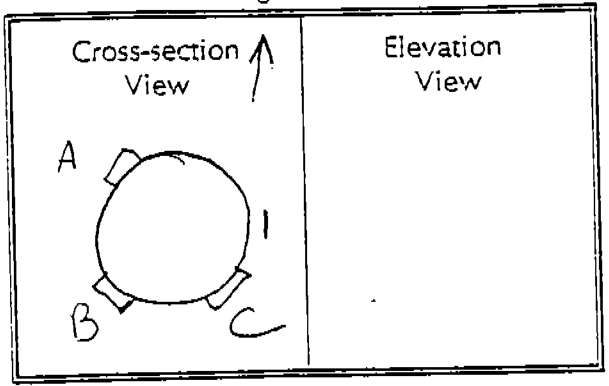
INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 2 Field Data Sheet

Job LP / Hayward
Source Line 1 Dryer RTO Stack
Test 19 Run ___ Date 7-15-94
Stack Dimen. 81.5" IN.
Dry Bulb ______ °F Wet bulb ______ °F
Manometer ☐ Reg. ☐ Exp ☐ Elec.
Barometric Pressure 28.86 IN.HG
Static Pressure ______ IN.WC
Operators DM & KN
Pitot No. ______ C_p ______

Phenol

Drawing of Test Site



Traverse Point No.	Fraction of Diameter	Distance From Stack Wall (IN.)	Distance From End of Port (IN.)	Velocity	Temp. of Gas (°F)
▒▒▒		Port Length:	IN.	Time Start:	HRS
		N/A			
Temp. Meas. Device & S/N:				Time End:	HRS

R or nothing = reg. manometer; S = expanded; E = electronic

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job LP/Hayward
Source Line 1 Dryer RTO Stack
Method Phenol Filter holder: Glass
Date 7-15-94 Test 19 Run 1
No. of traverse points 3
Filter type: 4" GF

Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Post test: ≤0.02 cfm at 10 in. Hg. (vac) ☒

Particulate Catch Data:

No. of filters used: NA

Recovery solvent(s)
☐acetone
☐other(s)

No. of probe wash bottles: 0
Sample recovered by: DM + KN

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1 A	415	269	146
Impinger No. 2 B	421	267	154
Impinger No. 3			
Condenser			
Desiccant	1509	1506	3
Total	▨	▨	303

Integrated Gas Sampling Data: Taken during test 20 Run 1 POM

Bag Pump No.
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check:
Time start: (HRS)
Sampling rate: cc/min
Box No.
Bag No.
Size: 44 L
cc/min at in. Hg.
Time end: (HRS)
Operator:

S/N of O_2 Analyzer used to monitor train outlet: 9

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job LP/Hayward
Source Line 1 Dryer RTO Stack
Date 2-15-94 Test 19 Run 1

Operators DM + KU
Meter Box No. 2 ΔH@ 1.77 IN WC
Gasmeter coeff. 99.74

Pitot No. NA Cp NA
Bar. Press. [illegible] inHg H2O %
Nozzle No. NA Nozzle Dia NA IN.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Dry. Vol. (cf)	VAC. inHg	Temperatures (°F) Stack	Probe	Oven	Impg.	Gas/In	Gas/Out	Oxygen (%v/v)
	(0922)	(551.20)											
A 3	5	554.41	~~1.77~~NA	1.77	NA	7	350	245	251	42	77	68	16.6
3	10	558.76	~~1.77~~	1.77		7	351	247	243	42	84	68	15.8
3	15	562.54	~~1.77~~	1.77		7	353	249	239	42	85	70	18.1
3	20	~~566~~.32	~~1.77~~	1.77		7	353	250	241	43	88	71	17.4
2	25	570.20	~~1.77~~	1.77		7	353	251	248	43	89	72	16.7
2	30	574.04	~~1.77~~	1.77		7	352	249	253	43	91	73	16.5
2	35	577.88		1.77		7	342	251	247	44	91	74	16.2
2	40	581.73		1.77		7	342	247	257	44	92	75	16.9
1	45	585.58		1.77		7	342	251	249	44	92	75	16.7
1	50	589.42		1.77		7	345	255	245	44	93	76	16.3
1	55	593.30		1.77		7	345	257	249	45	93	77	16.6
1	60	597.15		1.77		7	345	251	242	45	93	78	16.1
	(1025)												
	θ = 60	Vm = 45.95		ΔH = 1.77							Avg. = 81		

S-0037R

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job LP/Hayward
Source Line 1 Dryer RTO Stack
Method Phenol Filter holder: NA

Date 2-15-94 Test 19 Run 2
No. of traverse points NA
Filter type: NA

Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Post test: ≤.02 cfm at 15 in. Hg. (vac) ☒

Particulate Catch Data:

No. of filters used: NA

Recovery solvent(s)
☐acetone
☐other(s)

No. of probe wash bottles:
Sample recovered by:

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1 A	424	272	152
Impinger No. 2	422	267	155
Impinger No. 3			
Condenser			
Desiccant	1544	1527	17
Total	▨		324

Integrated Gas Sampling Data: NA

Bag Pump No.
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check:
Time start:
Sampling rate:

Box No. Bag No.
Size: 44 L
cc/min at in. Hg.
(HRS) Time end: (HRS)
cc/min Operator:

S/N of O₂ Analyzer used to monitor train outlet: 9

123093-G:\STACKS\WP\METHODS\S-0046RR

INTERPOLL LABORATORIES   A METHOD 5 FIELD DATA SHEET

Job LP / Hayward
Source Line 1 Dryer RTO Stack
Date 7-15-94 Test 19 Run 2

Operators DM & KN
Meter Box No. 29 ΔH@ 1.22 IN WC
Gas meter coeff. .9974

Pitot No. NA Cp NA
Bar. Press. 28.86 in Hg H2O %
Nozzle No. NA Nozzle Dia NA in.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Dry. Vol. (cf)	VAC. inHg	Temperatures (°F) Stack	Probe	Oven	Impg.	Gas/In	Gas/Out	Oxygen (%v/v)
	(1257)	(597.49)											
B 3	5	601.23	~~1.77~~	1.77	NA	7	357	249	238	43	83	80	16.7
3	10	605.06	NA	1.77		7	357	248	240	43	88	88	16.7
3	15	608.90		1.77		7	348	251	235	43	90	81	16.7
3	20	612.77		1.77		8	348	245	241	40	95	82	16.5
2	25	616.50		1.77		8	353	256	241	40	100	85	15.6
2	30	620.51		1.77		8	348	252	244	40	99	85	15.7
2	35	624.05		1.77		8	348	252	250	42	101	86	15.8
2	40	628.17		1.77		8	351	248	261	42	102	86	15.3
1	45	632.05		1.77		8	362	250	260	43	102	87	15.4
1	50	635.95		1.77		8	362	251	255	44	102	87	15.9
1	55	639.84		1.77		8	360	248	257	44	102	87	16.1
1	60	644.39				8	360	250	260	44	103	88	15.7
	(1352)												
	θ = 60	Vm = 46.90		ΔH = 1.77							Avg. = 91		

S-0037R

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job LP / Hayward
Source Line 1 Dryer RTO Stack
Method Phenol Filter holder: NA
Date 7-15-94 Test 19 Run 3
No. of traverse points NA
Filter type: NA

Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Post test: ≤.02 cfm at 15 in. Hg. (vac) ☒

Particulate Catch Data:

No. of filters used: NA

Recovery solvent(s)
☐acetone
☐other(s)

No. of probe wash bottles:
Sample recovered by:

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1 A	437	270	167
Impinger No. 2 B	364	268	96
Impinger No. 3			
Condenser			
Desiccant	1397	1377	20
Total	▨	▨	283

Integrated Gas Sampling Data: NA

Bag Pump No.
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check:
Time start:
Sampling rate:

Box No. Bag No.
Size: 44 L
cc/min at in. Hg.
(HRS) Time end: (HRS)
cc/min Operator:

S/N of O₂ Analyzer used to monitor train outlet: 9

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job LP / Hayward
Source Line 31 Dryer RTO Stack
Date 7-15-94 Test 19 Run 3

Operators UM + KU
Meter Box No. 2 ΔH@ 1.72 in WC
Gas meter coeff. .9974

Pitot No. NA Cp NA
Bar. Press. 28.86 inHg H2O NA %
Nozzle No. NA Nozzle Dia NA in.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Dsc. Vol. (ml)	VAC. inHg	Temperatures (°F) Stack	Probe	Oven	Impg.	Gas/In	Gas/Out	Oxygen (%v/v)
	(1408)	(644.70)											
C 3	5	648.55	NA	1.77	NA	7	361	248	255	41	98	88	16.3
3	10	652.42		1.77		8	366	250	250	41	102	89	16.1
3	15	656.35		1.77		8	366	250	250	41	104	89	16.1
3	20	660.34		1.77		8	346	255	241	43	105	89	16.1
2	25	664.10		1.77		8	348	256	247	43	107	90	16.5
2	30	668.00		1.77		8	351	247	253	44	108	91	16.1
2	35	671.89		1.77		8	366	250	241	44	108	92	16.5
2	40	675.84		1.77		8	351	248	248	46	110	94	16.5
1	45	679.79		1.77		8	351	248	258	46	111	95	16.6
1	50	683.72		1.77		8	355	251	251	47	112	95	16.9
1	55	687.50		1.77		8	357	249	249	46	112	96	17.1
1	60	691.66		1.77		8	353	255	254	47	110	95	17.0
	(1508)	(46.96)											
	θ = 60	Vm = 46.96		ΔH = 1.77							Avg. = 100		

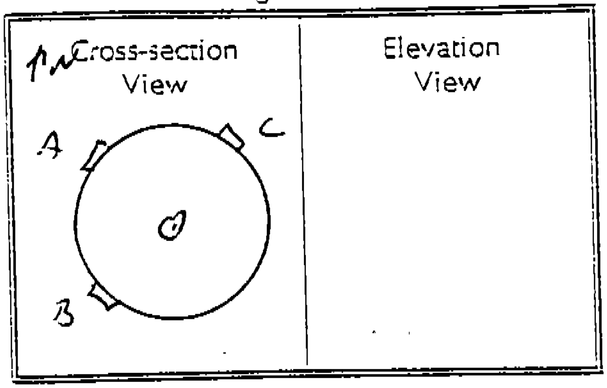
S-0037R

INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 2 Field Data Sheet

Job L.P. / Hayward, WI
Source Line 1 Dryer RTO / Stack
Test 20 Run 0 Date 2-15-94
Stack Dimen. 81.5 IN.
Dry Bulb 350 °F Wet bulb 159 °F
Manometer ☒ Reg. ☐ Exp ☐ Elec.
Barometric Pressure 28.87 IN.HG
Static Pressure -.54 IN.WC
Operators M. Koehler + K. Nuessmeier
Pitot No. 23V-8 C_p .84
PAH's

Drawing of Test Site



Traverse Point No.	Fraction of Diameter	Distance From Stack Wall (IN.)	Distance From End of Port (IN.)	Velocity	Temp. of Gas (°F)
▨		Port Length: 6.25 IN.		Time Start: NA HRS	

Refer to CH_2O Test for pts and flows

Time End: NA HRS

Temp. Meas. Device & S/N: PDT-31 / TC

R or nothing = reg. manometer; S = expanded; E = electronic

INTERPOLL LABORATORIES EPA MODIFIED METHOD 5 SAMPLE LOG SHEET

Job L.P. / Hayward, WI
Source Line 1 Dryer RTO / Stack
Cyclone: ☐ Yes ☒ No Filter holder: MM5
Analytes: PCM
Field recovery spike added: ☑ Yes ☐ No

Date 7-15-94 Test 20 Run 1
No. of traverse points 16 x 2
Filter type: 4" Glass fiber
XAD-2 resin: ___ g Batch No. ___
Reference: EPA SW-846 Method 0010

Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Postest: <0.02 cfm at 7 in. Hg. (vac) ☒

Semivolatile Catch Data:

No.s of filters used: 3006

Recovery solvent(s)
☒ MeCl2 * ~~MeOH (50:50 v/v)~~
☒ other(s) Acetone

No. of bottles for condensate trap catch: 1
Samples recovered by: M. Koehler

Condensate Data:

Item	Weight(g)		
	Final	Tare	Difference
Condensate trap	699	266	423
Condensate trap			
Condensate trap			
Impingers			
Desiccant	1460	1440	20
Total	▨	▨	443

Integrated Gas Sampling Data:

Bag Pump No. 23B Box No. 12 Bag No. 1
Bag Material: 4-layer Aluminized Tedlar Size: 44 L
Pretest leak check: 0 cc/min at 15 in. Hg.
Time start: 0900 (HRS) Time end: 1014 (HRS)
Sampling rate: 200 cc/min O2 Analyzer S/N: 3

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INTERPOLL LABORATORIES EPA MODIFIED METHOD 5 FIELD DATA SHEET

Job L.P. / Hayward, W.
Source Line 1 Dryer RTO / Stack
Date 2-15-94 Test 20 Run 1

Operators M. Kuehler + K. Nuessmeier
Meter Box No. 4
Gasmeter coeff. .9962

Nozzle No. 80-4
Nozzle Dia. .237 in.
Bar. Pres. 28.87 in. Hg

Pitot No. 23V-8
Cp .84
H_2O 21 %

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Gas. Vol. (cf)	VAC. inHg	Temperatures (°F) Stack	Probe	Oven	XAD2	Imp.	Meter (In/Out)		Oxygen (%v/v)
	0800	533.90												
A-8	4	535.94	.59	.85	5.96	5.5	341	233	239	49	49	68	67	16.9
8	9	538.06	.62	.88	9.05	5.5	353	247	242	49	48	70	67	16.8
7	11	540.18	.63	.89	0.16	5.5	351	245	238	48	48	73	68	16.9
7	16	542.34	.68	.97	2.36	6	352	248	242	48	48	75	68	17.3
6	20	544.50	.67	.95	4.54	6	356	243	243	48	48	76	68	16.7
6	24	546.74	.70	1.00	6.77	6.5	355	240	247	47	47	75	69	16.0
5	28	549.00	.69	.99	9.00	6.5	351	244	249	47	47	77	71	16.4
4	32	551.15	.63	.90	1.13	6	354	241	243	47	46	80	74	16.7
4	36	553.13	.57	.82	3.17	6	353	244	240	47	46	83	75	16.6
4	40	555.24	.60	.86	5.26	6	355	242	242	47	46	84	75	16.5
3	44	557.19	.55	.79	7.28	6	353	244	245	47	46	86	79	16.5
3	48	559.28	.58	.84	9.35	6	353	241	243	47	46	87	80	16.7
2	52	561.40	.59	.86	1.45	6	353	240	235	46	46	87	80	16.6
2	56	563.46	.56	.82	3.50	6	353	243	237	46	46	88	81	16.2
1	60	565.42	.53	.78	5.50	6	347	243	230	46	46	89	82	16.1
1	64	567.46	.57	.75	7.46	6	347	240	241	46	46	89	82	16.2
					Continued			on	Next		Page			
	θ=	Vm=		^H=								Avg.=		

INTERPOLL LABORATORIES EPA MODIFIED METHOD 5 FIELD DATA SHEET

Job L.P. / Hayward, WI
Source Line 1 Dryer RTO / stack
Date 2-15-94 Test 20 Run 1

Operators M. Kaschlet + K. Nessmann
Meter Box No. 4
Gasmeter coeff. .9962

Nozzle No. 8D-4
Nozzle Dia. .237 in.
Bar. Pres. 28.82 in. Hg

Pitot No. 23V-8
Cp .84
H₂O 25 %

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Del. Vol. (cf)	VAC. inHg	Temperatures (°F) Stack	Probe	Oven	XAD2	Imp.	Meter (In/Out)		Oxygen (%v/v)
B-9	68	569.52	.55	.81	9.50	6	350	243	245	46	46	85	82	15.9
9	72	571.63	.60	.87	1.62	6.5	352	235	240	47	46	87	82	15.5
7	76	573.59	.56	.82	3.67	6	350	232	242	48	47	89	92	15.4
7	90	575.80	.65	.95	5.89	7	350	237	241	48	47	89	83	18.8
6	84	578.00	.61	.89	8.03	6.5	351	232	240	48	48	88	82	15.9
6	88	580.15	.61	.89	0.18	6.5	351	235	244	48	48	89	93	15.2
5	92	582.35	.67	.98	2.42	7	353	240	235	49	48	89	83	16.1
5	96	584.58	.63	.92	4.60	7	353	242	238	49	49	90	84	15.6
4	100	586.74	.60	.88	6.73	7	354	237	240	49	49	91	84	15.7
4	104	588.88	.61	.89	8.98	7	354	240	243	49	49	91	85	15.4
3	108	590.94	.59	.88	1.01	7	342	236	240	49	49	92	85	15.3
3	112	593.20	.63	.94	3.22	7	339	241	244	50	49	92	86	15.2
2	116	595.35	.60	.90	5.38	7	335	235	240	50	50	93	86	15.7
2	120	597.50	.59	.88	7.52	7	342	240	237	50	50	93	87	15.3
1	124	599.60	.58	.86	9.63	7	345	238	245	50	50	93	87	15.4
1	128	601.70	.57	.85	1.73	7	345	235	247	50	50	94	87	15.0
	(1015)													
	θ= 128	Vm= 62.90		^H= .99								Avg.=	82.2	

CF-025

INTERPOLL LABORATORIES EPA MODIFIED METHOD 5 SAMPLE LOG SHEET

Job L.P. / Hayward, WI
Source Line 1 Dryer RTO / Stack
Cyclone: ☐ Yes ☒ No Filter holder: MM5
Analytes: POM
Field recovery spike added: ☒ Yes ☐ No

Date 7-15-94 Test 20 Run 1
No. of traverse points 16
Filter type: 4" Glass fiber
XAD-2 resin: ____ g Batch No. ____
Reference: EPA SW-846 Method 0010

Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Posttest: 0 cfm at 7 in. Hg. (vac) ☒

Semivolatile Catch Data:

No.s of filters used: 3007

Recovery solvent(s)
☒ MeCl2 * ~~MeOH (50:50 v/v)~~
☒ other(s) Acetone

No. of bottles for condensate trap catch: 1
Samples recovered by: McKuskler

Condensate Data:

Item	Weight(g)		
	Final	Tare	Difference
Condensate trap			
Condensate trap	715	266	449
Condensate trap			
Impingers			
Desiccant	1408	1387	21
Total			470

Integrated Gas Sampling Data:

Bag Pump No. 25B Box No. 12 Bag No. 1
Bag Material: 4-layer Aluminized Tedlar Size: 44 L
Pretest leak check: 0 cc/min at 15 in. Hg.
Time start: 0801 (HRS) Time end: 1014 (HRS)
Sampling rate: 200 cc/min O2 Analyzer S/N: 3

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INTERPOLL LABORATORIES EPA MODIFIED METHOD 5 FIELD DATA SHEET

Job L.P. / Hayward, WI
Source Line 1 Dryer RTO Stack
Date 2-15-94 Test 20 Run 2

Operators M. Koehlert R. Moessner
Meter Box No. 4
Gasmeter coeff. .9962

Nozzle No. ED-4
Nozzle Dia. .232 in.
Bar. Pres. 28.92 in. Hg

Pitot No. 230-S
Cp .84
H_2O 24.7 %

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Gas Vol. (cf)	VAC. in Hg	Temperatures (°F) Stack	Probe	Oven	XAD2	Imp.	Meter (In/Out)		Oxygen (%v/v)
	1258	601.90												
B-8	4	603.94	.54	.80	3.91	4	347	230	243	49	49	83	83	16.9
8	8	605.92	.53	.78	5.91	4	349	233	241	50	49	87	84	15.6
7	12	608.03	.59	.87	8.03	4	348	239	237	50	49	89	85	15.6
7	16	610.10	.57	.85	0.12	4	348	243	240	48	48	91	87	15.5
6	20	612.29	.59	.88	2.26	4	348	240	233	48	48	92	87	15.5
6	24	614.53	.65	.97	4.50	4.5	348	237	237	47	47	93	88	15.0
5	28	616.62	.60	.89	6.65	4	353	243	240	47	47	93	89	14.9
5	32	618.83	.63	.94	8.86	4.5	353	243	244	46	46	95	89	14.7
4	36	621.00	.60	.90	1.02	4.5	348	235	240	46	45	96	90	14.8
4	40	623.16	.60	.90	3.19	4.5	348	238	245	46	45	96	90	14.8
3	44	625.26	.57	.84	5.28	4	362	239	240	45	45	97	90	14.4
3	48	627.43	.62	.92	7.47	4.5	362	239	236	45	45	97	91	14.9
2	52	629.62	.63	.93	9.67	4.5	361	237	239	45	45	98	92	15.3
2	56	631.20	.58	.86	1.80	4.5	360	241	240	45	45	99	92	14.6
1	60	633.95	.60	.89	3.96	4.5	360	244	242	45	45	99	93	15.6
1	64	636.03	.59	.88	6.11	4.5	359	242	245	45	45	100	93	14.6
	θ=	Vm=		^H=								Avg.=		

Continued on Next Page

Rev. 1

CF-025

S-405

INTERPOLL LABORATORIES EPA MODIFIED METHOD 5 FIELD DATA SHEET

Job L.P. / Hayward WI
Source Line 1 Dryer RTO / Stack
Date 2-15-94 Test 20 Run 2

Operators M. Kaehler + K. Nuessmeier
Meter Box No. 4
Gasmeter coeff. .9962

Nozzle No. SD-4
Nozzle Dia. .237 in.
Bar. Pres. 28.97 in. Hg

Pitot No. 23V-8
Cp .84
H_2O 24.7 %

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Del. Vol. (cf)	VAC.	Temperatures (°F)							Oxygen
						inHg	Stack	Probe	Oven	XAD2	Imp.	Meter (In/Out)		(%V/V)
A-8	68	638.05	.50	.75	8.08	4	358	243	241	46	45	98	93	14.9
8	72	640.05	.53	.79	0.12	4.5	359	238	235	46	45	99	93	15.6
7	76	642.38	.68	1.00	2.41	5	366	239	240	46	45	100	94	14.6
7	80	644.62	.65	.96	4.66	5	368	235	243	46	46	100	95	15.2
6	84	646.91	.67	1.00	6.95	5	356	239	240	47	46	101	95	15.5
6	88	649.19	.67	1.01	9.15	5	356	234	245	47	46	101	95	15.1
5	92	651.42	.63	.94	1.42	5	363	243	242	47	46	101	96	15.1
5	96	653.70	.63	.94	3.70	5	363	240	244	47	47	101	95	14.9
4	100	655.95	.65	.96	5.95	5	366	242	240	47	47	100	95	15.0
4	104	658.02	.58	.86	8.07	5	366	238	243	47	47	101	95	15.6
3	108	660.19	.57	.86	0.10	5	357	246	240	47	47	102	96	15.5
3	112	662.24	.58	.88	2.35	5	357	243	247	48	48	102	96	15.5
2	116	664.40	.57	.77	4.37	4.5	348	243	250	48	48	102	96	15.6
2	120	666.30	.50	.76	6.37	4.5	348	245	253	48	48	102	97	15.6
1	124	668.29	.50	.75	8.37	4.5	353	248	245	48	48	102	96	16.0
1	128	670.25	.44	.66	0.24	4	353	248	243	48	48	103	97	16.1
	(1509)													
	θ= 128	Vm= 68.35		^H= .87								Avg.= 94.7		

Re.

INTERPOLL LABORATORIES EPA MODIFIED METHOD 5 SAMPLE LOG SHEET

Job L.P. / Hayward, WI
Source Line 1 Dryer RTO / Stack
Cyclone: ☐ Yes ☒ No Filter holder: MM5
Analytes: TOM
Field recovery spike added: ☒ Yes ☐ No

Date 7-15-94 Test 20 Run 3
No. of traverse points 16 X 2
Filter type: 4" Glass fiber
XAD-2 resin: ___ g Batch No. ___
Reference: EPA SW-846 Method 0010

Sample Train Leak Check:

Pretest: < 0.02 cfm at 15 in. Hg. (vac) ☒
Postest: < 0.02 cfm at 8 in. Hg. (vac) ☒

Semivolatile Catch Data:

No.s of filters used: 3008

Recovery solvent(s)
☒ MeCl2 * ~~MeOH (50:50 v/v)~~
☒ other(s) Acetone

No. of bottles for condensate trap catch: 1
Samples recovered by: M. Kaehler

Condensate Data:

Item	Weight(g)		
	Final	Tare	Difference
Condensate trap	676	265	411
Condensate trap			
Condensate trap			
Impingers			
Desiccant	1386	1367	19
Total	▨	▨	430

Integrated Gas Sampling Data:

Bag Pump No. 29B Box No. 12 Bag No. 3
Bag Material: 4-layer Aluminized Tedlar Size: 44 L
Pretest leak check: 0 cc/min at 15 in. Hg.
Time start: 1545 (HRS) Time end: 1754 (HRS)
Sampling rate: 200 cc/min O2 Analyzer S/N: 3

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INTERPOLL LABORATORIES EPA MODIFIED METHOD 5 FIELD DATA SHEET

Job L.P. / Hayward, WI
Source Line 1 Dryer RTO / Stack
Date 2-15-94 Test 20 Run 3

Operators M. Kuehler + R. Nussmeier
Meter Box No. 4
Gasmeter coeff. .9962

Nozzle No. BD-4
Nozzle Dia. .237 in.
Bar. Pres. 28.87 in. Hg

Pitot No. 23V-0
Cp .84
H_2O 24.2 %

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Dec. Vol. (cf)	VAC.	Temperatures (°F)							Oxygen
						inHg	Stack	Probe	Oven	XAD2	Imp.	Meter(In/Out)		(%V/V)
	1545	670.40												
A-8	4	672.43	.51	.75	2.38	5	339	244	246	44	46	95	92	15.5
8	8	674.51	.56	.83	4.46	5	339	247	245	46	47	96	93	15.7
7	12	676.63	.62	.90	6.63	6	354	239	255	48	48	99	94	15.3
7	16	678.72	.60	.87	8.77	6	354	240	239	48	48	99	94	15.3
6	20	681.00	.65	.93	0.98	6	366	251	240	50	51	101	95	15.3
6	24	683.18	.67	.96	3.24	6	366	250	243	50	50	101	95	15.3
5	28	685.40	.60	.87	5.58	6	555	253	248	51	52	101	95	15.6
5	32	687.50	.60	.87	7.55	6	355	251	246	52	52	102	96	15.6
4	36	689.70	.64	.93	9.75	6	355	258	249	52	53	103	96	15.6
4	40	691.98	.65	.95	1.99	6	356	257	251	50	50	103	96	15.5
3	44	694.02	.55	.79	4.04	6	364	255	250	51	50	103	96	15.6
3	48	695.95	.50	.73	5.99	6	360	252	253	51	50	103	96	15.7
2	52	697.94	.47	.69	7.90	6	356	248	250	51	50	103	97	15.7
2	56	699.80	.45	.66	9.76	5.5	356	245	250	51	50	103	98	15.7
1	60	701.66	.46	.67	1.65	5.5	354	249	253	51	50	103	98	15.2
1	64	703.50	.44	.64	3.50	5.5	354	250	248	51	50	103	97	15.5
	θ=	Vm=		^H=								Avg.=		

Continued on Next Page

INTERPOLL LABORATORIES EPA MOI ED METHOD 5 FIELD DATA SHEET

Job L.P. / Hayward, WI
Source Line Dryer RTO / Stack
Date 2-15-94 Test 20 Run 3

Operators M. Kaehler + K. Wessmeier
Meter Box No. 9
Gasmeter coeff. .9962

Nozzle No. BD-4
Nozzle Dia. .231 in.
Bar. Pres. 28.82 in. Hg

Pitot No. 23V-8
Cp .84
H_2O 24.7 %

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Del. Vol. (cf)	VAC. inHg	Temperatures (°F)							Oxygen
							Stack	Probe	Oven	XAD2	Imp.	Meter (In/Out)		(%V/V)
B-8	68	705.58	.56	.82	5.58	7	355	252	248	51	50	102	97	15.5
8	72	707.61	.56	.82	7.66	7	355	253	250	50	50	103	98	15.4
7	76	709.75	.59	.86	9.79	7	359	250	254	50	50	103	98	15.9
7	80	711.82	.57	.83	1.89	7	359	253	248	48	49	103	98	15.6
6	84	714.00	.62	.89	4.06	7	369	255	244	47	49	104	98	15.5
6	88	716.13	.57	.82	6.15	7	369	252	247	47	47	104	98	15.5
5	92	718.20	.59	.85	8.27	7	373	248	250	47	47	103	98	15.7
5	96	720.27	.57	.82	0.34	7	373	245	248	47	47	104	98	15.6
4	100	722.43	.62	.90	1.53	7.5	359	247	244	46	47	104	98	15.9
4	104	724.63	.60	.88	4.68	7.5	359	244	248	46	46	104	98	15.9
3	108	726.75	.59	.84	6.80	7	376	242	245	46	46	104	98	15.5
3	112	728.93	.57	.81	8.87	7	376	245	251	46	46	104	97	15.6
2	116	731.00	.61	.88	1.03	7.5	371	242	250	46	46	104	98	15.6
2	120	733.00	.55	.79	3.07	7	371	242	255	46	46	103	98	16.3
1	124	735.00	.50	.73	5.04	7	359	245	251	48	47	104	98	16.2
1	128	737.02	.52	.76	2.04	7	352	248	248	48	48	104	98	16.0
	(1754)													
	θ= 128	Vm= 66.62		^H= .92								Avg.=	99.5	

Rev. 1

Interpoll Laboratories
(612)786-6020

Visible Emissions Form

Test 14

SOURCE NAME: Louisiana Pacific Corp

ADDRESS:

CITY: Hayward

STATE: Wisconsin

ZIP:

PHONE:

SOURCE ID NUMBER:

PROCESS EQUIPMENT: Line 1 Dryer Stack

OPERATING MODE:

CONTROL EQUIPMENT: RTO

OPERATING MODE:

DESCRIBE EMISSION POINT
START Round metal stack STOP ✓

HEIGHT ABOVE GROUND LEVEL
START 100' STOP ✓

HEIGHT RELATIVE TO OBSERVER
START 100' STOP ✓

DISTANCE FROM OBSERVER
START 300' STOP ✓

DIRECTION FROM OBSERVER
START NE STOP ✓

DESCRIBE EMISSIONS
START None STOP ✓

EMISSION COLOR
START None STOP

PLUME TYPE: CONTINUOUS ☐ FUGITIVE ☐ INTERMITTENT ☐

WATER DROPLETS PRESENT:
NO ☑ YES ☐

IF WATER DROPLET PLUME:
ATTACHED ☐ DETACHED ☐

POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED
START 5' above stack STOP ✓

DESCRIBE BACKGROUND
START Sky STOP ✓

BACKGROUND COLOR
START Blue/Gray STOP ✓

SKY CONDITIONS
START 50% cloudy STOP ✓

WIND SPEED
START 8 STOP 10

WIND DIRECTION
START NW STOP ✓

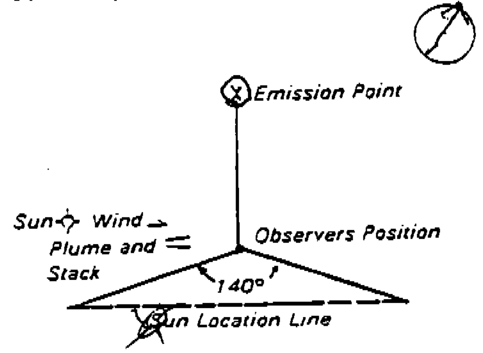
AMBIENT TEMP.
START 80 STOP 79

WET BULB TEMP. 63

RH.percent 34

Source Layout Sketch

Draw North Arrow



OBSERVATION DATE: 7-14-94

START TIME: 1642

STOP TIME: 1742

MIN	0	15	30	45	MIN	0	15	30	45
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
5	0	0	0	0	35	0	0	0	0
6	0	0	0	0	36	0	0	0	0
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
12	0	0	0	0	42	0	0	0	0
13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	0	0	0	0	49	0	0	0	0
20	0	0	0	0	50	0	0	0	0
21	0	0	0	0	51	0	0	0	0
22	0	0	0	0	52	0	0	0	0
23	0	0	0	0	53	0	0	0	0
24	0	0	0	0	54	0	0	0	0
25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

AVERAGE OPACITY FOR HIGHEST PERIOD:

NUMBER OF READINGS ABOVE % WERE:

RANGE OF OPACITY READINGS
MINIMUM: MAXIMUM:

OBSERVER'S NAME (PRINT): Edward W Trowbridge

OBSERVER'S SIGNATURE: Edward W Trowbridge

DATE: 7-14-94

ORGANIZATION: InterPoll Labs

CERTIFIED BY: ETA

DATE: 4-7-94

VERIFIED BY:

DATE:

COMMENTS:

I HAVE RECEIVED A COPY OF THESE OPACITY OBSERVATIONS
SIGNATURE

TITLE

DATE

S-0079R

APPENDIX D

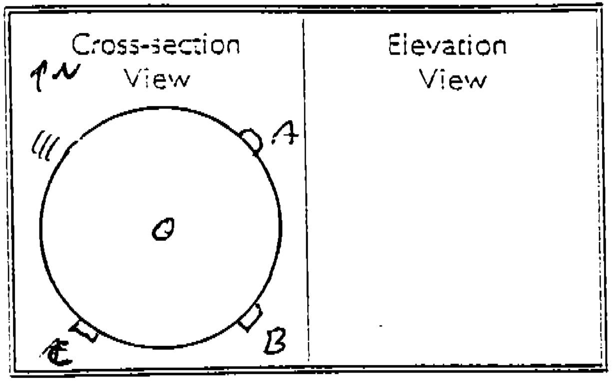
LINE 2 RTO FIELD DATA SHEETS

INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 2 Field Data Sheet

lou L.P. / Hayward, WI
ource Line 2 Dryer RTO / Outlet
est 1 Run 6 Date 2-12-94
Stack Dimen. 81.5 IN.
Dry Bulb 327 °F Wet bulb 154 °F
Manometer ☐ Reg. ☐ Exp ☐ Elec.
Barometric Pressure 28.71 IN.HG
tatic Pressure -.61 IN.WC
Operators M. Kaehler + K. Niessmeier
Pitot No. 29V-S C_p .84
PM/CO/NOx

Drawing of Test Site



Traverse Point No.	Fraction of Diameter	Distance From Stack Wall (IN.)	Distance From End of Port (IN.)	Velocity	Temp. of Gas (°F)
▨		Port Length: 6.25 IN.		Time Start: 0752 HRS	
A-1	.032	2.61	8.96	.50	
2	.105	9.56	14.81	.68	
3	.194	15.81	22.06	.73	
4	.323	26.32	32.57	.70	
5	.677	55.18	61.43	.71	
6	.806	65.59	71.94	.72	
7	.895	72.94	79.19	.68	
8	.968	79.99	85.14	.65	
B-1				.54	324
2				.72	
3				.70	
4				.69	
5				.71	
6				.71	
7				.72	
8				.60	
				Time End: 0757 HRS	

Temp. Meas. Device & S/N: PDT-31 / TC

R or nothing = reg. manometer; S = expanded; E = electronic

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job L.P. / Hayward, WI
Source Line 2 Dryer RTO / outlet
Method 5 Filter holder: Glass
Date 7-12-94 Test 1 Run 1
No. of traverse points 16
Filter type: 4" G.F.

Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) 0
Post test: <0.01 cfm at 9 in. Hg. (vac) 0

Particulate Catch Data:

No. of filters used:
6781

Recovery solvent(s)
☒ acetone
☐ other(s)

No. of probe wash bottles: 1
Sample recovered by: M. Kaehler + K. Rosenthal

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1	705	500	205
Impinger No. 2			
Impinger No. 3			
Condenser			
Desiccant	1524	1513	11
Total	▨	▨	216

Integrated Gas Sampling Data:

Bag Pump No. 29 B
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: 0
Time start: 1000
Sampling rate: 400
Box No. 30 Bag No. 1
Size: 44 L
cc/min at 15 in. Hg.
(HRS) Time end: 1210 (HRS)
cc/min Operator: M. Kaehler

S/N of O_2 Analyzer used to monitor train outlet: 9

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job L.P. / Hayward, WI
Source Line 2 Dryer RTO / Outlet
Date 7-12-94 Test ___ Run 1

Operators M. Koehler / K. Hausfeld
Meter Box No. 10 ΔH@ 1.72 in WC
Gamma coeff. .9530

Pitot No. 290-8 Cp .84
Bar. Press. 28.71 inHg H2O 23 %
Nozzle No. 3-4 Nozzle Dia. .265 in.

	Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Del. Vol. (cf)	VAC. inHg	Temperatures (°F) Stack	Probe	Oven	Impg.	Gas/In	Gas/Out	Oxygen (%v/v)
		(1000)	514.40											
Hold (1001) Restart (1017)	B-8	4	516.65	.59	.97	6.69	4	341	241	233	45	95	92	17.1
	7	8	519.11	.67	1.14	9.20	4.5	335	235	237	45	81	83	16.8
	6	12	521.71	.20	1.20	1.77	5	327	239	244	44	84	83	17.2
	5	16	524.24	.69	1.16	4.30	5	346	242	248	44	90	84	16.7
Hold (1036) Restart (1056)	4	20	526.77	.68	1.14	6.62	4.5	349	245	245	44	92	84	16.5
	3	24	529.42	.72	1.25	9.46	5	328	241	251	44	89	85	17.0
	2	28	531.99	.66	1.16	1.96	4.5	342	237	249	45	92	85	16.7
	1	32	534.39	.65	1.12	4.45	4.5	334	235	246	45	95	83	17.3
	A-8	36	536.91	.64	1.09	6.92	4.5	345	231	240	47	94	83	16.8
	7	40	539.45	.20	1.19	9.50	5	342	234	247	47	98	84	16.7
Hold (1128) Restart (1153)	6	44	542.13	.21	1.23	2.12	5.5	332	233	245	47	100	86	17.5
	5	48	544.74	.20	1.19	4.71	5.5	348	237	244	48	101	95	16.9
	4	52	547.35	.71	1.23	2.34	6	337	232	246	48	94	91	16.8
	3	56	549.93	.66	1.13	9.86	5.5	343	230	246	48	95	90	17.0
	2	60	552.32	.59	1.01	2.24	5	344	229	243	48	97	91	16.3
	1	64	554.50	.48	.83	4.41	4	336	233	245	49	100	91	17.1
		(1210)												
		θ = 64	Vm = 40.10		ΔH 1.12							Avg. = 89.2		

D-3

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Date 7-12-94 Test 1 Run 2
No. of traverse points 16
Filter type: 4" G.F.

Job L.P. / Hayward, WI
Source Line 2 Dryer RTO / Stack
Method 5 Filter holder: Glass

Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Post test: <0.02 cfm at 10 in. Hg. (vac) ☒

Particulate Catch Data:

No. of filters used:
67º2

Recovery solvent(s)
☒ acetone
☐ other(s)

No. of probe wash bottles: 1
Sample recovered by: M. Kaehler + K. Nuessmeier

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1	704	496	208
Impinger No. 2			
Impinger No. 3			
Condenser			
Desiccant	1449	1439	10
Total	▨	▨	218

Integrated Gas Sampling Data:

Bag Pump No. 2913
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: 0 cc/min at 15 in. Hg.
Time start: 1305 (HRS)
Sampling rate: 400 cc/min
Box No. 30 Bag No. 2
Size: 44 L
Time end: 1410 (HRS)
Operator: M. Kaehler

S/N of O$_2$ Analyzer used to monitor train outlet: 9

123093-G:\STACK\WP\METHODS\S-0046RR

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job L.P. / Hagwood, WI
Source Line 2 Dryer RTO / Stack
Date 7-12-94 Test 1 Run 2

Operators M. Kaehler + K. Wessmeier
Meter Box No. 10 ΔH@ 1.77 in HG
Gasmeter coeff.: .9930

Pitot No. 29V-8 Cp .84
Bar. Press. 28.71 in Hg MFD 26.6 %
Nozzle No. 3-4 Nozzle Dia .245 in.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (in H2O)	Orifice Meter (in H2O)	Dev. Vol. (cf)	VAC. in Hg	Temperatures (°F) Stack	Probe	Oven	Impg.	Gas/In	Gas/Out	Oxygen (%v/v)
	1305	554.80											
A-8	4	557.32	.65	1.11	7.29	4.5	347	229	249	49	95	96	17.1
7	8	559.90	.72	1.24	9.93	5	349	239	251	47	96	93	17.0
6	12	562.61	.70	1.22	2.56	5	338	240	255	46	99	93	16.9
5	16	565.20	.70	1.24	5.21	5	345	243	254	46	103	94	17.2
4	20	567.75	.63	1.10	7.72	5	340	241	254	46	104	94	16.8
3	24	570.30	.63	1.11	0.23	5	337	245	258	47	105	95	16.8
2	28	572.69	.60	1.07	2.70	5	329	247	255	47	105	94	16.8
1	32	575.03	.51	.91	4.98	4	327	242	258	47	107	94	17.0
B-8	36	577.41	.61	1.08	7.46	4.5	335	234	254	49	105	95	16.4
7	40	579.90	.64	1.11	9.97	5	350	231	247	49	108	95	16.7
6	44	582.55	.68	1.20	2.59	5.5	338	232	248	46	109	96	16.4
5	48	585.26	.66	1.19	5.20	5.5	326	235	244	46	109	95	17.1
4	52	587.77	.65	1.14	7.75	5	346	234	247	46	110	97	16.5
3	56	590.31	.63	1.10	0.26	5	350	230	247	46	110	97	16.6
2	60	592.92	.62	1.10	2.77	5	336	230	245	47	111	98	16.6
1	64	595.33	.65	1.15	5.34	5	343	232	243	47	112	98	17.0
	1410												
	θ = 64	Vm = 40.52		ΔH 1.13							Avg. = 100.3		

INTERPOLL LABORATORIES, INC.
(612)-786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job L.P. / Hayward, WI
Source Line 2 Dryer RTO / Stack
Method 5 Filter holder: Glass

Date 2-12-94 Test 1 Run 3
No. of traverse points 16
Filter type: 4" G.F

Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Post test: <0.02 cfm at 9 in. Hg. (vac) ☒

Particulate Catch Data:

No. of filters used:
6783

Recovery solvent(s)
☒ acetone
☐ other(s)

No. of probe wash bottles: 1
Sample recovered by: M. Kaehler + K. Rosenthal

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1	691	502	189
Impinger No. 2			
Impinger No. 3			
Condenser			
Desiccant	1539	1524	15
Total	▨	▨	204

Integrated Gas Sampling Data:

Bag Pump No. 298
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: 0
Time start: 1500
Sampling rate: 400

Box No. 30 Bag No. 3
Size: 44 L
cc/min at 15 in. Hg.
(HRS) Time end: 1611 (HRS)
cc/min Operator: M. Kaehler

S/N of O_2 Analyzer used to monitor train outlet: 9

123093-G:\STACK\WP\METHODS\S-0046RR

INTERPOLL LABORATORIES PA METHOD 5 FIELD DATA SHEET

Job L.P. / Hayward, WI
Source Line 2 Dryer RTO / Stack
Date 2-12-94 Test 1 Run 3

Operators McLackler / K. Nuessmeier
Meter Box No. 10 ΔH@ 1.77 IN WC
Correction coeff. .9930

Pitot No. 24V-2 Cp .84
Bar. Press. 28.71 inHg H2O 22 %
Nozzle No. 3-4 Nozzle Dia .245 IN.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Dec. Vol. (cf)	VAC. inHg	Temperatures (°F) Stack	Probe	Oven	Impg.	Gas/In	Gas/Out	Oxygen (%v/v)
	1500	595.60											
B-8	4	597.98	.59	1.02	8.01	4	347	227	233	45	97	98	17.1
7	8	600.34	.57	.99	0.38	4	339	231	240	45	99	97	17.1
6	12	603.00	.70	1.21	3.00	5	342	226	239	44	102	97	17.0
5	16	605.54	.69	1.17	5.58	5	361	230	242	44	104	96	16.8
4	20	608.14	.68	1.17	8.16	5	351	230	238	44	105	96	17.3
3	24	610.72	.66	1.15	0.72	5	341	231	236	44	106	95	17.6
2	29	613.25	.66	1.13	3.27	5	352	230	242	44	106	96	17.2
1	32	615.82	.65	1.11	5.78	5	359	233	245	44	108	95	17.0
A-8	36	619.25	.65	1.12	8.31	5	357	229	243	46	104	96	17.6
7	40	620.87	.72	1.25	0.98	6	344	239	244	46	103	96	17.5
6	44	623.54	.71	1.24	3.63	6	337	246	257	47	106	96	17.6
5	48	626.15	.69	1.20	6.25	5.5	344	248	255	47	107	96	17.1
4	52	628.70	.63	1.09	8.75	5.5	345	247	257	47	108	97	17.2
3	56	631.18	.60	1.06	1.21	5.5	334	250	260	47	109	97	17.3
2	60	633.66	.63	1.11	3.74	5.5	334	239	253	47	110	98	17.5
1	64	635.86	.46	.81	5.69	4.5	337	242	250	48	110	98	16.6
	1611												
	θ = 64	Vm = 40.26		ΔH 1.11							Avg. = 100.8		

D-7

S-0037R

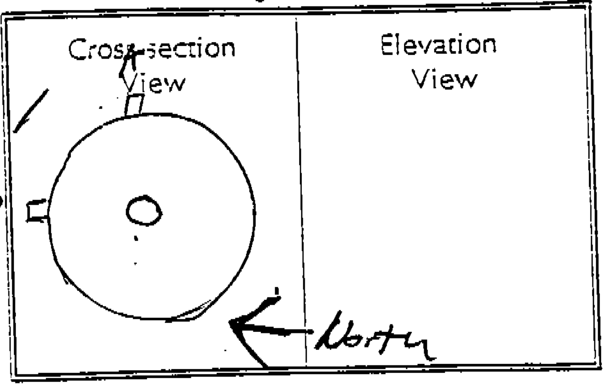
INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 2 Field Data Sheet

Job CP / HAYWARD
Source Line 2 SURFACER DRYER RTO INLET
Test 2 Run 0 Date 7-12-94
Stack Dimen. 42 IN.
Dry Bulb 199 °F Wet bulb 142 °F
Manometer ☒ Reg. ☐ Exp ☐ Elec.
Barometric Pressure 28.72 IN.HG
Static Pressure -16.30 IN.WC
Operators B ASCHENBACH J.
Pitot No. 27V-4 C_p .84

PM/CO/NOx

Drawing of Test Site



Traverse Point No.	Fraction of Diameter	Distance From Stack Wall (IN.)	Distance From End of Port (IN.)	Velocity	Temp. of Gas (°F)
▨		Port Length: 4	IN.	Time Start: 0846 HRS	
A - 1	.021	.882	4.882	1.50	
2	.067	2.814	6.814	1.80	
3	.118	4.956	8.956	1.85	
4	.177	7.434	11.434	1.80	
5	.250	10.500	14.500	1.70	
6	.356	14.952	18.952	1.55	199
7	.644	27.048	31.048	1.95	
8	.750	31.500	35.500	2.10	
9	.823	34.566	38.566	2.15	
10	.882	37.044	41.044	2.16	
11	.933	39.186	43.186	1.80	
12	.979	41.118	45.118	1.95	
B - 1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
				Time End: 0850 HRS	

Temp. Meas. Device & S/N: TM POT 33

R or nothing = reg. manometer; S = expanded; E = electronic

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job LP / HAYWARD
Line 2 Source SURFACER Dryer RTO INLET
Method 5 Filter holder: Glass

Date 7-12-94 Test 2 Run 1
No. of traverse points 24
Filter type: 4" GFF

Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Post test: 0 cfm at 15 in. Hg. (vac) ☒

Particulate Catch Data:

No. of filters used:
1 (6635)

Recovery solvent(s)
☒ acetone
☐ other(s)

No. of probe wash bottles:
Sample recovered by: Bob

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1	403	200	203
Impinger No. 2			
Impinger No. 3			
Condenser			
Desiccant	1482	1456	26
Total	▨	▨	229

Integrated Gas Sampling Data:

Bag Pump No. 27B
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: 0.0
Time start: 1017
Sampling rate: 400

Box No. 28 Bag No. 1
Size: 44 L
cc/min at 400 in. Hg.
(HRS) Time end: 1204 (HRS)
cc/min Operator: Bob

S/N of O_2 Analyzer used to monitor train outlet: 5

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INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job CP / HAYWARD
Source COKE SQUEAKER DRYER RTO INLET
Date 7-12-84 Test 2 Run 1

Operators BA JS
Meter Box No. 7 ΔH@ 1.95 IN WC
Gasmeter coeff. .9947

Pitot No. 27-4 Cp .84
Bar. Press. 29.72 inHg H2O 20 %
Nozzle No. 5-3 Nozzle Dia .197 IN.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Dev. Vol. (cf)	VAC. inHg	Temperatures (°F) Stack	Probe	Oven	Impg.	Gas/In	Gas/Out	Oxygen (%v/v)
	(1017)	(853.90)											
A-12	2.5	855.53	1.80	1.56	5.62	7	206	245	255	50	74	74	18.2
11	5	857.58	1.85	1.62	7.58	8	206				76	74	18.2
10	7.5	859.64	1.86	1.66	9.16	8	208	247	252	47	78	75	18.1
9	10	860.82	1.85	1.62	0.93	8	207				80	76	18.2
8	12.5	862.58	1.75	1.54	2.65	8	207	250	250	45	80	76	17.8
7	15	864.35	1.90	1.67	4.45	8	207				82	77	17.9
6	17.5	866.19	2.10	1.85	6.34	8.5	208	246	251	43	84	77	18.1
5	20	868.13	2.15	1.90	8.25	9.5	208				85	78	17.8
4	22.5	870.09	2.20	1.95	0.19	9	207	250	249	45	80	79	17.7
3	25	872.02	2.15	1.90	2.11	9.5	207				82	79	17.8
2	27.5	873.92	2.00	1.76	3.96	9	208	247	251	43	85	79	17.9
1	30	875.79	1.95	1.72	5.79	9	208				86	80	18.1
B-12	32.5	877.82	2.45	2.17	7.84	9	208	248	253	41	84	80	18.2
11	35	879.83	2.50	2.22	9.91	10	206				88	81	17.7
10	37.5	881.84	2.45	2.18	1.97	11	207	250	255	41	89	81	17.6
9	40	883.90	2.50	2.23	4.06	11	207				91	82	17.8
8	42.5	886.00	2.25	2.01	6.04	11	205	249	251	40	90	83	18.0
7	45	887.95	2.20	1.96	8.00	11	207				91	83	17.7
6	47.5	889.87	1.95	1.74	9.85	11	207	247	250	40	93	84	17.9
5	50	891.60	1.70	1.52	1.58	9.5	207				86	82	18.1
4	52.5	893.28	1.60	1.42	3.25	8	208	247	251	40	87	83	17.6
3	55	895.03	1.96	1.70	5.07	8.5	205				90	84	17.7
2	57.5	896.72	1.86	1.61	6.84	9	207	250	249	39	91	85	17.6
1	60	898.41	1.40	1.25	8.41	9	207				93	85	17.5
	(1204)												
	θ = 60	Vm = 44.51		ΔH = 1.78							Avg. = 82.5		

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INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job LP / HAYWARD
Site 2
Source SurFACER DRyer RTO INLET
Method 5 Filter holder: GLASS

Date 2-12-94 Test 2 Run 2
No. of traverse points 24
Filter type: 4" GFF

Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Post test: 0 cfm at 16 in. Hg. (vac) ☒

Particulate Catch Data:

No. of filters used:
(6636) 1

Recovery solvent(s)
☒ acetone
☐ other(s)

No. of probe wash bottles: (1)
Sample recovered by: GCS

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1	369	200	169
Impinger No. 2			
Impinger No. 3			
Condenser	1421	1380	41
Desiccant			
Total	▨	▨	216

Integrated Gas Sampling Data:

Bag Pump No. 27B
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: 0.0
Time start: 1365
Sampling rate: 400

Box No. 28 Bag No. 2
Size: 44 L
cc/min at 15 in. Hg.
(HRS) Time end: 1409 (HRS)
cc/min Operator: GCS

S/N of O_2 Analyzer used to monitor train outlet: 5

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INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job CP / HAYWARD
Source Z Surfacer Dryer RTO Duct
Date 7-12-94 Test 2 Run 2

Operators 6A JS
Meter Box No. 2 ΔH@ 1.85 in WC
Gasmeter coeff. .9947

Pitot No. 22-4 Cp .84
Bar. Press. 28.72 inHg H2O 2.0 %
Nozzle No. 5-3 Nozzle Dia .187 in.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Dgs. Vol. (cf)	VAC. inHg	Temperatures (°F)						Oxygen (%v/v)
							Stack	Probe	Oven	Impg.	Gas/In	Gas/Out	
	(1365)	(898.70)											
B-12	2.5	900.84	2.56	2.22	0.77	8	205	245	251	44	83	83	17.9
11	5	902.95	2.65	2.36	2.91	9	205				87	83	17.9
10	7.5	905.06	2.70	2.41	5.08	9	204	247	251	44	88	84	17.9
9	10	907.07	2.46	2.15	7.13	9	205				90	85	18.2
8	12.5	909.05	2.26	1.97	9.69	8.5	205	249	249	43	91	85	18.3
7	15	911.00	2.16	1.89	1.62	8	204				92	86	18.4
6	17.5	912.88	2.16	1.89	2.95	8	205	249	253	42	93	87	18.5
5	20	914.69	1.75	1.58	4.71	8	206				94	87	18.0
4	22.5	916.47	1.70	1.53	6.45	8	206	246	251	41	94	87	18.0
3	25	918.19	1.80	1.62	8.24	8	205				95	88	18.2
2	27.5	919.93	1.70	1.53	9.98	8	206	249	250	40	96	88	18.7
1	30	921.63	1.40	1.26	1.57	7	206				97	88	18.8
A-12	32.5	923.56	1.90	1.72	3.41	8.5	207	251	248	40	93	88	18.3
11	35	925.23	1.90	1.71	5.25	8	206				96	89	18.0
10	37.5	927.06	2.00	1.81	7.14	8.5	206	250	251	39	97	89	18.0
9	40	928.87	1.75	1.57	8.91	8.5	205				98	90	17.7
8	42.5	930.65	1.70	1.54	0.66	8.5	206	248	253	39	98	90	17.7
7	45	932.55	1.90	1.72	2.51	9	206				98	91	17.2
6	47.5	934.23	1.80	1.64	4.32	9	205	248	250	38	98	91	17.8
5	50	936.20	2.20	2.00	6.31	10	204				99	91	17.8
4	52.5	938.17	2.25	2.05	8.32	11	205	250	256	39	99	91	17.6
3	55	940.16	2.20	2.01	0.32	11	206				99	91	17.5
2	57.5	942.20	2.00	1.82	2.22	11	205	247	251	39	99	91	17.9
1	60	944.23	2.20	2.00	4.21	11	206				99	91	18.0
	(1409)												
	θ = 60	Vm = 45.53		1.83							Avg.	=91.5	

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job LP / HAYWARD
Line 2 Source Su-FACER Dryer RTO INLET
Method 5 Filter holder Glass
Date 7-12-94 Test 2 Run 3
No. of traverse points 24
Filter type: 4" GFF

Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Post test: 0 cfm at 25 in. Hg. (vac) ☑

Particulate Catch Data:

No. of filters used:
(2) 6637
5157

Recovery solvent(s)
☒ acetone
☐ other(s)

No. of probe wash bottles: 1
Sample recovered by: SG

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1	379	200	179
Impinger No. 2			
Impinger No. 3			
Condenser			
Desiccant	1517	1482	35
Total	▨	▨	214

Integrated Gas Sampling Data:

Bag Pump No. 27B
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: 0.0
Time start: 1500
Sampling rate: 400
Box No. 28 Bag No. 3
Size: 44 L
cc/min at 15 in. Hg.
(HRS) Time end: 1611 (HRS)
cc/min Operator: SG

S/N of O_2 Analyzer used to monitor train outlet: 5

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CF-011

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job LP / HAYWARD
Source 2 Sulfur Dryer RTO Inlet
Date 7-12-94 Test 2 Run 3

Operators GA JC
Meter Box No. 7 ΔH@ 1.95 IN WC
Gasmeter coeff. .9947

Pitot No. 22-4 Cp .84
Bar. Press. 28.23 inHg H2O 20 %
Nozzle No. 5-3 Nozzle Dia .122 IN.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Dev. Vol. (cf)	VAC. inHg	Temperatures (°F) Stack	Probe	Oven	Impg.	Gas/In	Gas/Out	Oxygen (%v/v)
	(1500)	(944.55)											
A-12	2.5	946.44	2.10	1.90	6.44	7.5	205	247	256	40	88	87	17.9
11	5	948.22	1.80	1.68	8.26	7.5	207				91	87	18.2
10	7.5	950.10	1.96	1.78	0.13	8	205	249	249	41	92	88	18.0
9	10	951.95	2.00	1.87	2.05	8	207				94	89	18.0
8	12.5	953.90	1.95	1.84	3.96	8	204	247	251	40	95	89	18.1
7	15	955.86	2.10	1.98	5.93	8.5	205				96	89	17.8
6	17.5	957.80	2.00	1.89	7.87	9	204	250	250	39	97	89	18.3
5	20	959.85	2.20	2.07	9.89	10	206				97	90	17.8
4	22.5	961.60	2.20	2.08	1.92	10	205	247	252	40	97	90	18.0
3	25	963.76	2.00	1.87	3.86	11	205				97	90	18.3
2	27.5	965.50	1.90	1.79	5.74	15	206	250	249	39	97	91	18.2
1	30	968.00	1.70	1.61	7.53	16	205				95	90	17.6
B-12	32.5	970.50	2.35	2.21	0.62	9	206	245	251	39	92	90	18.1
11	35	972.18	2.50	2.35	2.28	10	204				94	90	17.6
10	37.5	974.40	2.60	2.45	4.47	11	205	247	250	38	94	90	17.9
9	40	976.61	2.60	2.45	6.67	11	205				95	91	18.4
8	42.5	977.82	2.70	2.54	7.91	11.5	206	247	249	39	96	91	18.0
7	45	981.00	2.60	2.45	1.12	11.5	205				96	91	17.9
6	47.5	982.91	2.00	1.89	3.05	9	205	250	251	39	97	91	18.1
5	50	984.60	1.70	1.61	4.84	9	204				97	91	18.1
4	52.5	986.50	1.70	1.61	6.63	9	205	249	253	40	98	92	18.0
3	55	988.40	1.70	1.61	8.42	9	204				99	92	17.1
2	57.5	990.06	1.50	1.42	0.10	8	205	250	250	39	100	92	17.4
1	60	991.80	1.60	1.52	1.85	10	204				100	93	17.4
	(1611)												
	θ = 60	Vm = 47.25		ΔH = 1.94							Avg. = 92.9		

Change Filters on Port Change
Releak Check

+ .5 on Port B

S-0037R

Interpoll Laboratories
(612)786-6020

EPA Method 7 Sample Collection
Field Data Sheet

Job CP/ HAYWARD
Test Location ~~[illegible]~~ Sup Recir Dryer RTO Duct
Date 7-12-94
Fuel Type NAT GAS
Technician JEFF
Bar. Pressure 28.72 IN.HG.
Sample Train No. Green
Pump No. 27 B

No.	Test Run Point	Flask No.	Time (HRS)	Vacuum (IN.HG.)	Flask Temp. (°F)	Leak Rate <0.4 IN.HG./MIN.
1	2-1-1	1	10:17	26.4	100°	☑ Yes ☐ No
2	2-1-2	2	10:34	26.4	101°	☑ Yes ☐ No
3	2-1-3	3	11:28	26.4	101°	☑ Yes ☐ No
4	2-1-4	4	11:50	26.5	103°	☑ Yes ☐ No
5	2-2-1	5	1310	26.3	104	☑ Yes ☐ No
6	2-2-2	6	1330	26.4	103	☑ Yes ☐ No
7	2-2-3	7	1345	26.3	104	☑ Yes ☐ No
8	2-2-4	9	1400	26.4	103	☑ Yes ☐ No
9	2-3-1	10	1505	26.4	101	☑ Yes ☐ No
10	2-3-2	11	1520	26.3	101	☑ Yes ☐ No
11	2-3-3	12	1545	26.3	100	☑ Yes ☐ No
12	2-34	28	1600	26.2	100	☑ Yes ☐ No
13						☐ Yes ☐ No
14						☐ Yes ☐ No
15						☐ Yes ☐ No
16						☐ Yes ☐ No
17						☐ Yes ☐ No
18						☐ Yes ☐ No
19						☐ Yes ☐ No
20						☐ Yes ☐ No
21						☐ Yes ☐ No
22						☐ Yes ☐ No
23						☐ Yes ☐ No
24						☐ Yes ☐ No
25						☐ Yes ☐ No
26						☐ Yes ☐ No
27						☐ Yes ☐ No

S-263R

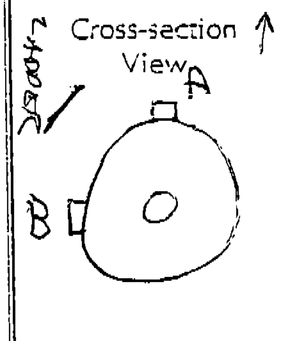
INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 2 Field Data Sheet

Job LP / Hayward
Source Line 3 Core Dryer Stack
Test 3 Run __ Date 7-19-94
Stack Dimen. 42 IN.
Dry Bulb ___ °F Wet bulb ___ °F
Manometer ☒ Reg. ☐ Exp ☐ Elec.
Barometric Pressure 28.71 IN.HG
Static Pressure -11.4 IN.WC
Operators D.M
Pitot No. 290-4 C_p .840
PM/CO

Drawing of Test Site

Cross-section View



Elevation View

Traverse Point No.		Fraction of Diameter	Distance From Stack Wall (IN.)	Distance From End of Port (IN.)	Velocity	Temp. of Gas (°F)
			Port Length:	4 IN.	Time Start: 0846	HRS
A	1	.021	.88	4.88	.90	
	2	.067	2.81	6.81	1.25	
	3	.118	4.96	8.96	1.20	
	4	.177	7.43	11.43	1.20	
	5	.250	10.50	14.50	1.10	
	6	.356	14.95	18.95	1.40	
	7	.644	27.05	31.05	1.70	235
	8	.750	31.50	35.50	1.90	
	9	.823	34.57	38.57	2.10	
	10	.882	37.04	41.04	2.10	
	11	.933	39.19	43.19	2.15	
	12	.979	41.12	45.12	2.30	
B	1	.021	.81	4.88	1.55	
	2	.067	2.81	6.81	1.55	
	3	.118	4.96	8.96	1.70	
	4	.177	7.43	11.43	1.70	
	5	.250	10.50	14.50	1.40	
	6	.356	14.95	18.95	1.20	
	7	.644	27.05	31.05	1.20	235
	8	.750	31.50	35.50	1.30	
	9	.823	34.57	38.57	1.90	
	10	.882	37.04	41.04	1.70	
	11	.933	39.19	43.19	1.70	
	12	.979	41.12	45.19	1.90	
Temp. Meas. Device & S/N: PDT 38					0856	Time End: HRS

R or nothing = reg. manometer; S = expanded; E = electronic

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job LP/Hayward
Source Line 3 Core Dryer Stack
Method 5 Filter holder: 4" Glass
Date 7-12-94 Test 3 Run 1
No. of traverse points 24
Filter type: 4" GFF

Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Post test: 0 cfm at 8 in. Hg. (vac) ☒

Particulate Catch Data:

No. of filters used:
6720

Recovery solvent(s)

☒ acetone
☐ other(s)

No. of probe wash bottles: 1
Sample recovered by: DM

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1		100	
Impinger No. 2	399	100	199
Impinger No. 3		0	
Condenser			
Desiccant	1460	1443	17
Total	▨	▨	216

Integrated Gas Sampling Data:

Bag Pump No. 23B
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: 0
Time start: 1017
Sampling rate: 400
Box No. 15 Bag No. 1
Size: 44 L
cc/min at 15 in. Hg.
(HRS) Time end: 1204 (HRS)
cc/min Operator: DM

S/N of O_2 Analyzer used to monitor train outlet: NA

123093-GASTACK\WP\METHODS\S-0046RR

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job LP/HAYWARD
Source COKE DRYER
Date 7-12-94 Test 3 Run 1

Operators DM - TJ
Meter Box No. 4 Md 1.189 IN WC
Gamma coeff. .9962

Pitot No. 23V-4 Cp .840
Bar. Press. 29.7 inHg H2O 30 %
Nozzle No. T-3 Nozzle Dia .185 IN.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC) ΔP	Orifice Meter (inWC) ΔH	Dev. Vol. (cf)	VAC. inHg	Stack	Probe	Oven	Impg.	Gas/In	Gas/Out	Oxygen (%v/v)
	1017	84.10											
A 12	2.5	85.44	1.65	1.08	5.55	5	235	245	265	45	75	74	17.5
11	5	87.00	1.65	1.02	7.01	5	239				77	74	
10	7.5	88.45	2.20	1.45	8.71	7	233	240	262	45	78	75	12.6
9	10	90.00	1.85	1.20	0.25	6	245				80	75	10.6
8	12.5	91.48	1.65	1.07	1.71	6	247	241	263	46	80	75	
7	15	92.35	1.40	.93	3.07	6	235				82	76	
6	17.5	94.42	1.30	.86	4.38	6	235	250	257	47	83	77	
5	20	95.75	1.05	.70	5.56	6	235				84	77	
4	22.5	96.69	1.10	.73	6.78	5	235	251	262	48	80	78	
3	25	98.23	1.20	.81	8.05	5	222				83	79	
2	27.5	99.46	1.10	.75	9.28	5	217	249	252	48	83	79	
B 1	30	100.64	1.20	.83	0.56	5	212				85	80	
12	32.5	102.40	1.90	1.28	2.17	7	227	240	255	49	85	80	
11	35	103.87	1.70	1.14	3.68	7	232				86	81	
10	37.5	105.25	1.70	1.14	5.20	6	232	244	260	49	88	81	
9	40	106.87	1.90	1.28	6.80	7	234				89	82	
8	42.5	108.27	1.30	.88	8.13	8	232	238	257	49	87	82	
7	45	109.54	1.2	.81	9.41	6	233				89	82	
6	47.5	110.83	1.2	.81	0.69	6	233	240	260	50	89	83	
5	50	112.19	1.4	.94	2.07	7	233				82	83	
4	52.5	113.67	1.7	1.13	3.58	7	238	245	261	50	85	82	
3	55	115.20	1.7	1.16	6.61	8	238				87	83	
2	57.5	116.20	1.55	1.04	8.06	8	235	240	262	51	88	83	
1	60	118.12	1.55	1.04	8.04	8	231				88	85	
	(1200)												
	θ = 60	Vm = 34.02		ΔH = 1.01							Avg. = 78.1		

INTERPOLL LABORATORIES, INC
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job LP / Hayward
Source Line 3 Core Dryer Stack
Method 5 Filter holder: Glass

Date 7-12-94 Test 3 Run 2
No. of traverse points 24
Filter type: 4" GFF

Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Post test: 0 cfm at 8 in. Hg. (vac) ☒

Particulate Catch Data:

No. of filters used:
6744

Recovery solvent(s)
☒ acetone
☐ other(s)

No. of probe wash bottles: 1
Sample recovered by: DM

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1		100	
Impinger No. 2	433	100	233
Impinger No. 3		0	
Condenser			
Desiccant	1464	1458	6
Total	▒	▒	239

Integrated Gas Sampling Data:

Bag Pump No. 23 B
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: 0
Time start: 1303
Sampling rate: 400 cc

Box No. 15 Bag No. 2
Size: 44 L
cc/min at 15 in. Hg.
(HRS) Time end: 1410 (HRS)
cc/min Operator: DM

S/N of O₂ Analyzer used to monitor train outlet: NA

3366

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job LP/Hayward
Source Line 2 Core Dryer Stack B
Date 7-13-94 Test 3 Run 2

Operators DM JJ
Meter Box No. 4 ΔH@ 1.57 IN WC
Calibr. coeff. .9964

Pitot No. 23V-4 Cp .840
Bar. Press. 38.71 inHg H2O 34 %
Nozzle No. 7-3 Nozzle Dia 435 IN.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Dev. Vol. (cf)	VAC. inHg	Temperatures (°F) Stack	Probe	Oven	Impg.	Gas/In	Gas/Out	Oxygen (%v/v)
	1303	118.84											
B 12	2.5	120.12	1.20	.73	2.04	4	234	240	250	46	84	83	
11	5	121.49	1.60	.97	1.44	4	241				85	83	
10	7.5	122.92	1.65	1.01	2.87	5	241	241	253	46	87	84	
9	10	124.30	1.50	.91	4.22	5	241				88	84	
8	12.5	125.55	1.2	.73	5.44	5	241	244	260	47	89	84	
7	15	126.60	.91	.56	6.51	4	241				89	84	
6	17.5	127.65	1.2	.74	7.73	4	240	260	254	47	90	85	
5	20	129.20	1.5	.92	9.09	4	241				91	86	
4	22.5	130.64	1.65	1.06	0.53	5	240	261	253	48	92	86	
3	25	131.95	1.35	.83	1.83	6	240				92	86	
2	27.5	133.26	1.35	.83	3.13	5	240	257	243	49	94	86	
1	30	135.60	1.5	1.58	5.47	5	241				94	87	
A 12	32.5	136.64	1.95	1.20	7.03	7	241	265	245	49	92	87	
11	35	138.17	1.9	1.17	8.57	7	241				94	88	
10	37.5	143.89	1.8	1.15	0.08	7	241	263	250	49	95	88	
9	40	141.20	1.6	.99	1.50	7	241				95	88	
8	42.5	142.78	1.8	1.11	3.01	7	240	259	248	50	96	89	
7	45	144.10	1.2	.74	4.24	7	241				96	89	
6	47.5	145.25	.91	.56	5.31	6	241	255	253	50	96	89	
5	50	146.40	.92	.57	6.40	5	240				96	90	
4	52.5	147.54	.97	.60	7.51	5	241	257	249	50	96	90	
3	55	148.68	1.00	.62	8.63	5	241				96	90	
2	57.2	149.88	1.10	.68	9.82	5	240	255	253	50	96	90	
1	60	151.37	1.3	.81	1.10	6	240				97	90	
	(1410)												
	θ = 60	Vm = 32.53		ΔH = .87							Avg. = 89.7		

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job LP / Hayward
Source Line 3 Core Dryer Stack
Method 5 Filter holder: 2/Glass 3
Date 7-12-94 Test 3 Run 3
No. of traverse points 24
Filter type: 4" GF

Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Post test: 0 cfm at 13 in. Hg. (vac) ☒

Particulate Catch Data:

No. of filters used: 6743

Recovery solvent(s)
☒ acetone
☐ other(s)

No. of probe wash bottles: 1
Sample recovered by: DM

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1		100	
Impinger No. 2	403	100	203
Impinger No. 3		0	
Condenser			
Desiccant	1498	1485	13
Total	▨	▨	216

Integrated Gas Sampling Data:

Bag Pump No. 23B
Box No. 15 Bag No. 3
Bag Material: 5-layer Aluminized Tedlar
Size: 44 L
Pretest leak check: 0 cc/min at .15 in. Hg.
Time start: 1500 (HRS) Time end: 1611 (HRS)
Sampling rate: 4 l/m cc/min Operator: DM

S/N of O₂ Analyzer used to monitor train outlet: NA

123093-G:\STACK\WP\METHODS\S-0046RR

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job LP / Hayward
Source Line 3 Core Dryer Stack
Date 7-12-94 Test 2 Run 3

Operators DM - JV
Meter Box No. 4 ΔH@ 1.89 IN WC
Calibr. coeff. .9962

Pitot No. 230-4 Cp .840
Bar. Press. 29.71 inHg H2O 17 %
Nozzle No. 7-3 Nozzle Dia. .185 IN.

	Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Dev. Vol. (cf)	VAC. inHg	Temperatures (°F) Stack	Probe	Oven	Impg.	Gas/In	Gas/Out	Oxygen (%v/v)
		(1500)	(151.55)											
North	A 12	2.5	153.37	2.1	1.24	3.15	7	238	242	257	46	87	86	
	11	5	154.81	1.9	1.09	4.64	6	239				88	86	
	10	7.5	156.53	2.0	1.15	6.16	6	240	252	261	46	90	87	
	9	10	158.08	1.8	1.04	7.61	6	239				90	87	
	8	12.5	159.47	1.6	.92	8.98	6	240	250	257	47	91	87	
	7	15	160.67	1.5	.86	0.31	5	240	2			92	88	
	6	17.5	161.99	1.1	.63	1.44	5	239	256	262	47	93	88	
	5	20	163.10	1.2	.69	2.63	5	240				93	89	
	4	22.5	164.42	1.2	.69	3.82	5	240	242	271	46	94	88	
	3	25	165.56	1.0	.58	4.91	5	239				94	89	
	2	27.5	166.70	1.0	.58	6.00	5	240	250	266	46	95	89	
	1	30	167.78	1.0	.58	7.09	5	240				95	87	
	B 12	32.5	168.19	1.3	.75	8.33	6	240	254	255	47	93	89	
	11	35	170.63	1.8	1.04	9.78	7	241				92	89	
	10	37.5	172.00	1.5	.87	1.11	7	242	249	261	47	94	90	
	9	40	173.30	1.5	.82	2.45	7	240				94	90	
	8	42.5	174.55	1.3	.75	3.69	7	241	251	257	48	96	90	
	7	45	175.76	1.2	.70	4.88	7	240				96	90	
	6	47.5	176.16	1.5	.87	6.22	8	240	247	263	48	96	91	
	5	50	178.39	1.5	.87	7.55	9	239				96	91	
	4	52.5	179.70	1.4	.81	8.85	10	240	244	255	48	97	91	
	3	55	180.09	1.4	.81	0.14	10	240				97	91	
	2	57.5	182.44	1.7	.99	1.56	11	239	246	256	49	97	91	
	1	60	184.23	1.8	1.05	3.02	13	240				97	91	
		(1611)	( )											
		θ = 60	Vm = 32.68		ΔH = .85							Avg. = 91.3		

INTERPOLL LABORATORIES - EPA METHOD 2 FIELD DATA SHEET

Job CP / HAYWARD

Source LINE 2 SURFACE DRYER RTO INLET

Test 5 Run 1 Date 7-12-96

Stack dimen. 42 IN.

Dry bulb 209 °F Wet bulb 144 °F

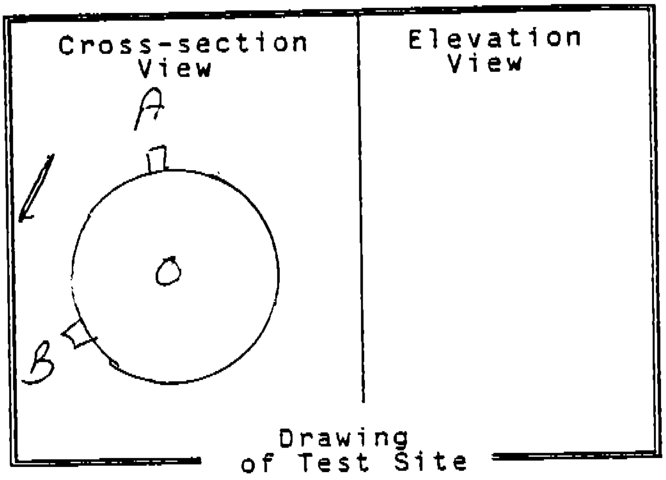
Manometer: ☒ Reg. ☐ Exp. ☐ Elec.

Barometric pressure 28.72 in Hg

Static pressure -17.10 in WC

Operators B. Aschuler & J. Schuson

Pitot No. 22-4 Cp .84



Drawing of Test Site

Traverse Point No.		Fraction of Diameter	Distance from Stack Wall (in)	Distance from End of Port (in)	Velocity Pressure (in WC)	Temperature of gas (°F)
			Port length: 4.0 in.		Time start: 1854 hrs	
B	12				1.95	
	11				2.30	
	10				2.40	
	9				2.25	
	8				2.10	
	7				1.70	
	6				1.40	
	5				1.55	
	4				1.45	
	3				1.50	
	2				1.75	
	1				1.65	
A	12				1.60	
	11				1.85	
	10				1.95	
	9				1.70	
	8				1.95	
	7				1.80	
	6				1.90	
	5				2.00	
	4				1.90	
	3				2.10	
	2				1.45	
	1				1.40	
Temp. meas. device & S/N: PJT 33					Time end: 1906 hrs	

R or nothing = reg. manometer; S= expanded; E=electronic

INTERPOLL LABORATORIES - EPA METHOD 2 FIELD DATA SHEET

Job CP / HAYWARD

Source Line 2 Surface Dryer RTO Ret

Test 5 Run 2 Date 7-12-94

Stack dimen. 42 IN.

Dry bulb 210 °F Wet bulb 146 °F

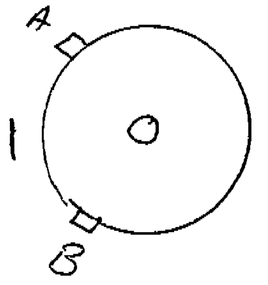
Manometer: ☒ Reg. ☐ Exp. ☐ Elec.

Barometric pressure 28.72 in Hg

Static pressure -17.10 in WC

Operators G Aschenbach J. Scripter

Pitot No. 27u-4 Cp .84

Cross-section View	Elevation View
	

Drawing of Test Site

Traverse Point No.		Fraction of Diameter	Distance from Stack Wall (in)	Distance from End of Port (in)	Velocity Pressure (in WC)	Temperature of gas (°F)
			Port length: 4 in.		Time start: 2016 hrs	
B	1				1.65	
	2				1:40	
	3				1.55	
	4				1.55	
	5				1.60	
	6				1.35	
	7				1.60	
	8				2.00	
	9				2.25	
	10				2.40	
	11				2.45	
	12				2.20	
A	1				1.60	
	2				1.60	
	3				1.70	
	4				1.50	
	5				1.55	
	6				1.75	
	7				2.00	
	8				2.20	
	9				2.25	
	10				2.15	
	11				2.10	
	12				2.00	
Temp. meas. device & S/N: PPT 33					Time end: 2035 hrs	

R or nothing = reg. manometer; S= expanded; E=electronic

INTERPOLL LABORATORIES - EPA METHOD 2 FIELD DATA SHEET

Job CP / HAYWARD

Source LDG 2 Surface Dryer RTO Inlet

Test 5 Run 3 Date 7-12-96

Stack dimen. 42 IN.

Dry bulb 211 °F Wet bulb 142 °F

Manometer: ☒ Reg. ☐ Exp. ☐ Elec.

Barometric pressure 28.72 in Hg

Static pressure -16.40 in WC

Operators B. Achenbach J. Johnson

Pitot No. 270-4 Cp .84

Cross-section View | Elevation View

Drawing of Test Site

Traverse Point No.		Fraction of Diameter	Distance from Stack Wall (in)	Distance from End of Port (in)	Velocity Pressure (in WC)	Temperature of gas (°F)
			Port length: 4 in.		Time start: hrs	
B	1				2.00	
	2				1.80	
	3				1.50	
	4				1.60	
	5				1.60	
	6				1.45	
	7				1.50	
	8				1.80	
	9				2.15	
	10				2.30	
	11				2.40	
	12				2.25	
A	1				1.20	
	2				1.80	
	3				1.85	
	4				2.00	
	5				1.95	
	6				1.70	
	7				1.65	
	8				1.75	
	9				1.95	
	10				2.20	
	11				1.80	
	12				1.65	
Temp. meas. device & S/N:					Time end: hrs	

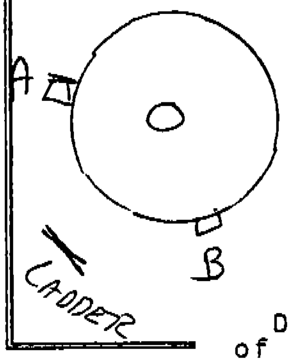
R or nothing = reg. manometer; S= expanded; E=electronic

INTERPOLL LABORATORIES - EPA METHOD 2 FIELD DATA SHEET

Job CP / HAYWARD
Source Line 2 Core Dryer RTO Inlet
Test 6 Run 1 Date 7-12-96
Stack dimen. 42 IN.
Dry bulb 225 °F Wet bulb 150 °F
Manometer: ☒ Reg. ☐ Exp. ☐ Elec.
Barometric pressure 28.72 in Hg
Static pressure -15.40 in WC
Operators B Aschenbach John Johnson
Pitot No. 270-4 Cp .84

Cross-section View

Elevation View



Drawing of Test Site

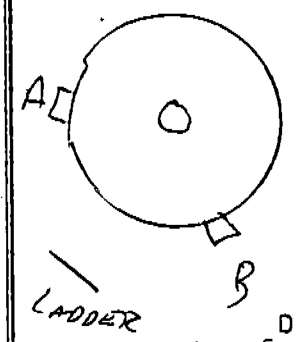
Traverse Point No.		Fraction of Diameter	Distance from Stack Wall (in)	Distance from End of Port (in)	Velocity Pressure (in WC)	Temperature of gas (°F)
			Port length: 4.0 in.		Timexstart: 1834 hrs	
B	12				1.50	
	11				1.85	225
	10				1.70	
	9				1.50	223
	8				1.40	
	7				1.20	226
	6				1.45	
	5				1.65	225
	4				1.85	
	3				1.80	225
	2				1.80	
	1				1.50	224
A	12				1.60	
	11				1.85	225
	10				2.00	
	9				1.85	
	8				1.80	
	7				1.55	
	6				1.35	
	5				1.30	
	4				1.15	
	3				1.20	
	2				1.10	
	1				1.10	
Temp. meas. device & S/N: DDT 33					Time end: 1840 hrs	

R or nothing = reg. manometer; S= expanded; E=electronic

INTERPOLL LABORATORIES - EPA METHOD 2 FIELD DATA SHEET

Job LP / HAYWARD
Source Line 2 Core Dryer RTO Inlet
Test 6 Run 2 Date 7-12-96
Stack dimen. 42 IN.
Dry bulb 253 °F Wet bulb 145 °F
Manometer: ☒ Reg. ☐ Exp. ☐ Elec.
Barometric pressure 28.72 in Hg
Static pressure -15.30 in WC
Operators B Aschenback J. Scripter
Pitot No. 2N-4 Cp .84

Cross-section View | Elevation View



Drawing of Test Site

Traverse Point No.		Fraction of Diameter	Distance from Stack Wall (in)	Distance from End of Port (in)	Velocity Pressure (in WC)	Temperature of gas (°F)
			Port length: 4 in.		Time start: 2039 hrs	
B	1				1.10	
	2				1.75	
	3				1.60	
	4				1.50	
	5				1.25	
	6				1.15	
	7				1.05	
	8				1.10	
	9				1.30	
	10				1.50	
	11				1.65	
	12				1.60	
	1				.90	
	2				.95	
	3				.95	
	4				1.00	
	5				.93	
	6				.85	
	7				1.15	
	8				1.30	
	9				1.60	
	10				1.60	
	11				1.45	
	12				1.50	
Temp. meas. device & S/N: PDT 33					Time end: 2045 hrs	

R or nothing = reg. manometer; S= expanded; E=electronic

INTERPOLL LABORATORIES - EPA METHOD 2 FIELD DATA SHEET

Job CP HAYWARD

Source Line 2 Core Dryer RTO Inlet

Test 6 Run 3 Date 7-12-96

Stack dimen. 42 IN.

Dry bulb 239 °F Wet bulb 151 °F

Manometer: ☒ Reg. ☐ Exp. ☐ Elec.

Barometric pressure 28.72 in Hg

Static pressure -15.20 in WC

Operators S. Asaluba & J. Johnsen

Pitot No. 77-4 Cp .84

Cross-section View	Elevation View

Drawing of Test Site

Traverse Point No.		Fraction of Diameter	Distance from Stack Wall (in)	Distance from End of Port (in)	Velocity Pressure (in WC)	Temperature of gas (°F)
			Port length: 4.0 in.		Time start: 2159 hrs	
B	1				1.70	
	2				1.65	
	3				1.60	
	4				1.55	
	5				1.35	
	6				1.20	
	7				1.10	
	8				1.35	
	9				1.50	
	10				1.65	
	11				1.70	
	12				1.40	
A	1				1.05	
	2				1.10	
	3				1.30	
	4				1.20	
	5				.90	
	6				1.05	
	7				1.40	
	8				1.65	
	9				1.70	
	10				1.95	
	11				2.10	
	12				1.90	
Temp. meas. device & S/N: PPT 33					Time end: 2205 hrs	

R or nothing = reg. manometer; S= expanded; E=electronic

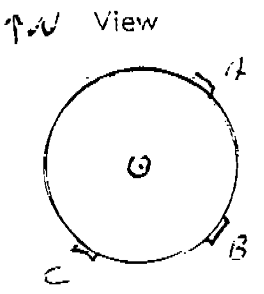
INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 2 Field Data Sheet

Loc. L.P. / Hagwood, [illegible]
Source Line 2 Dryer E.P. / Stack
Test 7 Run 0 Date 7-12-94
Stack Dimen. 81.5 IN.
Dry Bulb 327 °F Wet bulb 157 °F
Manometer ☒ Reg. ☐ Exp ☐ Elec.
Barometric Pressure 28.71 IN.HG
Static Pressure -.61 IN.WC
Operators E. Trowbridge + R. Mussmeyer
Pitot No. ~~[illegible]~~ C_p .84
4.45 % H_2O

Drawing of Test Site

Cross-section View



Elevation View

Traverse Point No.	Fraction of Diameter	Distance From Stack Wall (IN.)	Distance From End of Port (IN.)	Velocity	Temp. of Gas (°F)
▨		Port Length:	6.25 IN.	Time Start:	HRS
				Time End:	HRS

Refer to Test No 1

for pts and flows

Temp. Meas. Device & S/N:

R or nothing = reg. manometer; S = expanded; E = electronic

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INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job LP/HAYWARD
Source LINE 2 DRYER RTO STACK
Method 0011 Filter holder: NA
Date 7-12-94 Test 7 Run 1
No. of traverse points 16
Filter type: N/A

Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Post test: 0 cfm at 5 in. Hg. (vac) ☒

Particulate Catch Data:

No. of filters used: NA

Recovery solvent(s)
☐ acetone
☒ other(s) MeCl2

No. of probe wash bottles: 0
Sample recovered by: DM + K. Nuessmeier

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2			290
Impinger No. 3			
Condenser			
Desiccant	1480	1444	36
Total	▩	▩	326

Integrated Gas Sampling Data:

Bag Pump No. 29B
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: 0 cc/min at 15 in. Hg.
Time start: 1831 (HRS)
Sampling rate: 400 cc/min
Box No. 12 Bag No. 1
Size: 44 L
Time end: 1939 (HRS)
Operator: DM

S/N of O_2 Analyzer used to monitor train outlet: 9

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INTERPOLL LABORATORIES A METHOD 5 FIELD DATA SHEET

Job LP/HAYWARD
Source LINE 2 DRYER RTO STACK
Date 7-12-94 Test 2 Run 1

Operators DM-
Meter Box No. 10 ΔH@ 1.77 in WC
Gasmeter coeff. .9930

Pitot No. 415-8 Cp .84
Bar. Press. 28.71 inHg H2O 31 %
Nozzle No. GLASS Nozzle Dia .303 in.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Del. Vol. (cf)	VAC. inHg	Temperatures (°F) Stack	Probe	Oven	Impg.	Gas/In	Gas/Out	Oxygen (%v/v)
	(1830)	(636.70)											
A 8	4	640.12	.70	2.86	0.72	5	356	227	248	55	91	91	17.1
7	8	644.42	.77	3.12	4.88	6	347	231	246	58	95	91	17.2
6	12	647.39	.72	2.87	6.89	6	363	233	245	58	96	91	16.9
5	16	651.20	.75	3.07	3.03	6	343	231	245	58	98	91	17.4
4	20	655.20	.68	2.81	7.00	7	337	230	251	59	100	90	17.7
3	24	659.45	.70	2.81	0.97	7	361	231	247	59	102	91	17.3
2	28	664.51	.63	2.57	4.77	8	351	232	243	59	103	91	17.1
1	32	668.34	.60	2.45	8.49	6	351	231	245	59	105	91	17.3
B 8	36	672.08	.65	2.65	2.36	6	352	231	252	59	106	92	17.3
7	40	676.20	.74	3.10	6.52	7	341	229	257	58	104	93	17.4
6	44	680.50	.75	3.08	0.68	8	348	230	255	58	106	93	18.1
5	48	684.62	.75	2.95	4.69	8	356	233	270	59	105	92	17.8
4	52	688.80	.75	3.09	8.87	8	345	230	270	58	106	94	17.7
3	56	692.95	.72	3.01	2.99	8	336	229	269	56	107	94	17.7
2	60	697.10	.71	2.90	7.05	8	354	232	268	54	108	95	18.1
1	64	700.83	.55	2.27	0.64	7	350	235	269	57	107	95	17.3
	(1940)												
	Θ = 64	Vm = 64.13		ΔH 2.84							Avg. = 97.3		

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job LP / Hayward
Source Line 2 Dryer RTO Outlet
Method 0011 Filter holder: NA
Date 2-12 Test 2 Run 2
No. of traverse points 16
Filter type: NA

Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Post test: ≤0.02 cfm at 15 in. Hg. (vac) ☒

Particulate Catch Data:

No. of filters used: NA

Recovery solvent(s)
☐ acetone
☒ other(s) Methel Chloride

No. of probe wash bottles: 2
Sample recovered by: E. Trowbridge & K. Moessmeier

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1	787	467	320
Impinger No. 2			
Impinger No. 3			
Condenser			
Desiccant	411	380	31
Total	▨	▨	351

Integrated Gas Sampling Data:

Bag Pump No. 29B
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: 0
Time start: 2015 (HRS)
Sampling rate: 400 cc cc/min
Box No. 12 Bag No. 2
Size: 44 L
cc/min at 15 in. Hg.
Time end: 2121 (HRS)
Operator: DM

S/N of O_2 Analyzer used to monitor train outlet: 9

123093-G:\STACK\WP\METHODS\S-0046RR

METHOD ALL DRA ES AH DD EL ITA EF

Job LP, Hayward
Source Line 2 Dryer RTO Outlet
Date 2-12-94 Test 2 Run 2

Operators L A
Meter Box No. 10 ΔH@ 1.22 IN WC
Dry Gas Meter coeff. .9930

Pitot No. 4A)S-8 Cp .84
Bar. Press. 28.76 inHg H2O 21 %
Nozzle No. Glass Nozzle Dia .303 IN.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Dev. Vol. (cf)	VAC. inHg	Temperatures (°F) Stack	Probe	Oven	Impg.	Gas/In	Gas/Out	Oxygen (%v/v)
	(2015)	(701.50)											
B 8	4	705.10	.60	2.44	5.20	5	355	230	251	60	94	93	17.5
7	8	709.72	.58	2.34	4.82	5	355	231	270	59	95	93	16.9
6	12	712.66	.70	2.85	2.82	6	348	230	270	58	98	92	17.4
5	16	716.87	.72	2.95	6.88	7	345	231	271	50	99	93	17.2
4	20	721.00	.73	2.99	0.98	7	345	229	269	45	98	92	17.4
3	24	724.99	.70	2.85	4.98	7	349	231	271	43	100	91	17.3
2	28	729.45	.68	2.80	8.95	7	340	230	265	44	100	92	17.7
1	32	733.41	.65	2.69	2.84	7	337	233	265	45	102	93	17.8
A 8	36	737.44	.67	2.78	6.80	7	339	229	250	50	99	92	17.9
7	40	741.49	.75	3.11	0.98	7	338	231	255	49	102	92	17.9
6	44	745.51	.75	3.04	5.12	7	355	230	245	51	102	92	17.2
5	48	749.74	.78	3.18	9.35	7	350	235	256	54	102	92	17.7
4	52	753.67	.68	2.75	3.26	7	358	229	249	53	103	92	18.1
3	56	757.60	.70	2.82	7.27	7	361	231	243	54	102	91	18.1
2	60	761.46	.65	2.65	1.13	7	350	235	250	56	102	92	17.6
1	64	765.33	.69	2.81	5.11	7	352	234	250	57	102	92	17.7
	(2121)												
	Θ = 64	Vm = 63.83		ΔH 2.62							Avg. = 96.1		

S-0037R

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job LP / Hayward
Source LINE 2 DRYER RTO-STACK
Method 0011 Filter holder: NA
Date 7-12-94 Test 7 Run 3
No. of traverse points 16
Filter type: NA

Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Post test: 0 cfm at 7 in. Hg. (vac) ☒

Particulate Catch Data:

No. of filters used: N/A

Recovery solvent(s)
☐acetone
☒other(s) Methel Cloride

No. of probe wash bottles: 0
Sample recovered by: DM

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2			312
Impinger No. 3			
Condenser			
Desiccant	1447	1415	32
Total	▨	▨	344

Integrated Gas Sampling Data:

Bag Pump No. 29B
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: 0
Time start: 2156
Sampling rate: 400 cc/min
Box No. 12 Bag No. 3
Size: 44 L
cc/min at 15 in. Hg.
(HRS) Time end: 2304 (HRS)
cc/min Operator: D. Marso

S/N of O₂ Analyzer used to monitor train outlet: ~~29B~~ 9

123093-G:\STACK\WP\METHODS\S-0046RR

LF-011

3366

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job LP/Hayward
Source Line 2 Dryer RTO Outlet
Date 7-12-94 Test 2 Run 3

Operators DM + KU
Meter Box No. 10 ΔH@ 1.22 IN WC
Gamma coeff. .9930

Pitot No. 415-8 Cp .840
Bar. Press. 28.71 in Hg H2O 22.1 %
Nozzle No. Glass Nozzle Dia .303 IN.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Dev. Vol. (cf)	VAC. inHg	Temperatures (°F) Stack	Probe	Oven	Impg.	Gas/In	Gas/Out	Oxygen (%v/v)
	(2155)	765.60											
A 8	4	769.50	.73	2.95	9.67	6	337	229	250	55	87	86	18.0
7	8	773.42	.71	2.76	3.58	7	354	231	251	54	92	85	18.2
6	12	777.42	.72	2.86	7.56	7	340	232	251	55	93	85	18.4
5	16	781.50	.80	3.19	1.77	7	337	233	261	54	94	85	18.4
4	20	785.58	.73	2.84	5.74	7	338	231	254	56	95	85	18.2
3	24	789.67	.73	2.88	9.74	7	350	229	255	56	96	85	17.9
2	28	793.84	.69	2.72	3.63	7	350	231	244	55	97	85	18.3
1	32	797.74	.62	2.48	7.36	7	338	230	240	55	97	85	18.1
B 8	36	801.76	.70	3.08	1.50	7	338	229	237	56	97	85	17.6
7	40	805.83	.77	3.08	5.64	7	339	231	240	56	92	87	17.9
6	44	809.95	.79	3.15	9.82	7	338	233	243	56	95	84	18.5
5	48	814.00	.78	3.05	3.93	7	355	235	246	48	96	84	18.2
4	52	818.09	.75	2.96	7.99	7	348	231	246	49	97	84	18.3
3	56	822.18	.75	2.96	2.04	7	349	234	260	48	97	85	18.5
2	60	826.25	.71	2.77	5.97	7	358	231	266	48	98	85	18.6
1	64	830.13	.69	2.72	9.87	7	353	230	253	49	97	85	18.2
	(2305)												
	θ = 64	Vm = 64.53		ΔH 2.90							Avg. = 90.0		

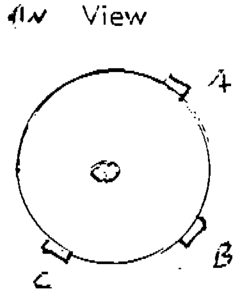
INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 2 Field Data Sheet

Job L.P. / Hayward, WI
Source Line 2 Dryer RTO / stack
Test 6 Run 0 Date 7-13-94
Stack Dimen. 81.5 IN.
Dry Bulb ____ °F Wet bulb ____ °F
Manometer ☒ Reg. ☐ Exp ☐ Elec.
Barometric Pressure 28.94 IN.HG
Static Pressure -.40 IN.WC
Operators D Maus & K Almstreier
Pitot No. 22V-8 C_p .84

PAH's

Drawing of Test Site

Cross-section View	Elevation View
	

Traverse Point No.	Fraction of Diameter	Distance From Stack Wall (IN.)	Distance From End of Port (IN.)	Velocity	Temp. of Gas (°F)
		Port Length: 6.25 IN.		Time Start:	HRS
A-1	.032	2.61	8.86		
2	.105	8.56	14.81		
3	.194	15.81	22.06		
4	.323	26.32	32.57		
5	677	55.18	61.43		
6	.806	65.69	71.94		
7	.895	72.94	79.19		
8	968	78.99	85.14		
B-1					
2					
3					
4					
5					
6					
7					
8					
Temp. Meas. Device & S/N:	PDT-31 / TC			Time End:	HRS

R or nothing = reg. manometer; S = expanded; E = electronic

032594-G:\STACK\WP\FORMS\S-392.1

INTERPOLL LABORATORIES EPA MODIFIED METHOD 5 SAMPLE LOG SHEET

Job LP/Hayward
urce Line 2 Dryer RTO Outlet
yclone: ☐ Yes ☒ No Filter holder: MM5
Analytes: PD-M
Field recovery spike added: ☒ Yes ☐ No

Date 7-13-94 Test 8 Run 1
No. of traverse points 16
Filter type: 4" Glass fiber
XAD-2 resin: ____ g Batch No. ____
Reference: EPA SW-846 Method 0010

Sample Train Leak Check:

Pretest: < 0.02 cfm at 15 in. Hg. (vac) ☒
Posttest: ≤0.02 cfm at 10 in. Hg. (vac) ☒

Semivolatile Catch Data:

No.s of filters used: 3002

Recovery solvent(s)
☒ MeCl2 ~~+ MeOH (50:50 v/v)~~
☒ other(s) Acetone

No. of bottles for condensate trap catch: 1
Samples recovered by:

Condensate Data:

Item	Weight(g)		
	Final	Tare	Difference
Condensate trap	607	267	347
Condensate trap			
Condensate trap			
Impingers			
Desiccant	1465	1445	20
Total	▨	▨	367

Integrated Gas Sampling Data:

Bag Pump No. 29B Box No. 28 Bag No. 1
Bag Material: 4-layer Aluminized Tedlar Size: 44 L
Pretest leak check: 0 cc/min at 15 in. Hg.
Time start: 0848 (HRS) Time end: 1058 (HRS)
Sampling rate: 200 cc/min O2 Analyzer S/N: ____

Rev.1 CF-026

INTERPOLL LABORATORIES EPA MODIFIED METHOD 5 FIELD DATA SHEET

Job LP / Hayward
Source Line 2 Dryer RTO Outlet
Date 7-13-94 Test 8 Run 1

Operators DM + KN
Meter Box No. 10
Gasmeter coeff. .9930

Nozzle No. 80-4
Nozzle Dia. .237 in.
Bar. Pres. 28.94 in. Hg

Pitot No 22-8
Cp .840
H_2O 22 %

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Det. Vol. (cf)	VAC.	Temperatures (°F)							Oxygen
						inHg	Stack	Probe	Oven	XAD2	Imp.	Meter(In/Out)		(%v/v)
	0842	838.55												
A 8	4	840.80	.66	.96	0.80	6	329	231	242	49	48	65	64	17.8
8	8	843.05	.65	.94	3.03	7	330	233	245	49	46	71	64	17.6
7	12	845.40	.71	1.04	5.38	7	330	229	240	49	46	72	64	18.0
7	16	847.95	.70	1.17	7.88	8	330	230	241	49	46	74	65	17.3
6	20	850.43	.70	1.01	0.21	8	338	228	239	50	47	76	65	17.8
6	24	852.95	.73	1.06	2.59	8	338	229	240	50	47	79	65	18.2
5	28	855.35	.72	1.03	4.94	8	350	231	242	50	47	77	64	17.8
5	32	857.70	.69	.99	7.24	8	350	230	230	50	46	79	65	17.7
4	36	859.80	.71	1.04	9.60	8	335	232	236	50	46	81	65	17.9
4	40	862.48	.70	1.02	1.95	8	335	238	234	50	46	83	68	17.8
3	44	864.80	.70	1.02	4.68	8	344	240	235	50	46	83	71	17.9
3	48	867.15	.72	1.05	6.64	8	344	234	229	50	45	85	72	17.8
2	52	869.54	.68	1.00	9.03	8	336	229	230	49	44	85	72	17.8
2	56	871.63	.66	.97	1.33	8	336	229	230	49	44	86	72	17.5
1	60	873.88	.45	.66	3.23	6	337	231	235	49	45	86	72	17.9
1	64	875.74	.43	.63	5.10	5	337	231	235	49	45	86	73	18.2
	θ=	Vm=		^H=								Avg.=		

Rev

S-405

025

INTERPOLL LABORATORIES EPA MODIFIED METHOD 5 FIELD DATA SHEET

Job LP / Hayward
Source Line 2 Dryer RTO Outlet
Date 7-13-94 Test 8 Run 1

Operators DM + KU
Meter Box No. 10
Gasmeter coeff. .9930

Nozzle No. 8D-4
Nozzle Dia. .232 in.
Bar. Pres. 28.94 in. Hg

Pitot No. 22-8
Cp .840
H_2O 22 %

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Del. Vol. (cf)	VAC. inHg	Temperatures (°F) Stack	Probe	Oven	XAD2	Imp.	Meter (In/Out) In	Meter (In/Out) Out	Oxygen (%v/v)
B 8	68	878.15	.67	.99	7.42	9	337	231	235	49	45	86	74	17.9
8	72	879.99	.65	.96	9.71	8	337	232	237	49	44	88	75	18.2
7	76	882.82	.65	.96	2.00	8	340	235	240	48	46	88	74	17.9
7	80	885.22	.75	1.13	4.48	9	327	229	230	48	45	90	76	17.8
6	84	887.63	.74	1.11	6.95	9	333	243	230	49	46	91	76	17.8
6	88	889.21	.72	1.08	9.38	8	333	243	230	49	46	91	76	17.5
5	92	892.40	.70	1.05	1.78	8	335	245	231	48	45	91	76	17.9
5	96	894.89	.73	1.07	4.20	9	349	249	230	48	45	93	78	17.8
4	100	897.29	.68	1.00	6.55	8	349	250	235	49	46	93	78	18.1
4	104	899.67	.68	1.00	8.90	8	349	250	235	49	46	93	78	17.4
3	108	901.78	.69	1.03	1.28	8	336	251	233	48	45	93	79	18.0
3	112	904.41	.71	1.06	371	8	336	251	233	48	45	94	80	18.2
2	116	906.77	.70	1.02	6.09	8	356	255	239	49	47	95	80	17.9
2	120	908.91	.60	.88	8.29	8	356	255	239	49	47	95	81	17.5
1	124	911.28	.60	.91	0.54	8	327	252	243	49	47	95	81	17.2
1	128	913.48	.61	.92	2.80	8	330	252	243	49	47	96	82	17.4
	(4058)	(74.93)												
	θ= 128	Vm= 74.93		^H= .99								Avg.= ~~92.0~~ 77.9		

Rev. 1

CF-023

S-405

INTERPOLL LABORATORIES EPA MODIFIED METHOD 5 SAMPLE LOG SHEET

Job LP / Hayward
Source Line 2 Dryer RTO Outlet
Cyclone: ☐ Yes ☒ No Filter holder: MM5
Analytes: POM
Field recovery spike added: ☒ Yes ☐ No

Date 7-13-94 Test 8 Run 2
No. of traverse points 16
Filter type: 4" Glass fiber
XAD-2 resin: ___ g Batch No. ___
Reference: EPA SW-846 Method 0010

Sample Train Leak Check:

Pretest: < 0.02 cfm at 15 in. Hg. (vac) ☒
Postest: ≤0.02 cfm at 10 in. Hg. (vac) ☒

Semivolatile Catch Data:

No.s of filters used: 3003

Recovery solvent(s)
☒ MeCl2 ~~* MeOH (50:50~~ v/v)
☒ other(s) Acetone

No. of bottles for condensate trap catch: 1
Samples recovered by: M. Kachler

Condensate Data:

Item	Weight(g)		
	Final	Tare	Difference
Condensate trap	639	267	372
Condensate trap			
Condensate trap			
Impingers			
Desiccant	1340	1317	23
Total	▨	▨	395

Integrated Gas Sampling Data:

Bag Pump No. 29B Box No. 28 Bag No. 2
Bag Material: 4-layer Aluminized Tedlar Size: 44 L
Pretest leak check: 0 cc/min at 15 in. Hg.
Time start: 1150 (HRS) Time end: 1402 (HRS)
Sampling rate: 200 cc/min O2 Analyzer S/N: ___

Rev.1 CF-026

INTERPOLL LABORATORIES EPA MODIFIED METHOD 5 FIELD DATA SHEET

Job LP / Hayward
Source Line 2 Dryer RTO Outlet
Date 7-13-94 Test 3 Run 3
Operators DM + KN
Meter Box No. 10
Gasmeter coeff. .9930
Nozzle No. 8D-4
Nozzle Dia. .337 in.
Bar. Pres. 28.94 in. Hg
Pilot No. 22-8
Cp .840
H_2O 20 %

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Del. Vol. (cf)	VAC. inHg	Temperatures (°F) Stack	Probe	Oven	XAD2	Imp.	Meter (In/Out) In	Out	Oxygen (%V/V)
	(1150)	913.90												
8	4	916.20	.72	1.09	6.33	5	353	231	242	47	43	86	82	17.9
8	8	918.58	.69	1.05	8.73	6	352	231	242	47	43	90	82	17.5
7	12	921.21	.70	1.07	1.16	6	353	234	241	47	43	91	82	17.6
7	16	923.55	.73	1.12	3.65	6	354	235	230	47	43	93	82	17.6
6	20	926.03	.73	1.12	6.13	6	353	258	235	48	44	94	82	17.6
6	24	928.55	.73	1.12	8.63	6	353	258	235	48	44	95	82	18.0
5	28	931.09	.75	1.18	1.18	7	334	251	241	47	44	95	83	17.6
5	32	933.65	.71	1.12	3.67	7	334	251	241	47	44	96	83	17.7
4	36	936.20	.70	1.10	6.15	7	335	255	243	47	45	97	83	17.5
4	40	938.72	.72	1.14	8.66	7	335	255	243	48	45	97	84	17.7
3	44	941.16	.65	1.02	1.04	7	338	249	251	48	45	97	84	17.9
3	48	943.55	.65	1.02	3.42	7	338	249	251	48	45	97	84	17.4
2	52	945.94	.65	1.02	5.80	7	340	253	248	47	44	98	85	17.3
2	56	948.28	.60	.93	8.04	7	352	253	248	47	44	98	86	17.1
1	60	951.18	.70	1.08	0.54	7	352	261	241	48	44	98	85	17.9
1	64	953.16	.67	1.04	2.95	7	346	261	241	48	44	99	86	17.6
	θ=	Vm=		^H=								Avg.=		

Rev. 1

CF-025

S-405

INTERPOLL LABORATORIES EPA MODIFIED METHOD 5 FIELD DATA SHEET

Job LP/Hayward
Source Line 2 Dryer RTO Outlet
Date 7-13-94 Test 8 Run 2

Operators DM + KN
Meter Box No. 10
Gasmeter coeff. .9930

Nozzle No. 80-4
Nozzle Dia. .237 in.
Bar. Pres. 28.94 in. Hg

Pitot No. 22-8
Cp .840
H_2O 20 %

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Del. Vol. (cf)	VAC. inHg	Temperatures (°F) Stack	Probe	Oven	XAD2	Imp.	Meter (In/Out)		Oxygen (%v/v)
A 8	68	955.50	.62	.97	5.27	7	346	251	257	49	45	95	86	17.8
8	72	957.75	.55	.86	7.46	6	346	251	257	49	45	95	86	17.0
7	76	956.05	.69	1.08	9.91	7	338	256	230	49	46	98	86	17.4
7	80	962.56	.69	1.09	2.38	7	338	256	230	49	46	98	87	17.9
6	84	965.01	.72	1.12	4.87	7	352	256	232	48	46	98	87	16.9
6	88	967.47	.70	1.09	7.33	7	352	261	235	48	46	99	87	17.5
5	92	969.98	.73	1.15	9.87	7	338	253	235	49	45	99	87	17.7
5	96	972.42	.65	1.03	2.26	7	338	253	235	49	45	100	87	17.5
4	100	974.85	.65	1.00	4.63	7	357	246	230	50	46	100	87	17.3
4	104	977.32	.70	1.08	7.09	7	357	246	230	50	46	100	87	17.8
3	108	979.79	.70	1.09	9.55	7	352	256	232	50	47	100	87	17.5
3	112	982.25	.68	1.06	1.99	7	346	256	232	50	47	100	88	17.1
2	116	984.63	.69	1.08	4.45	7	346	252	237	51	47	100	88	17.5
2	120	987.06	.70	1.10	6.93	7	346	240	235	51	48	101	88	17.6
1	124	989.45	.64	1.01	9.31	7	338	240	235	51	48	101	88	17.9
1	128	991.83	.64	1.01	1.69	7	338	251	230	51	48	101	88	17.5
	(0402)													
	θ= 128	Vs= 77.43		^H=1.06								Avg.= 91.1		

Rev

S-405

D-42

INTERPOLL LABORATORIES EPA MODIFIED METHOD 5 SAMPLE LOG SHEET

Job L.P. Hayward, CA
Source Line 2 Press PTO / Stack
Cyclone: ☐ Yes ☒ No Filter holder: MM5
Analytes: POM
Field recovery spike added: ☒ Yes ☐ No

Date 7-13-94 Test 8 Run 3
No. of traverse points 16
Filter type: 4" Glass fiber
XAD-2 resin: ___ g Batch No. ___
Reference: EPA SW-846 Method 0010

Sample Train Leak Check:

Pretest: < 0.02 cfm at 15 in. Hg. (vac) ☒
Postest: ≤0.02 cfm at 8 in. Hg. (vac) ☒

Semivolatile Catch Data:

No.s of filters used: 3004

Recovery solvent(s)
☒ MeCl2 ~~* MeOH (50:50~~ v/v)
☒ other(s) Acetone

No. of bottles for condensate trap catch: 1
Samples recovered by: M. Koehler

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Condensate trap	661	267	394
Condensate trap			
Condensate trap			
Impingers			
Desiccant	1387	1365	22
Total	▨		416

Integrated Gas Sampling Data:

Bag Pump No. 28B Box No. 28 Bag No. 3
Bag Material: 4-layer Aluminized Tedlar Size: 44 L
Pretest leak check: 0 cc/min at 15 in. Hg.
Time start: 1505 (HRS) Time end: 1717 (HRS)
Sampling rate: 200 cc/min O2 Analyzer S/N: ___

Rev.1 CF-026

INTERPOLL LABORATORIES EPA MODIFIED METHOD 5 FIELD DATA SHEET

Job LP / Hayward
Source Line 2 Dryer RTO Outlet
Date 7-13-94 Test 8 Run 3

Operators DM & KN
Meter Box No. 10
Gasmeter coeff. .9930

Nozzle No. 8D-4
Nozzle Dia. .237 in.
Bar.Pres. 29.94 in.Hg

Pitot No. 22-8
Cp .840
H_2O 21 %

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Del. Vol. (cf)	VAC. inHg	Temperatures (°F)							Oxygen (%v/v)
							Stack	Probe	Oven	XAD2	Imp.	Meter(In/Out)		
	(1500)	(992.20)												
A 8	4	994.36	.52	.79	4.30	5	344	248	252	46	42	86	84	16.8
8	8	996.36	.47	.71	6.27	5	347	248	252	46	42	86	84	17.1
7	12	998.71	.66	1.00	8.62	6	339	236	229	46	42	90	84	17.1
7	16	1001.08	.65	.99	0.97	6	339	236	229	46	42	93	84	16.9
6	20	1003.45	.69	1.06	3.39	6	339	238	230	47	43	96	84	17.1
6	24	1005.79	.61	.94	5.67	6	334	238	230	47	43	98	84	17.4
5	28	1008.18	.69	1.04	8.08	6	342	251	230	47	44	98	85	17.5
5	32	1010.57	.68	1.04	0.49	6	342	251	230	47	44	99	85	16.9
4	36	1012.98	.70	1.08	2.94	6	338	248	230	46	45	100	86	17.2
4	40	1015.40	.68	1.05	5.37	6	338	248	230	46	45	100	86	17.0
3	44	1017.78	.65	.98	7.71	6	358	250	232	48	44	101	86	16.7
3	48	1020.13	.68	1.03	0.10	6	358	250	232	48	44	101	87	17.0
2	52	1022.55	.67	1.04	2.52	6	335	242	230	49	44	101	88	17.1
2	56	1024.93	.66	1.03	4.92	6	335	243	231	49	44	101	88	17.0
1	60	1027.33	.68	1.04	7.33	6	348	239	250	49	45	102	88	17.4
1	64	1029.69	.64	.98	9.68	6	348	239	250	49	46	102	89	17.1
	θ=	Vm=		^H=								Avg.=		

INTERPOLL LABORATORIES EPA MODIFIED METHOD 5 FIELD DATA SHEET

Job LP / Hayward
Source Line 2 Dryer RTO Outlet
Date 7-13-94 Test 8 Run 3

Operators DM & KU
Meter Box No. 10
Gasmeter coeff. .9930

Nozzle No. 8D-4
Nozzle Dia. .237 in.
Bar. Pres. 28.94 in. Hg

Pitot No. 24-8
Cp .840
H_2O 21 %

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Dev. Vol. (cf)	VAC. in Hg	Temperatures (°F) Stack	Probe	Oven	XAD2	Imp.	Meter (In/Out)		Oxygen (%V/V)
B 8	68	1032.04	.63	.97	2.01	6	348	234	250	50	46	99	89	17.1
8	72	1034.40	.65	.99	4.36	6	348	238	251	50	46	99	89	17.3
7	76	1036.85	.72	1.12	6.86	7	337	251	230	50	45	102	89	17.5
7	80	1039.35	.72	1.12	9.37	7	337	252	235	51	45	103	90	16.8
6	84	1041.84	.71	1.10	1.86	7	339	259	231	51	46	103	90	16.9
6	88	1044.34	.70	1.09	4.33	7	339	260	230	51	46	103	91	17.3
5	92	1046.82	.72	1.10	6.82	7	353	260	230	49	45	103	91	17.0
5	96	1049.32	.72	1.10	9.31	7	353	260	232	49	45	104	91	17.1
4	100	1051.82	.72	1.13	1.83	7	334	251	240	51	47	104	91	17.5
4	104	1054.33	.70	1.10	4.31	7	334	250	243	52	48	104	92	17.2
3	108	1056.71	.65	.99	6.68	7	354	245	230	52	48	103	91	17.3
3	112	1059.09	.65	.99	9.04	7	354	248	231	53	48	103	91	17.5
2	116	1061.45	.64	.98	1.40	7	348	240	230	53	47	103	92	17.3
2	120	1063.83	.65	1.00	3.77	7	348	242	233	51	46	103	92	17.2
1	124	1066.13	.60	.92	6.05	7	349	240	235	52	47	103	92	17.1
1	128	1068.35	.56	.86	8.26	7	349	241	237	52	47	102	92	17.6
	(1717)													
	θ= 128	Vm= 36.15		^H= 1.01								Avg.= 96.0		

INTERPOLL LABORATORIES - EPA METHOD 2 FIELD DATA SHEET

Job L.P. / Hayward, WI

Source Line 2 Dryer RTO / Stack

Test 9 Run 0 Date 7-13-94

Stack dimen. 81.5 IN.

Dry bulb 327 °F Wet bulb 154 °F

Manometer: ☒ Reg. ☐ Exp. ☐ Elec.

Barometric pressure 28.94 in Hg

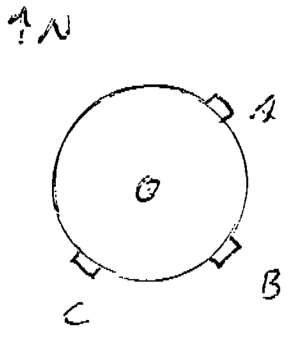
Static pressure -.40 in WC

Operators M. Kuhlman & K. Kliessmeier

Pitot No. NA Cp NA

Cross-section View

Elevation View



Drawing of Test Site

Traverse Point No.	Fraction of Diameter	Distance from Stack Wall (in)	Distance from End of Port (in)	Velocity Pressure (in WC)	Temperature of gas (°F)
▨	▨	Port length: 6.25 in.		Time start: NA hrs	
	1/6	13.58	19.83		
	3/6	40.75	47.00		
	5/6	67.92	74.17		
Temp. meas. device & S/N: PDT-31 / Tc				Time end: NA hrs	

R or nothing = reg. manometer; S= expanded; E=electronic

INTERPOLL LABORATORIES

Benzene Field Data Sheet

Job L.P. / Hayward, WI
Source Line 2 Dryer RTO / Stack
Date 7-13-94 Test 9 Run 1

Operator(s) M. Kuehler + K. Niessmeier
Meter Box No. 25 Meter coef. 1.0078
Barometric Pressure 28.94 in.Hg

Sample Train Leak Check:
Pretest: 0 cc/min at 15 in.Hg
Posttest: 0 cc/min at 15 in.Hg

Trav. Point No.	Samp. Time (min)	Sample Volume (cf)	Sample Rate (cc/min)	VAC. (inHg)	Temperature (°F)		
					Stack	Probe	Gasmeter
	0956	475.900					
B-3	5	475.993	1000	4	330	243	84
3	10	476.185	1000	4	330	240	86
3	15	476.370	1000	4	330	242	86
3	20	476.570	1000	4	350	245	88
2	25	476.757	1000	4	350	244	90
2	30	476.948	1000	4	335	249	90
2	35	477.136	1000	4	344	245	92
2	40	477.326	1000	4	348	245	92
C-1	45	477.515	1000	4	336	242	92
1	50	477.703	1000	4	336	247	92
1	55	477.900	1000	4	342	250	92
1	60	478.095	1000	4	340	252	93
	θ=60	V_m=2.195					t_m=89.8

(0956)

V_{STD}= 2.149

INTERPOLL LABORATORIES

Benzene Field Data Sheet

Job L.P. / Hayward, WI
Source Lined Dryer RTO / Stack
Date 2-13-94 Test 9 Run 2

Operator(s) M. Kachlbat + K. Wessmeier
Meter Box No. 25 Meter coef. 1.0078
Barometric Pressure 28.94 in.Hg

Sample Train Leak Check:
Pretest: 0 cc/min at 15 in.Hg
Posttest: 0 cc/min at 15 in.Hg

Trav. Point No.	Samp. Time (min)	Sample Volume (cf)	Sample Rate (cc/min)	VAC. (inHg)	Temperature (°F)		
					Stack	Probe	Gasmeter
	(1120)	478.310					
c 3	5	478.51	1000	4	333	240	86
3	10	478.79	1000	4	335	238	86
3	15	478.87	1000	4	334	242	86
3	20	479.06	1000	4	339	245	88
2	25	479.251	1000	4	347	247	89
2	30	479.443	1000	4	347	242	89
2	35	479.631	1000	4	345	249	90
2	40	479.820	1000	4	340	250	91
1	45	480.006	1000	4	344	253	92
1	50	480.193	1000	4	349	255	92
1	55	480.380	1000	4	352	251	93
1	60	480.568	1000	4	334	251	93
	θ= 60	V_m= 2.258					t_m= 89.6

(1220)

VSTD = 2.114

INTERPOLL LABORATORIES

Benzene Field Data Sheet

Job L.P. / Hayward, WI
Source Line 2 Dryer RTO / Stack
Date 2-13-94 Test 9 Run 3

Operator(s) M. Kuehler + K. Wessmeier
Meter Box No. 25 Meter coef. 1.0078
Barometric Pressure 28.94 in.Hg

Sample Train Leak Check:
Pretest: 0 cc/min at 15 in.Hg
Posttest: 0 cc/min at 15 in.Hg

Trav. Point No.	Samp. Time (min)	Sample Volume (cf)	Sample Rate (cc/min)	VAC. (inHg)	Temperature (oF)		
					Stack	Probe	Gasmeter
	1300	480.800					
B-3	5		1000	4	352	247	94
3	10	481.182	1000	4	357	250	94
3	15	481.371	1000	4	338	245	94
3	20	481.560	1000	4	352	249	93
2	25	481.751	1000	4	352	247	93
2	30	481.937	1000	4	338	250	94
2	35	482.130	1000	4	357	252	94
2	40	482.319	1000	4	357	249	95
1	45	482.508	1000	4	352	250	96
1	50	482.497	1000	4	346	245	97
1	55	482.888	1000	4	340	249	98
1	60	483.077	1000	4	342	251	98
	θ= 60	Vm= 2.277					tm= 95.0

(1401)

VSTD = 2.112

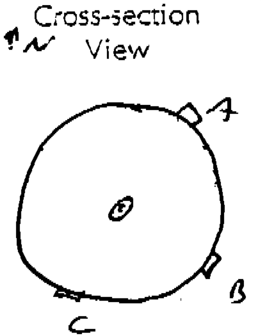
S-476

INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 2 Field Data Sheet

Job L.P. / Hayward, WI
Source Line 2 Dryer RTO / Stack
Test 10 Run 0 Date 7-13-94
Stack Dimen. 81.5 IN.
Dry Bulb 345 °F Wet bulb 155 °F
Manometer ☐ Reg. ☐ Exp ☐ Elec.
Barometric Pressure 28.94 IN.HG
Static Pressure -.40 IN.WC
Operators M. Kaehler + K. Nuessmeier
Pitot No. 29V-8 C_p .84
Thend

Drawing of Test Site

Cross-section View	Elevation View
	

Traverse Point No.	Fraction of Diameter	Distance From Stack Wall (IN.)	Distance From End of Port (IN.)	Velocity	Temp. of Gas (°F)
▨		Port Length: 6.25 IN.		Time Start: NA HRS	
	1/6	13.58	19.83		
	3/6	40.75	47.00		
	5/6	67.92	74.17		
Temp. Meas. Device & S/N: PDT-31/TC				Time End: NA HRS	

R or nothing = reg. manometer; S = expanded; E = electronic

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INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job L.P. / Hayward, WI
Source Line 2 Dryer RTO / stack
Method Phenol Filter holder: Glass
Date 7-13-94 Test 10 Run 1
No. of traverse points 3
Filter type: 4" G.F.

Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) 0
Post test: <0.02 cfm at 12 in. Hg. (vac) 0

Particulate Catch Data:

No. of filters used: NA

Recovery solvent(s)
☐ acetone
☐ other(s)

No. of probe wash bottles: 0
Sample recovered by: M. Kuehlen + K. Nuessmeier

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. A	417	268	149
Impinger No. B	327	268	59
Impinger No. 3			
Condenser			
Desiccant	1317	1304	13
Total			221

Integrated Gas Sampling Data: Took Bag Sample During Run 1 POM

Bag Pump No.
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check:
Time start:
Sampling rate:
Box No. Bag No.
Size: 44 L
cc/min at in. Hg.
(HRS) Time end: (HRS)
cc/min Operator:

S/N of O_2 Analyzer used to monitor train outlet:

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job L.P. / Hayward, WI
Source Line 2 Dryer RTO / Stack
Date 2-13-94 Test 10 Run 1

Operators M.Koehler + K.Nassmeier
Meter Box No. 2 ΔH@ 1.72 in HC
Gasmeter coeff. .9974

Pitot No. 29U-B Cp .84
Bar. Press. 28.94 inHg H2O NA %
Nozzle No. NA Nozzle Dia NA in.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Dry. Vol. (cf)	VAC. inHg	Temperatures (°F) Stack	Probe	Oven	Impg.	Gas/In	Gas/Out	Oxygen (%v/v)
	0956	193.50											
B-3	5	197.40	NA	1.77	NA	7	330	242	250	44	70	69	17.6
3	10	201.27	↓	1.77	↓	7	330	245	247	44	77	69	17.8
3	15	205.25		1.77		7	330	243	249	44	82	70	18.0
3	20	209.02		1.77		7.5	350	242	241	45	85	70	17.9
2	25	212.92		1.77		2.5	350	245	246	45	86	72	17.7
2	30	216.82		1.77		2.5	335	248	243	45	87	75	17.5
2	35	220.74		1.77		2.5	344	251	245	45	88	74	18.0
2	40	224.64		1.77		2.5	348	250	249	45	89	74	17.8
C-1	45	228.53		1.77		2.5	336	239	244	46	88	75	19.0
1	50	232.40		1.77		2.5	336	244	250	46	89	75	18.1
1	55	236.27		1.77		2.5	341	248	250	46	88	76	17.7
1	60	240.15	↓	1.77	↓	2.5	340	245	247	46	90	76	18.3
	(0956)												
	θ = 60	Vm = 46.65		ΔH 1.77							Avg. = 78.92		

S-0037R

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job L.P. / Hayward, WI
Source Line 2 Dryer RTO / Stack
Method Phenol Filter holder: Glass
Date 7-13-94 Test 10 Run 2
No. of traverse points 3
Filter type: 4" G.F.

Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Post test: <0.02 cfm at 12 in. Hg. (vac) ☒

Particulate Catch Data:

No. of filters used: NA

Recovery solvent(s)
☐acetone
☐other(s)

No. of probe wash bottles: 0
Sample recovered by: M. Koehler + K. Nuessmeier

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1	398	268	130
Impinger No. 2	362	268	94
Impinger No. 3			
Condenser			
Desiccant	1496	1480	16
Total	▨	▨	240

Integrated Gas Sampling Data: Sample Taken During Run 2, POM

Bag Pump No.
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check:
Time start:
Sampling rate:
Box No. Bag No.
Size: 44 L
cc/min at in. Hg.
(HRS) Time end: (HRS)
cc/min Operator:

S/N of O_2 Analyzer used to monitor train outlet:

123093-G:\STACK\WP\METHODS\S-0046RR

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job LP/Hayward
Source Line 2 Dryer RTO / Stack
Date 7-23-94 Test 10 Run 2

Operators M. Kaehler + K. Nuessmeier
Meter Box No. 2 ΔH@ 1.72 in WC
Calibr. coeff. .9924

Pitot No. 23V-8 Cp .84
Bar. Press. 28.94 in Hg H2O NA %
Nozzle No. NA Nozzle Dia NA in.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Dev. Vol. (cf)	VAC. (inHg)	Temperatures (°F) Stack	Probe	Oven	Impg.	Gas/In	Gas/Out	Oxygen (%v/v)
	(1120)	(240.89)											
C-3	5	244.52	NA	1.77	NA	7	333	240	250	45	85	76	17.6
3	10	248.35		1.77		7	335	241	252	45	86	77	17.2
3	15	252.22		1.77		7	334	243	250	45	90	77	17.5
3	20	256.03		1.77		7	339	239	255	45	93	78	18.1
2	25	259.89		1.77		2.5	342	240	250	45	94	78	18.0
2	30	263.73		1.77		2.5	347	245	252	46	94	79	18.0
2	35	267.57		1.77		2.5	345	249	248	46	95	80	17.5
2	40	271.42		1.77		2.5	340	253	245	47	95	80	17.7
1	45	275.28		1.77		2.5	344	250	247	47	95	81	17.3
1	50	279.21		1.77		2.5	349	247	252	47	96	82	17.4
1	55	283.14		1.77		2.5	352	245	257	48	96	92	17.5
1	60	287.02		1.77		2.5	334	250	257	48	96	82	17.9
	(1220)												
	θ = 60	Vm = 46.13		ΔH 1.77							Avg. = 86.13		

10

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Date 7-13-94 Test 20 Run 3
No. of traverse points 3
Filter type: 4" G.F.

Job L.P. / Hayward, WI
Source Line 2 Dryer RTO / Stack
Method Phenol Filter holder: Glass
Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☑
Post test: <0.02 cfm at 12 in. Hg. (vac) ☒

Particulate Catch Data:

No. of filters used: NA

Recovery solvent(s)
☐acetone
☐other(s)

No. of probe wash bottles: 0
Sample recovered by: M. Kachler + K. Niessmeier

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. A	395	270	125
Impinger No. B	357	268	89
Impinger No. 3			
Condenser			
Desiccant	1487	1472	15
Total	▨		229

Integrated Gas Sampling Data: Sample Taken During Run 2 POM

Bag Pump No.
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check:
Time start:
Sampling rate:

Box No. Bag No.
Size: 44 L
cc/min at in. Hg.
(HRS) Time end: (HRS)
cc/min Operator:

S/N of O_2 Analyzer used to monitor train outlet:

123093-G:\STACK\WP\METHODS\S-0046RR

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job L.P. / Hayward, WI
Source Line 1 Dryer RTO / Stack
Date 2-13-94 Test 10 Run 3

Operators M. Luchler / K. Nuessmeier
Meter Box No. 2 ΔH@ 1.77 IN WC
Gasmeter coeff. .9974

Pitot No. 29V-8 Cp .84
Bar. Press. 28.94 inHg H2O NA %
Nozzle No. NA Nozzle Dia NA IN.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Dry. Vol. (cf)	VAC. inHg	Temperatures (°F) Stack	Probe	Oven	Impg.	Gas/In	Gas/Out	Oxygen (%v/v)
	1300	287.40											
B-3	5	291.32	NA	1.77	NA	7	352	243	250	47	82	82	17.6
3	10	295.24		1.77		2.5	357	240	253	47	84	79	18.1
3	15	299.01		1.77		2.5	338	245	249	47	87	79	17.8
3	20	302.91		1.77		2.5	352	248	252	47	90	80	17.7
2	25	306.76		1.77		2.5	352	250	255	48	91	80	18.0
2	30	310.60		1.77		2.5	338	252	259	48	93	80	17.3
2	35	314.40		1.77		2.5	357	248	261	48	94	81	17.1
2	40	318.30		1.77		2.5	357	256	267	48	95	82	17.6
1	45	322.22		1.77		2.5	352	253	264	48	96	82	17.1
1	50	326.13		1.77		2.5	346	250	261	46	96	83	17.6
1	55	330.04		1.77		2.5	340	253	260	46	97	83	17.3
1	60	333.96	↓	1.77	↓	2.5	342	258	255	46	97	84	17.9
	(1401)												
	θ = 60	Vm = 46.56		ΔH 1.77							Avg. = 86.54		

S-0037R

Interpoll Laboratories
(612)786-6020

Visible Emissions Form

Test 1

SOURCE NAME Louisiana Pacific Corp	OBSERVATION DATE 7-12-94	START TIME 1500	STOP TIME 1600

ADDRESS //

CITY HAYWARD

STATE WISC

ZIP

PHONE

SOURCE ID NUMBER

PROCESS EQUIPMENT Line 2 Dryer

OPERATING MODE

CONTROL EQUIPMENT RTO

OPERATING MODE

DESCRIBE EMISSION POINT

START Round metal stack STOP ✓

HEIGHT ABOVE GROUND LEVEL START 100' STOP

HEIGHT RELATIVE TO OBSERVER START 100' STOP

DISTANCE FROM OBSERVER START 300' STOP ✓

DIRECTION FROM OBSERVER START NE STOP ✓

DESCRIBE EMISSIONS START NONE STOP ✓

EMISSION COLOR START None STOP ✓

PLUME TYPE: CONTINUOUS ☐ FUGITIVE ☐ INTERMITTENT ☐

WATER DROPLETS PRESENT: NO ☒ YES ☐

IF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☐

POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED

START 8' Above STACK STOP ✓

DESCRIBE BACKGROUND

START SKY STOP ✓

BACKGROUND COLOR START Blue/Gray STOP ✓

SKY CONDITIONS START 50% cloudy STOP ✓

WIND SPEED START 10 STOP 5

WIND DIRECTION START NW STOP ✓

AMBIENT TEMP. START 82 STOP 83

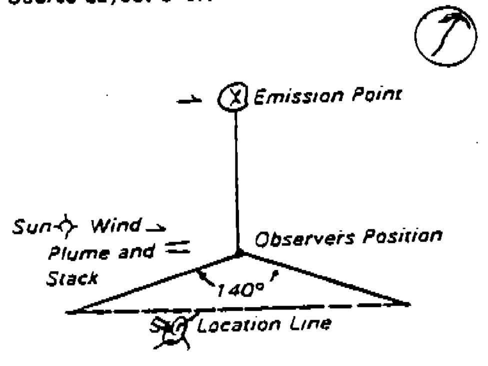
WET BULB TEMP. 65

RH, percent 39

MIN \ SEC	0	15	30	45	MIN \ SEC	0	15	30	45
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
5	0	0	0	0	35	0	0	0	0
6	0	0	0	0	36	0	0	0	0
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
12	0	0	0	0	42	0	0	0	0
13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	0	0	0	0	49	0	0	0	0
20	0	0	0	0	50	0	0	0	0
21	0	0	0	0	51	0	0	0	0
22	0	0	0	0	52	0	0	0	0
23	0	0	0	0	53	0	0	0	0
24	0	0	0	0	54	0	0	0	0
25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

Source Layout Sketch

Draw North Arrow



AVERAGE OPACITY FOR HIGHEST PERIOD

NUMBER OF READINGS ABOVE % WERE

RANGE OF OPACITY READINGS MINIMUM MAXIMUM

OBSERVER'S NAME (PRINT) Edward M. Trowbridge

OBSERVER'S SIGNATURE Edward M. Trowbridge

DATE 7-12-94

ORGANIZATION Interpoll Labs

CERTIFIED BY E TA

DATE 4-7-94

VERIFIED BY

DATE

COMMENTS

I HAVE RECEIVED A COPY OF THESE OPACITY OBSERVATIONS

SIGNATURE

TITLE

DATE

VISIBLE EMISSIONS EVALUATOR

This is to certify that

Edward Trowbridge

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.

Thomas Rose
President

Vice President

David B. Savage, Jr.
Program Manager

243006
Certificate Number

Minneapolis
Location

April 7, 1994
Date of Issue

APPENDIX E

INTERPOLL LABORATORIES ANALYTICAL DATA

TABLE OF CONTENTS

Interpoll Laboratories
(612) 786-6020

EPA Method 3 Data Reporting Sheet
Orsat Analysis

Job L.P. Hayward
am Leader DM
.te Submitted 7-18-94
Test No. 3
Date of Analysis 7-18-94

Source Line 2 Core Dryer
Test Site Inlet
Date of Test 7-12-94
No. of Runs Completed 3
Technician C. Helgeso

Test/ Run	Sample Log Number and Type	No. of An.	Buret Readings (ml)			Conc. CO_2 %v/v Dry	Conc. O_2 %v/v Dry	F_0
			Zero Pt.	After CO_2	After O_2			
3/1	3366-20	1	0.00	3.40	20.80	3.40	17.40	1.03
		2	0.00	3.40	20.80	3.40	17.40	1.03
	☑ B ☐ F	Avg				3.40	17.40	
3/2	-21	1	0.00	4.50	20.90	4.50	16.40	1.00
		2	0.00	4.50	20.90	4.50	16.40	1.00
	☑ B ☐ F	Avg				4.50	16.40	
3/3	-22	1	0.00	3.80	20.90	3.80	17.10	1.00
		2	0.00	3.80	20.90	3.80	17.10	1.00
	☑ B ☐ F	Avg				3.80	17.10	
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						

☑ Ambient Air QA Check
☑ Orsat Analyzer System Leak Check
☐ F_0 Within EPA M-3 Guidelines for fuel type.

Where $F_0 = \frac{20.9 - O_2}{CO_2}$

EPA Method 3 Guidelines

Fuel Type	F0 Range
Coal:	
Anthracite/Lignite	1.016-1.130
Bituminous	1.083-1.230
Oil:	
Distillate	1.260-1.413
Residual	1.210-1.370
Gas:	
Natural	1.600-1.836
Propane	1.434-1.586
Butane	1.405-1.553
Wood/Wood Bark	1.000-1.130

F=Flask (250 cc all glass)
B=Tedlar Bag (5-layer)

6-23

Interpoll Laboratories
(612) 786-6020

EPA Method 3 Data Reporting Sheet
Orsat Analysis

Job L.P. Hayword
Team Leader BA
Date Submitted 7-18-94
Test No. 13
Date of Analysis 7-18-94

Source Lin 1 Surface Dryer
Test Site RTO Inlet
Date of Test 7-14-94
No. of Runs Completed 4
Technician C. Helgeson

Test/Run	Sample Log Number and Type	No. of An.	Buret Readings (ml) Zero Pt.	After CO_2	After O_2	Conc. CO_2 %v/v Dry	Conc. O_2 %v/v Dry	F_o
13/1	3366-99	1	0.00	4.30	20.80	4.30	16.50	1.02
		2	0.00	4.30	20.80	4.30	16.50	1.02
	☑ B ☐ F	Avg				4.30	16.50	
13/2	-100	1	0.00	1.40	20.90	1.40	19.50	1.00
		2	0.00	1.40	20.90	1.40	19.50	1.00
	☑ B ☐ F	Avg				1.40	19.50	
13/3	-101	1	0.00	3.50	20.90	3.50	17.40	1.00
		2	0.00	3.50	20.90	3.50	17.40	1.00
	☑ B ☐ F	Avg				3.50	17.40	
13/4	-102	1	0.00	3.80	20.90	3.80	17.10	1.00
		2	0.00	3.80	20.90	3.80	17.10	1.00
	☑ B ☐ F	Avg				3.80	17.10	
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						

☑ Ambient Air QA Check
☑ Orsat Analyzer System Leak Check
☐ F_o Within EPA M-3 Guidelines for fuel type.

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

F=Flask (250 cc all glass)
B=Tedlar Bag (5-layer)

EPA Method 3 Guidelines

Fuel Type	F0 Range
Coal:	
Anthracite/Lignite	1.016-1.130
Bituminous	1.083-1.230
Oil:	
Distillate	1.260-1.413
Residual	1.210-1.370
Gas:	
Natural	1.600-1.836
Propane	1.434-1.586
Butane	1.405-1.553
Wood/Wood Bark	1.000-1.130

Interpoll Laboratories
(612) 786-6020

EPA Method 3 Data Reporting Sheet
Orsat Analysis

Job L.P. Hayward
am Leader DM
.te Submitted 7-18-94
Test No. 15
Date of Analysis 7-18-94

Source Line 1 Core Dryer
Test Site RTO Inlet
Date of Test 7-14-94
No. of Runs Completed 4
Technician C. Helgeson

Test/ Run	Sample Log Number and Type	No. of An.	Buret Readings (ml)			Conc. CO₂ %v/v Dry	Conc. O₂ %v/v Dry	F₀
			Zero Pt.	After CO₂	After O₂			
15/1	3366-28	1	0.00	4.30	20.90	4.30	16.60	1.00
		2	0.00	4.30	20.90	4.30	16.60	1.00
	☑ B ☐ F	Avg				4.30	16.60	
15/2	-29	1	0.00	4.20	20.80	4.20	16.60	1.02
		2	0.00	4.20	20.80	4.20	16.60	1.02
	☑ B ☐ F	Avg				4.20	16.60	
15/3	-30	1	0.00	4.50	20.80	4.50	16.30	1.02
		2	0.00	4.50	20.80	4.50	16.30	1.02
	☑ B ☐ F	Avg				4.50	16.30	
15/4	-31	1	0.00	3.70	20.80	3.70	17.10	1.02
		2	0.00	3.70	20.80	3.70	17.10	1.02
	☑ B ☐ F	Avg				3.70	17.10	
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						

☑ Ambient Air QA Check
☑ Orsat Analyzer System Leak Check
☐ F₀ Within EPA M-3 Guidelines for fuel type.

Where $F_0 = \frac{20.9 - O_2}{CO_2}$

F=Flask (250 cc all glass)
B=Tedlar Bag (5-layer)

EPA Method 3 Guidelines

Fuel Type	F0 Range
Coal:	
Anthracite/Lignite	1.016-1.130
Bituminous	1.083-1.230
Oil:	
Distillate	1.260-1.413
Residual	1.210-1.370
Gas:	
Natural	1.600-1.836
Propane	1.434-1.586
Butane	1.405-1.553
Wood/Wood Bark	1.000-1.130

Interpoll Laboratories
(612) 786-6020

EPA Method 3 Data Reporting Sheet
Orsat Analysis

Job L. P. Hayward
Team Leader MK
Date Submitted 7-18-94
Test No. 20
Date of Analysis 7-18-94

Source Line 1 Dryer RTO
Test Site Stack
Date of Test 7-15-94
No. of Runs Completed 3
Technician C. Hebeson

Test/Run	Sample Log Number and Type	No. of An.	Buret Readings (ml) Zero Pt.	After CO_2	After O_2	Conc. CO_2 %v/v Dry	Conc. O_2 %v/v Dry	F_o
20/1	3366-107	1	0.00	4.10	20.70	4.10	16.60	1.05
		2	0.00	4.10	20.70	4.10	16.60	1.05
	☑ B ☐ F	Avg				4.10	16.60	
20/2	-108	1	0.00	4.30	20.60	4.30	16.30	1.07
		2	0.00	4.30	20.60	4.30	16.30	1.07
	☑ B ☐ F	Avg				4.30	16.30	
20/3	-109	1	0.00	4.10	20.60	4.10	16.50	1.07
		2	0.00	4.10	20.60	4.10	16.50	1.07
	☑ B ☐ F	Avg				4.10	16.50	
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						

☑ Ambient Air QA Check
☑ Orsat Analyzer System Leak Check
☐ F_o Within EPA M-3 Guidelines for fuel type.

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

F=Flask (250 cc all glass)
B=Tedlar Bag (5-layer)

EPA Method 3 Guidelines

Fuel Type	F0 Range
Coal:	
Anthracite/Lignite	1.016-1.130
Bituminous	1.083-1.230
Oil:	
Distillate	1.260-1.413
Residual	1.210-1.370
Gas:	
Natural	1.600-1.836
Propane	1.434-1.586
Butane	1.405-1.553
Wood/Wood Bark	1.000-1.130

Interpoll Laboratories
(612) 786-6020

EPA Method 5 Data Reporting Sheet
Impinger Catch/Wisconsin Protocol

Job L. P. Hayward
Team Leader MK
Date Submitted 7-18-94
Test No. 1
Date of Analysis 7-21-94

Source Line 2 Dryer RTO
Test Site Stack
Date of Test 7-16-94
No. of Runs Completed 3
Technician C. Helgeson

		Solvent Phase	Aqueous Phase
0	Test 1 Run 0 Field Blank Log Number 3366-32I Comments	Dish No. 55 Dish Tare Wt. 47.7754 g Dish+Sample Wt. 47.7756 g Sample Wt. 0.0002 g	Dish No. 328 Dish Tare Wt. 41.9670 g Dish+Sample Wt. 41.9674 g Sample Wt. 0.0004 g
1	Test 1 Run 1 Log Number -33I Comments	Dish No. 54 Dish Tare Wt. 49.6664 g Dish+Sample Wt. 49.6754 g Sample Wt. 0.0090 g	Dish No. 340 Dish Tare Wt. 47.9150 g Dish+Sample Wt. 47.9350 g Sample Wt. 0.0200 g
2	Test 1 Run 2 Log Number -34I Comments	Dish No. 63 Dish Tare Wt. 50.4220 g Dish+Sample Wt. 50.4298 g Sample Wt. 0.0078 g	Dish No. 401 Dish Tare Wt. 49.5262 g Dish+Sample Wt. 49.5338 g Sample Wt. 0.0076 g
3	Test 1 Run 3 Log Number -35I Comments	Dish No. 98 Dish Tare Wt. 47.2108 g Dish+Sample Wt. 47.2168 g Sample Wt. 0.0060 g	Dish No. 405 Dish Tare Wt. 48.4897 g Dish+Sample Wt. 48.4977 g Sample Wt. 0.0080 g
4	Test Run Log Number Comments	Dish No. Dish Tare Wt. g Dish+Sample Wt. g Sample Wt. g	Dish No. Dish Tare Wt. g Dish+Sample Wt. g Sample Wt. g
5	Test Run Log Number Comments	Dish No. Dish Tare Wt. g Dish+Sample Wt. g Sample Wt. g	Dish No. Dish Tare Wt. g Dish+Sample Wt. g Sample Wt. g

Results Solvent Phase:

Blank Solvent Wt. 0.0002 g

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.0088	0.0076	0.0058		

Results Aqueous Phase:

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.0196	0.0072	0.0076	E-5	

LSC-03WYR

Interpoll Laboratories
(612) 786-6020

EPA Method 5 Data Reporting Sheet
Probe/Cyclone Wash

Job L.P. Hayward
Team Leader MK
Date Submitted 7-18-94
Test No. 1
Date of Analysis 7-21-94
Transport Leakage ☐ None ☐ ______ ml

Source Line 2 Dryer RTO
Test Site Stack
Date of Test 7-12-94
No. of Runs Completed 3
Technician C. Helgeson
Solvent Acetone

0	Test 1 Run 0 Field Blank Log Number 3366-32P Vol. of Solvent 100 ml *Solvent Residue 4.00 ug/ml	Dish No. 12 Dish Tare Wt. 48.1481 g Dish+Sample Wt. 48.1485 g Sample Wt. 0.0004 g
1	Test 1 Run 1 Vol. of Solvent 200 ml Log Number -33P Comments	Dish No. 13 Dish Tare Wt. 45.7199 g Dish+Sample Wt. 45.8215 g Sample Wt. 0.1016 g
2	Test 1 Run 2 Vol. of Solvent 230 ml Log Number -34P Comments	Dish No. 17 Dish Tare Wt. 48.3900 g Dish+Sample Wt. 48.4116 g Sample Wt. 0.0216 g
3	Test 1 Run 3 Vol. of Solvent 220 ml Log Number 35P Comments	Dish No. 18 Dish Tare Wt. 49.9873 g Dish+Sample Wt. 50.0010 g Sample Wt. 0.0137 g
4	Test ____ Run ____ Vol. of Solvent ____ ml Log Number Comments	Dish No. Dish Tare Wt. ____ g Dish+Sample Wt. ____ g Sample Wt. ____ g
5	Test ____ Run ____ Vol. of Solvent ____ ml Log Number Comments	Dish No. Dish Tare Wt. ____ g Dish+Sample Wt. ____ g Sample Wt. ____ g

*Solvent Residue 4.00 ug/ml=[(Sample Wt. 0.0004 g)(10^6)]/Vol. of Sol. 100 ml
EPA-M5 Acetone Residue Blank Spec. <7.8 ug/ml

Results:

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.1008	0.0207	0.0128	E-6	

LSC-01YR

Interpoll Laboratories
(612) 786-6020

EPA Method 5 Data Reporting Sheet
Filter Gravimetrics

Job L.P. Hayward	Source Line 2 Dryer RTO
Team Leader MK	Test Site Stack
Date Submitted 7-18-94	Date of Test 7-12-94
Test No. 1	No. of Runs Completed 3
Date of Analysis 6-20-94	Technician C. Helgeson

0	Test 1 Run 0 Field Blank Log Number 3366-32F Comments	Filter No. 6784 Filter Type 4"GF Filter Tare Wt. 0.4367 g Filter+Sample Wt. 0.4367 g Sample Wt. 0.0000 g
1	Test 1 Run 1 Log Number 33F Comments	Filter No. 6781 Filter Type 4"GF Filter Tare Wt. 0.4519 g Filter+Sample Wt. 0.4535 g Sample Wt. 0.0016 g
2	Test 1 Run 2 Log Number -34F Comments	Filter No. 6782 Filter Type 4"GF Filter Tare Wt. 0.4330 g Filter+Sample Wt. 0.4362 g Sample Wt. 0.0032 g
3	Test 1 Run 3 Log Number 35F Comments	Filter No. 6783 Filter Type 4"GF Filter Tare Wt. 0.4508 g Filter+Sample Wt. 0.4553 g Sample Wt. 0.0045 g
4	Test Run Log Number Comments	Filter No. Filter Type Filter Tare Wt. g Filter+Sample Wt. g Sample Wt. g
5	Test Run Log Number Comments	Filter No. Filter Type Filter Tare Wt. g Filter+Sample Wt. g Sample Wt. g

Results:

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.0016	0.0032	0.0045		

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.1308	0.0387	0.0307		

LSC-02PR

Interpoll Laboratories
(612) 786-6020

EPA Method 5 Data Reporting Sheet
Impinger Catch/Wisconsin Protocol

Job L.P. Hayward
Team Leader BA
Date Submitted 7-18-94
Test No. 2
Date of Analysis 7-21-94

Source Line 2 Surface Dryer
Test Site RTO Inlet
Date of Test 7-12-94
No. of Runs Completed 3
Technician C. Helgeson

		Solvent Phase	Aqueous Phase
0	Test 2 Run 0 Field Blank Log Number 3366-36I Comments	Dish No. 306 Dish Tare Wt. 42.8328 g Dish+Sample Wt. 42.8330 g Sample Wt. 0.0002 g	Dish No. 23 Dish Tare Wt. 46.0851 g Dish+Sample Wt. 46.0855 g Sample Wt. 0.0004 g
1	Test 2 Run 1 Log Number -37I Comments	Dish No. 603 Dish Tare Wt. 48.3673 g Dish+Sample Wt. 46.4036 g Sample Wt. 0.0363 g	Dish No. 407 Dish Tare Wt. 47.9932 g Dish+Sample Wt. 48.1135 g Sample Wt. 0.1203 g
2	Test 2 Run 2 Log Number -38I Comments	Dish No. 611 Dish Tare Wt. 50.0068 g Dish+Sample Wt. 50.0315 g Sample Wt. 0.0247 g	Dish No. 409 Dish Tare Wt. 46.1910 g Dish+Sample Wt. 46.2551 g Sample Wt. 0.0641 g
3	Test 2 Run 3 Log Number -39I Comments	Dish No. 612 Dish Tare Wt. 49.6231 g Dish+Sample Wt. 49.6561 g Sample Wt. 0.0330 g	Dish No. 415 Dish Tare Wt. 45.0838 g Dish+Sample Wt. 45.1532 g Sample Wt. 0.0694 g
4	Test Run Log Number Comments	Dish No. Dish Tare Wt. g Dish+Sample Wt. g Sample Wt. g	Dish No. Dish Tare Wt. g Dish+Sample Wt. g Sample Wt. g
5	Test Run Log Number Comments	Dish No. Dish Tare Wt. g Dish+Sample Wt. g Sample Wt. g	Dish No. Dish Tare Wt. g Dish+Sample Wt. g Sample Wt. g

Results Solvent Phase:

Blank Solvent Wt. 0.0002 g

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.0361	0.0245	0.0328		

Results Aqueous Phase:

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.1199	0.0637	0.0690		

LSC-03WYR

Interpoll Laboratories
(612) 786-6020

EPA Method 5 Data Reporting Sheet
Probe/Cyclone Wash

Job L.P. Hayward
Team Leader BA
Date Submitted 7-18-94
Test No. 2
Date of Analysis 7-21-94
Transport Leakage ☒ None ☐ ______ ml

Source Line 2 Surface Dryer
Test Site RTO Inlet
Date of Test 7-12-94
No. of Runs Completed 3
Technician C. Helgeson
Solvent Acetone

0	Test 2 Run 0 Field Blank Log Number 3366-36P Vol. of Solvent 100 ml *Solvent Residue 4.00 ug/ml	Dish No. 41 Dish Tare Wt. 45.3212 g Dish+Sample Wt. 45.3216 g Sample Wt. 0.0004 g
1	Test 2 Run 1 Vol. of Solvent 90 ml Log Number -37P Comments	Dish No. 59 Dish Tare Wt. 44.7329 g Dish+Sample Wt. 44.8138 g Sample Wt. 0.0809 g
2	Test 2 Run 2 Vol. of Solvent 130 ml Log Number -38P Comments	Dish No. 84 Dish Tare Wt. 49.0998 g Dish+Sample Wt. 49.1893 g Sample Wt. 0.0895 g
3	Test 2 Run 3 Vol. of Solvent 120 ml Log Number -39P Comments	Dish No. 325 Dish Tare Wt. 47.6619 g Dish+Sample Wt. 47.7725 g Sample Wt. 0.1106 g
4	Test Run Vol. of Solvent ml Log Number Comments	Dish No. Dish Tare Wt. g Dish+Sample Wt. g Sample Wt. g
5	Test Run Vol. of Solvent ml Log Number Comments	Dish No. Dish Tare Wt. g Dish+Sample Wt. g Sample Wt. g

*Solvent Residue 4.00 ug/ml = [(Sample Wt. 0.0004 g)(10^6)]/Vol. of Sol. 100 ml
EPA-M5 Acetone Residue Blank Spec. < 7.3 ug/ml

Results:

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.0805	0.0890	0.1101		

Interpoll Laboratories
(612) 786-6020

EPA Method 5 Data Reporting Sheet
Filter Gravimetrics

Job L. P. Hayward
Team Leader BA
Date Submitted
Test No. 2
Date of Analysis 7-20-94

Source Line 2 Surface Dryer
Test Site RTO Inlet
Date of Test 7-12-94
No. of Runs Completed 3
Technician C. Helgeson

0 Test 2 Run 0
Field Blank
Log Number 3366-36F
Comments

Filter No. 5746
Filter Type 4" GF
Filter Tare Wt. 0.9257 g
Filter+Sample Wt. 0.9257 g
Sample Wt. 0.0000 g

1 Test 2 Run 1
Log Number -37F
Comments

Filter No. 6635
Filter Type 4" GF
Filter Tare Wt. 0.9313 g
Filter+Sample Wt. 1.1908 g
Sample Wt. 0.2595 g

2 Test 2 Run 2
Log Number -38F
Comments

Filter No. 6636
Filter Type 4" GF
Filter Tare Wt. 0.9326 g
Filter+Sample Wt. 1.1644 g
Sample Wt. 0.2318 g

3 Test 2 Run 3
Log Number -39F
Comments
One of Two filters

Filter No. 6637
Filter Type 4" GF
Filter Tare Wt. 0.9411 g
Filter+Sample Wt. 1.0675 g
Sample Wt. 0.1264 g

4 Test Run
Log Number
Comments

Filter No.
Filter Type
Filter Tare Wt. g
Filter+Sample Wt. g
Sample Wt. g

5 Test Run
Log Number
Comments

Filter No.
Filter Type
Filter Tare Wt. g
Filter+Sample Wt. g
Sample Wt. g

Results:

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.2595	0.2318	0.1264		

Interpoll Laboratories
(612) 786-6020

EPA Method 5 Data Reporting Sheet
Filter Gravimetrics

Job L.P. Hayward
Team Leader BA
Date Submitted 7-18-94
Test No. 2
Date of Analysis 7-20-94

Source Line 2 Surface Dryer
Test Site RTO Inlet
Date of Test 7-12-94
No. of Runs Completed 3
Technician C. Helgeson

0
Test ____ Run 0
Field Blank
Log Number ____
Comments ____
Filter No. ____
Filter Type ____
Filter Tare Wt. ____ g
Filter+Sample Wt. ____ g
Sample Wt. ____ g

1
Test ____ Run ____
Log Number ____
Comments ____
Filter No. ____
Filter Type ____
Filter Tare Wt. ____ g
Filter+Sample Wt. ____ g
Sample Wt. ____ g

2
Test ____ Run ____
Log Number ____
Comments ____
Filter No. ____
Filter Type ____
Filter Tare Wt. ____ g
Filter+Sample Wt. ____ g
Sample Wt. ____ g

3
Test 2 Run 3
Log Number 3366-39F
Comments 2 of 2
Filter No. 5157
Filter Type 4" GF
Filter Tare Wt. 0.8955 g
Filter+Sample Wt. 1.0459 g
Sample Wt. 0.1504 g

4
Test ____ Run ____
Log Number ____
Comments ____
Filter No. ____
Filter Type ____
Filter Tare Wt. ____ g
Filter+Sample Wt. ____ g
Sample Wt. ____ g

5
Test ____ Run ____
Log Number ____
Comments ____
Filter No. ____
Filter Type ____
Filter Tare Wt. ____ g
Filter+Sample Wt. ____ g
Sample Wt. ____ g

Results:

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
			0.1504		

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.4960	0.4090	0.4887		

LSC-02PR

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EPA Method 5 Data Reporting Sheet
Probe/Cyclone Wash

Job LP/Hayword
Team Leader DM
Date Submitted 7-18-94
Test No. 3
Date of Analysis 7-22-94
Transport Leakage ☒ None ☐ ______ ml

Source Line I Core Dryer
Test Site Inlet
Date of Test 7-12-94
No. of Runs Completed 3
Technician B-Dule
Solvent Acetone

0
Test 3 Run 0
Field Blank
Log Number 3366-16P
Vol. of Solvent 100 ml
*Solvent Residue 4.00 ug/ml
Dish No. 62A
Dish Tare Wt. 50.8890 g
Dish+Sample Wt. 50.8894 g
Sample Wt. 0.0004 g

1
Test 3 Run 1
Vol. of Solvent 120 ml
Log Number -17P
Comments ______
Dish No. 35
Dish Tare Wt. 51.0917 g
Dish+Sample Wt. 51.2015 g
Sample Wt. 0.1098 g

2
Test 3 Run 2
Vol. of Solvent 130 ml
Log Number -18P
Comments ______
Dish No. 48
Dish Tare Wt. 47.8881 g
Dish+Sample Wt. 47.9853 g
Sample Wt. 0.0972 g

3
Test 3 Run 3
Vol. of Solvent 150 ml
Log Number -19P
Comments ______
Dish No. 313
Dish Tare Wt. 46.4584 g
Dish+Sample Wt. 46.5395 g
Sample Wt. 0.0811 g

4
Test ______ Run ______
Vol. of Solvent ______ ml
Log Number ______
Comments ______
Dish No. ______
Dish Tare Wt. ______ g
Dish+Sample Wt. ______ g
Sample Wt. ______ g

5
Test ______ Run ______
Vol. of Solvent ______ ml
Log Number ______
Comments ______
Dish No. ______
Dish Tare Wt. ______ g
Dish+Sample Wt. ______ g
Sample Wt. ______ g

*Solvent Residue 4.00 ug/ml = [(Sample Wt. 0.0004 g) (10^6)]/Vol. of Sol. 100 ml
EPA-M5 Acetone Residue Blank Spec. ≤7.3 ug/ml

Results:

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.1093	0.0967	0.0805	E-13	

LSC-01YR

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EPA Method 5 Data Reporting Sheet
Filter Gravimetrics

Job L.P. Hayward	Source Line 2 Coke Dryer
Team Leader CT	Test Site Inlet
Date Submitted	Date of Test 7-12-94
Test No. 3	No. of Runs Completed 3
Date of Analysis 7-20-94	Technician C. Helgeson

0

Test 3 Run 0
Field Blank
Log Number 3366-16 F
Comments

Filter No. 6748
Filter Type 4"GF
Filter Tare Wt. 0.9385 g
Filter+Sample Wt. 0.9386 g
Sample Wt. 0.0001 g

1

Test 3 Run 1
Log Number -17 F
Comments

Filter No. 6720
Filter Type 4"GF
Filter Tare Wt. 0.4340 g
Filter+Sample Wt. 1.2336 g
Sample Wt. 0.2996 g

2

Test 3 Run 2
Log Number -18 F
Comments

Filter No. 6744
Filter Type 4"GF
Filter Tare Wt. 0.9581 g
Filter+Sample Wt. 1.2283 g
Sample Wt. 0.2702 g

3

Test 3 Run 3
Log Number -19 F
Comments

Filter No. 6743
Filter Type 4"GF
Filter Tare Wt. 0.9401 g
Filter+Sample Wt. 1.1972 g
Sample Wt. 0.2571 g

4

Test Run
Log Number
Comments

Filter No.
Filter Type
Filter Tare Wt. g
Filter+Sample Wt. g
Sample Wt. g

5

Test Run
Log Number
Comments

Filter No.
Filter Type
Filter Tare Wt. g
Filter+Sample Wt. g
Sample Wt. g

Results:

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.2996	0.2702	0.2571		

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.6743	0.5672	0.5580		

LSC-02PR

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EPA Method 5 Data Reporting Sheet
Impinger Catch/Wisconsin Protocol

Job L.P. Hayward
Team Leader BA
Date Submitted 7-18-94
Test No. 13
Date of Analysis 7-21-94
Source Line 1 Surface Dryer
Test Site RTO Inlet
Date of Test 7-14-94
No. of Runs Completed 4
Technician C. Helgeson

		Solvent Phase	Aqueous Phase
0	Test ___ Run 0 Field Blank Log Number ___ Comments ___	Dish No. ___ Dish Tare Wt. ___ g Dish+Sample Wt. ___ g Sample Wt. ___ g	Dish No. ___ Dish Tare Wt. ___ g Dish+Sample Wt. ___ g Sample Wt. ___ g
1	Test 13 Run 1 Log Number 3366-95I Comments ___	Dish No. 53 Dish Tare Wt. 47.4060 g Dish+Sample Wt. 47.4530 g Sample Wt. 0.0470 g	Dish No. 501 Dish Tare Wt. 47.2501 g Dish+Sample Wt. 47.3878 g Sample Wt. 0.1377 g
2	Test 13 Run 2 Log Number -96I Comments ___	Dish No. 56 Dish Tare Wt. 47.7558 g Dish+Sample Wt. 47.7723 g Sample Wt. 0.0165 g	Dish No. 502 Dish Tare Wt. 46.9008 g Dish+Sample Wt. 46.9399 g Sample Wt. 0.0391 g
3	Test 13 Run 3 Log Number -97I Comments ___	Dish No. 80 Dish Tare Wt. 49.6258 g Dish+Sample Wt. 49.6686 g Sample Wt. 0.0428 g	Dish No. 504 Dish Tare Wt. 50.0214 g Dish+Sample Wt. 50.1626 g Sample Wt. 0.1412 g
4	Test 13 Run 4 Log Number -98I Comments ___	Dish No. 81 Dish Tare Wt. 48.8534 g Dish+Sample Wt. 48.8874 g Sample Wt. 0.0340 g	Dish No. 506 Dish Tare Wt. 48.6382 g Dish+Sample Wt. 48.7377 g Sample Wt. 0.0995 g
5	Test ___ Run ___ Log Number ___ Comments ___	Dish No. ___ Dish Tare Wt. ___ g Dish+Sample Wt. ___ g Sample Wt. ___ g	Dish No. ___ Dish Tare Wt. ___ g Dish+Sample Wt. ___ g Sample Wt. ___ g

Results Solvent Phase:

Blank Solvent Wt. 0.0002 g

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.0468	0.0163	0.0426	0.0338	

Results Aqueous Phase:

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.1373	0.0387	0.1408	0.0991	

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EPA Method 5 Data Reporting Sheet
Probe/Cyclone Wash

Job L. P. Hayward
Team Leader BA
Date Submitted 7-18-94
Test No. 13
Date of Analysis 7-21-94
Transport Leakage ☒ None ☐ ______ ml

Source Line 1 Surface Dryer
Test Site RTO Inlet
Date of Test 7-14-94
No. of Runs Completed 4
Technician C. Helgeson
Solvent Acetone

0
Test 13 Run 0
Field Blank
Log Number 3366-94P
Vol. of Solvent 100 ml
*Solvent Residue 4.00 ug/ml
Dish No. 35
Dish Tare Wt. 51.0915 g
Dish+Sample Wt. 51.0919 g
Sample Wt. 0.0004 g

1
Test 13 Run 1
Vol. of Solvent 80 ml
Log Number -95P
Comments ______
Dish No. 38
Dish Tare Wt. 48.6498 g
Dish+Sample Wt. 48.7308 g
Sample Wt. 0.0810 g

2
Test 13 Run 2
Vol. of Solvent 70 ml
Log Number -96P
Comments ______
Dish No. 40
Dish Tare Wt. 47.6424 g
Dish+Sample Wt. 47.7142 g
Sample Wt. 0.0718 g

3
Test 13 Run 3
Vol. of Solvent 80 ml
Log Number -97P
Comments ______
Dish No. 43
Dish Tare Wt. 47.3906 g
Dish+Sample Wt. 47.4211 g
Sample Wt. 0.0305 g

4
Test 13 Run 4
Vol. of Solvent 90 ml
Log Number -98P
Comments ______
Dish No. 45
Dish Tare Wt. 48.1514 g
Dish+Sample Wt. 48.2054 g
Sample Wt. 0.0540 g

5
Test ______ Run ______
Vol. of Solvent ______ ml
Log Number ______
Comments ______
Dish No. ______
Dish Tare Wt. ______ g
Dish+Sample Wt. ______ g
Sample Wt. ______ g

*Solvent Residue 4.00 ug/ml = [(Sample Wt. 0.0004 g) (10^6)]/Vol. of Sol. 100 ml
EPA-M5 Acetone Residue Blank Spec. ≤7.8 ug/ml

Results:

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.0807	0.0715	0.0302	0.0536	E-16

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EPA Method 5 Data Reporting Sheet
Filter Gravimetrics

Job L.P. Hayward
Team Leader BA
Date Submitted
Test No. 13
Date of Analysis 7-21-94

Source Line 1 Surface Dryer
Test Site RTO Inlet
Date of Test 7-14-94
No. of Runs Completed 1
Technician C. Helgeson

0
Test 13 Run 0
Field Blank
Log Number 3366-94F
Comments
Filter No. 41
Filter Type SS Thimble
Filter Tare Wt. 40.5604 g
Filter+Sample Wt. 40.5606 g
Sample Wt. 0.0002 g

1
Test 13 Run 1
Log Number -95F
Comments 1 of 4
Filter No. 29
Filter Type SS Thimble
Filter Tare Wt. 40.9841 g
Filter+Sample Wt. 41.0187 g
Sample Wt. 0.0346 g

2
Test 13 Run 2
Log Number -96F
Comments
Filter No. 5743
Filter Type 4"GF
Filter Tare Wt. .9261 g
Filter+Sample Wt. 1.0862 g
Sample Wt. 0.1601 g

3
Test 13 Run 3
Log Number -97F
Comments
Filter No. 5744
Filter Type 4"GF
Filter Tare Wt. .9243 g
Filter+Sample Wt. 1.2167 g
Sample Wt. 0.2924 g

4
Test 13 Run 4
Log Number -98F
Comments
Filter No. 5745
Filter Type 4"GF
Filter Tare Wt. .9201 g
Filter+Sample Wt. 1.2786 g
Sample Wt. 0.3585 g

5
Test Run
Log Number
Comments
Filter No.
Filter Type
Filter Tare Wt. g
Filter+Sample Wt. g
Sample Wt. g

Results:

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.0346	0.1601	0.2924	0.3585	

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EPA Method 5 Data Reporting Sheet
Filter Gravimetrics

Job L-P. Hayward
Team Leader BA
Date Submitted
Test No. 13
Date of Analysis 7-21-94

Source Line 1 Surface Dryer
Test Site RTO Inlet
Date of Test 7-14-94
No. of Runs Completed 1
Technician C. Helgeson

0
Test ____ Run 0
Field Blank
Log Number
Comments
Filter No.
Filter Type
Filter Tare Wt. ____ g
Filter+Sample Wt. ____ g
Sample Wt. ____ g

1
Test 13 Run 1
Log Number 3366-95 F
Comments 2 of 4
Filter No. 26
Filter Type SS Thimble
Filter Tare Wt. 41.1517 g
Filter+Sample Wt. 41.3405 g
Sample Wt. 0.1888 g

2
Test ____ Run ____
Log Number
Comments
Filter No.
Filter Type
Filter Tare Wt. ____ g
Filter+Sample Wt. ____ g
Sample Wt. ____ g

3
Test ____ Run ____
Log Number
Comments
Filter No.
Filter Type
Filter Tare Wt. ____ g
Filter+Sample Wt. ____ g
Sample Wt. ____ g

4
Test ____ Run ____
Log Number
Comments
Filter No.
Filter Type
Filter Tare Wt. ____ g
Filter+Sample Wt. ____ g
Sample Wt. ____ g

5
Test ____ Run ____
Log Number
Comments
Filter No.
Filter Type
Filter Tare Wt. ____ g
Filter+Sample Wt. ____ g
Sample Wt. ____ g

Results:

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.1888				

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EPA Method 5 Data Reporting Sheet
Filter Gravimetrics

Job L.P. Hayward
Team Leader BA
Date Submitted
Test No. 13
Date of Analysis 7-21-94

Source Line 1 Surface Dryer
Test Site RTO Inlet
Date of Test 7-14-94
No. of Runs Completed 1
Technician C. Helgeson

0	Test ____ Run 0 Field Blank Log Number Comments	Filter No. Filter Type Filter Tare Wt. ____ g Filter+Sample Wt. ____ g Sample Wt. ____ g
1	Test 13 Run 1 Log Number 3366-95F Comments 3 of 4	Filter No. 14 Filter Type SS Thimble Filter Tare Wt. 38.0068 g Filter+Sample Wt. 38.1252 g Sample Wt. 0.1184 g
2	Test ____ Run ____ Log Number Comments	Filter No. Filter Type Filter Tare Wt. ____ g Filter+Sample Wt. ____ g Sample Wt. ____ g
3	Test ____ Run ____ Log Number Comments	Filter No. Filter Type Filter Tare Wt. ____ g Filter+Sample Wt. ____ g Sample Wt. ____ g
4	Test ____ Run ____ Log Number Comments	Filter No. Filter Type Filter Tare Wt. ____ g Filter+Sample Wt. ____ g Sample Wt. ____ g
5	Test ____ Run ____ Log Number Comments	Filter No. Filter Type Filter Tare Wt. ____ g Filter+Sample Wt. ____ g Sample Wt. ____ g

Results:

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.1184				

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EPA Method 5 Data Reporting Sheet
Filter Gravimetrics

Job L.P. Hayward	Source Line 1 Surface Dryer
Team Leader BA	Test Site RTO Inlet
Date Submitted	Date of Test 7-14-94
Test No. 13	No. of Runs Completed 1
Date of Analysis 7-21-94	Technician C. Helgeson

0	Test Run 0 Field Blank Log Number Comments	Filter No. Filter Type Filter Tare Wt. g Filter+Sample Wt. g Sample Wt. g
1	Test 13 Run 1 Log Number 3366-95 F Comments 4 of 4	Filter No. 17 Filter Type SS Thimble Filter Tare Wt. 40.4499 g Filter+Sample Wt. 40.5519 g Sample Wt. 0.1020 g
2	Test Run Log Number Comments	Filter No. Filter Type Filter Tare Wt. g Filter+Sample Wt. g Sample Wt. g
3	Test Run Log Number Comments	Filter No. Filter Type Filter Tare Wt. g Filter+Sample Wt. g Sample Wt. g
4	Test Run Log Number Comments	Filter No. Filter Type Filter Tare Wt. g Filter+Sample Wt. g Sample Wt. g
5	Test Run Log Number Comments	Filter No. Filter Type Filter Tare Wt. g Filter+Sample Wt. g Sample Wt. g

Results:

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.1020				

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.7086	0.2866	0.5060	0.5450	

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EPA Method 5 Data Reporting Sheet
Impinger Catch/Wisconsin Protocol

Job L.P. Hayward
Team Leader MK
Date Submitted 7-18-94
Test No. 14
Date of Analysis 7-21-94

Source Line 1 Dryer RTO
Test Site Stack
Date of Test 7-14-94
No. of Runs Completed 4
Technician C. Helgeson

		Solvent Phase	Aqueous Phase
0	Test ___ Run 0 Field Blank Log Number ___ Comments ___	Dish No. ___ Dish Tare Wt. ___ g Dish+Sample Wt. ___ g Sample Wt. ___ g	Dish No. ___ Dish Tare Wt. ___ g Dish+Sample Wt. ___ g Sample Wt. ___ g
1	Test 14 Run 1 Log Number 3366-110I Comments ___	Dish No. 19 Dish Tare Wt. 48.9568 g Dish+Sample Wt. 48.9668 g Sample Wt. 0.0100 g	Dish No. 508 Dish Tare Wt. 46.5049 g Dish+Sample Wt. 46.5639 g Sample Wt. 0.0590 g
2	Test 14 Run 2 Log Number -111I Comments ___	Dish No. 25 Dish Tare Wt. 44.3438 g Dish+Sample Wt. 44.3513 g Sample Wt. 0.0075 g	Dish No. 518 Dish Tare Wt. 48.1024 g Dish+Sample Wt. 48.1164 g Sample Wt. 0.0140 g
3	Test 14 Run 3 Log Number -112I Comments ___	Dish No. 32 Dish Tare Wt. 57.8075 g Dish+Sample Wt. 57.8145 g Sample Wt. 0.0070 g	Dish No. 521 Dish Tare Wt 50.5959 g Dish+Sample Wt. 50.6218 g Sample Wt. 0.0259 g
4	Test 14 Run 4 Log Number -113I Comments ___	Dish No. 33 Dish Tare Wt. 47.9438 g Dish+Sample Wt. 47.9464 g Sample Wt. 0.0026 g	Dish No. 609 Dish Tare Wt. 45.5622 g Dish+Sample Wt. 45.5646 g Sample Wt. 0.0024 g
5	Test ___ Run ___ Log Number ___ Comments ___	Dish No. ___ Dish Tare Wt. ___ g Dish+Sample Wt. ___ g Sample Wt. ___ g	Dish No. ___ Dish Tare Wt. ___ g Dish+Sample Wt. ___ g Sample Wt. ___ g

Results Solvent Phase:

Blank Solvent Wt. 0.0002 g

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.0098	0.0073	0.0068	0.0024	

Results Aqueous Phase:

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.0586	0.0136	0.0255	0.0020	E-21

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EPA Method 5 Data Reporting Sheet
Probe/Cyclone Wash

Job Lp/Hayward
Team Leader MK
Date Submitted 7-18-94
Test No. 14
Date of Analysis 7-22-94
Transport Leakage ☒ None ☐ ______ ml

Source Line 1 Dryer RTO
Test Site Stack
Date of Test 7-14-94
No. of Runs Completed 4
Technician B. Dale
Solvent Acetone

0
Test ______ Run 0
Field Blank
Log Number ______
Vol. of Solvent ______ ml
*Solvent Residue 4.00 ug/ml
Dish No. ______
Dish Tare Wt. ______ g
Dish+Sample Wt. ______ g
Sample Wt. ______ g

1
Test 14 Run 1
Vol. of Solvent 190 ml
Log Number 3366-110P
Comments ______
Dish No. 52
Dish Tare Wt. 50.8897 g
Dish+Sample Wt. 50.9257 g
Sample Wt. 0.0360 g

2
Test 14 Run 2
Vol. of Solvent 190 ml
Log Number -111P
Comments ______
Dish No. 93
Dish Tare Wt. 53.9847 g
Dish+Sample Wt. 54.0155 g
Sample Wt. 0.0308 g

3
Test 14 Run 3
Vol. of Solvent 200 ml
Log Number -112P
Comments ______
Dish No. 115
Dish Tare Wt. 45.0678 g
Dish+Sample Wt. 45.0856 g
Sample Wt. 0.0178 g

4
Test 14 Run 4
Vol. of Solvent 190 ml
Log Number -113P
Comments ______
Dish No. 311
Dish Tare Wt. 43.8112 g
Dish+Sample Wt. 43.8256 g
Sample Wt. 0.0144 g

5
Test ______ Run ______
Vol. of Solvent ______ ml
Log Number ______
Comments ______
Dish No. ______
Dish Tare Wt. ______ g
Dish+Sample Wt. ______ g
Sample Wt. ______ g

*Solvent Residue ___ ug/ml = [(Sample Wt. ______ g)(10^6)]/Vol. of Sol. ______ ml
EPA-M5 Acetone Residue Blank Spec. ≤7.3 ug/ml

Results:

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.0352	0.0300	0.0170	0.0136	

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EPA Method 5 Data Reporting Sheet
Filter Gravimetrics

Job L.P Hayward
Team Leader MC
Date Submitted 7-18-94
Test No. 14
Date of Analysis 7-25-94

Source Line 1 dryer RTO
Test Site Stack
Date of Test 7-14-94
No. of Runs Completed 4
Technician C. GIERKE

0
Test ____ Run 0
Field Blank
Log Number ____
Comments ____
Filter No. ____
Filter Type ____
Filter Tare Wt. ____ g
Filter+Sample Wt. ____ g
Sample Wt. ____ g

1
Test 14 Run 1
Log Number 3366-110F
Comments ____
Filter No. 6745
Filter Type 4"GF
Filter Tare Wt. .9442 g
Filter+Sample Wt. .9521 g
Sample Wt. 0.0079 g

2
Test 14 Run 2
Log Number -111F
Comments ____
Filter No. 6746
Filter Type 4"GF
Filter Tare Wt. .9267 g
Filter+Sample Wt. .9320 g
Sample Wt. 0.0053 g

3
Test 14 Run 3
Log Number -112F
Comments ____
Filter No. 6747
Filter Type 4"GF
Filter Tare Wt. .9376 g
Filter+Sample Wt. .9472 g
Sample Wt. 0.0096 g

4
Test 14 Run 4
Log Number -113F
Comments ____
Filter No. 6749
Filter Type 4"GF
Filter Tare Wt. .9247 g
Filter+Sample Wt. .9319 g
Sample Wt. 0.0072 g

5
Test ____ Run ____
Log Number ____
Comments ____
Filter No. ____
Filter Type ____
Filter Tare Wt. ____ g
Filter+Sample Wt. ____ g
Sample Wt. ____ g

Results:

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.0079	0.0053	0.0096	0.0072	

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.1115	0.0562	0.0589	0.0252	

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EPA Method 5 Data Reporting Sheet
Impinger Catch/Wisconsin Protocol

Job L. P. Hayward
Team Leader DM
Date Submitted 7-18-94
Test No. 15
Date of Analysis 7-21-94

Source Line 1 Core Dryer
Test Site RTO Inlet
Date of Test 7-14-94
No. of Runs Completed 4
Technician C. Helgeson

		Solvent Phase	Aqueous Phase
0	Test 15 Run 0 Field Blank Log Number 3366-23I Comments	Dish No. 48 Dish Tare Wt. 47.8879 g Dish+Sample Wt. 47.8881 g Sample Wt. 0.0002 g	Dish No. 119 Dish Tare Wt. 47.7649 g Dish+Sample Wt. 47.7653 g Sample Wt. 0.0004 g
1	Test 15 Run 1 Log Number -24I Comments	Dish No. 50 Dish Tare Wt. 45.4662 g Dish+Sample Wt. 45.5273 g Sample Wt. 0.0611 g	Dish No. 1 Dish Tare Wt. 51.9704 g Dish+Sample Wt. 52.1654 g Sample Wt. 0.1950 g
2	Test 15 Run 2 Log Number -25I Comments	Dish No. 52 Dish Tare Wt. 49.8082 g Dish+Sample Wt 49.8724 g Sample Wt. 0.0642 g	Dish No. 20 Dish Tare Wt. 48.8144 g Dish+Sample Wt. 49.0298 g Sample Wt. 0.2154 g
3	Test 15 Run 3 Log Number -26I Comments	Dish No. 200 Dish Tare Wt. 44.9374 g Dish+Sample Wt 45.0118 g Sample Wt. 0.0744 g	Dish No. 21 Dish Tare Wt. 47.5283 g Dish+Sample Wt. 47.8163 g Sample Wt. 0.2880 g
4	Test 15 Run 4 Log Number -27I Comments	Dish No. 203 Dish Tare Wt. 46.8704 g Dish+Sample Wt. 46.9034 g Sample Wt. 0.0330 g	Dish No. 29 Dish Tare Wt. 48.8867 g Dish+Sample Wt. 49.0067 g Sample Wt. 0.1200 g
5	Test Run Log Number Comments	Dish No. Dish Tare Wt. g Dish+Sample Wt. g Sample Wt. g	Dish No. Dish Tare Wt. g Dish+Sample Wt. g Sample Wt. g

Results Solvent Phase:

Blank Solvent Wt. g

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.0609	0.0640	0.0742	0.0328	

Results Aqueous Phase:

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.1946	0.2150	0.2876	0.1196	E-24

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EPA Method 5 Data Reporting Sheet
Probe/Cyclone Wash

Job LP/Hayward
Team Leader DM
Date Submitted 7-18-94
Test No. 15
Date of Analysis 7-22-94
Transport Leakage ☒ None ☐ ______ ml

Source Line 1 Core Dryer
Test Site RTO Inlet
Date of Test 7-14-94
No. of Runs Completed 4
Technician B. Dale
Solvent Acetone

0
Test 15 Run 0
Field Blank
Log Number 3366-23P
Vol. of Solvent 100 ml
*Solvent Residue 4.00 ug/ml
Dish No. 62
Dish Tare Wt. 43.1560 g
Dish+Sample Wt. 43.1564 g
Sample Wt. 0.0004 g

1
Test 15 Run 1
Vol. of Solvent 60 ml
Log Number -24P
Comments
Dish No. 36
Dish Tare Wt. 43.5651 g
Dish+Sample Wt. 43.6358 g
Sample Wt. 0.0707 g

2
Test 15 Run 2
Vol. of Solvent 80 ml
Log Number -25P
Comments
Dish No. 39
Dish Tare Wt. 49.4379 g
Dish+Sample Wt. 49.5310 g
Sample Wt. 0.0931 g

3
Test 15 Run 3
Vol. of Solvent 100 ml
Log Number -26P
Comments
Dish No. 44
Dish Tare Wt. 47.6197 g
Dish+Sample Wt. 47.7548 g
Sample Wt. 0.1351 g

4
Test 15 Run 4
Vol. of Solvent 80 ml
Log Number -27P
Comments
Dish No. 47
Dish Tare Wt. 48.4667 g
Dish+Sample Wt. 48.5176 g
Sample Wt. 0.0509 g

5
Test ____ Run ____
Vol. of Solvent ____ ml
Log Number
Comments
Dish No.
Dish Tare Wt. g
Dish+Sample Wt. g
Sample Wt. g

*Solvent Residue 4.00 ug/ml=[(Sample Wt. 0.0004 g)(10⁶)]/Vol. of Sol. 100 ml
EPA-M5 Acetone Residue Blank Spec. ≤7.3 ug/ml

Results:

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.0705	0.0928	0.1347	0.0506	E-25

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EPA Method 5 Data Reporting Sheet
Filter Gravimetrics

Job LP Hayward
Team Leader DM
Date Submitted 7-18-94
Test No. 15
Date of Analysis 7-22-94

Source Line 1 Core Dryer
Test Site RTO Inlet
Date of Test 7-14-94
No. of Runs Completed 4
Technician B. DRAKE

0
Test ____ Run 0
Field Blank
Log Number ____
Comments ____
Filter No. ____
Filter Type ____
Filter Tare Wt. ____ g
Filter+Sample Wt. ____ g
Sample Wt. ____ g

1
Test 15 Run 1
Log Number 3366-24F
Comments ____
Filter No. 37
Filter Type SS Thimble
Filter Tare Wt. 41.9341 g
Filter+Sample Wt. 42.3353 g
Sample Wt. 0.4012 g

2
Test 15 Run 2
Log Number -25F
Comments ____
Filter No. 35
Filter Type SS Thimble
Filter Tare Wt. 42.0361 g
Filter+Sample Wt. 42.4896 g
Sample Wt. 0.4535 g

3
Test 15 Run 3
Log Number -26F
Comments ____
Filter No. 38
Filter Type SS Thimble
Filter Tare Wt. 43.3965 g
Filter+Sample Wt. 43.8936 g
Sample Wt. 0.4971 g

4
Test 15 Run 4
Log Number -27F
Comments ____
Filter No. 33
Filter Type SS Thimble
Filter Tare Wt. 40.8107 g
Filter+Sample Wt. 41.1586 g
Sample Wt. 0.3479 g

5
Test ____ Run ____
Log Number ____
Comments ____
Filter No. ____
Filter Type ____
Filter Tare Wt. ____ g
Filter+Sample Wt. ____ g
Sample Wt. ____ g

Results:

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.4012	0.4535	0.4971	0.3479	

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.7272	0.8253	0.9936	0.5509	

LSC-02PR

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EPA Method 7A Recovery and Analysis Data Sheet (1)

**************SOURCE*************	**************RECOVERY****************	*************ANALYTICAL************
Job LP / Hayward	Date of Recovery 7-21-94	Date of Analysis 7-26-94
Source Line 2 Surfacer Dryer RTO Inlet	Recovered by C. GIERKE	Analyst KLO
Date of Sampling 7-12-94	Recovery volume 500 ml	Eluent AS4A
Test No(s) 2	Barometric at time 28.955 IN.HG.	Chromatograph: Dionex System 4000i

Samples collected in accordance with EPA Method 7, CFR Title 40, Part 60, Appendix A. Samples analyzed in accordance with EPA Method 7A by ion chromatography. Mercury manometers used to measure flask pressures/vacuums in sampling and in recovery. Thommen Model TX 19 jewel barometer calibrated against laboratory mercury in glass barometer used to measure field barometric pressure. Three field blanks are prepared and the average used to correct measured nitrate concentrations. All samples are analyzed as a batch using a Dionex Model 4270 Chromatograph Data Intergrator. The integrator is programmed to give the actual concentration of the 500 ml recovered sample even if a subsequent dilution was made. The dilution is indicated here as well as on the chromatogram.

$C_{RS} = DF(C_{DS})$ $\quad M_{NO_3} = (C_{RS} - \overline{C}_B)V_R$ $\quad \overline{C}_B = (C_{B1} + C_{B2} + C_{B3})/3$

where:

C_{RS} = concentration of nitrate in 500 ml recovered sample in ug/ml

DF = dilution factor

C_{DS} = concentration of nitrate of a 500 ml recovered sample which has been diluted by a factor of DF to bring it into the proper range for the ion chromatograph. This value is an intermediate number and is not outputted by the electronic integrator which is programmed to output the concentration of the original undiluted 500 ml recovered sample.

M_{NO_3} = total mass of nitrate in micrograms in the 500 ml recovered sample and/or in the 2L flask.

C_B = average conc. of nitrate in 500 ml recovered samples from the three field blanks (ug/ml)

C_{B1}, C_{B2}, C_{B3} = conc. of nitrate in 500 ml recovered samples from the three field blanks (ug/ml)

V_R = recovery volume for samples and field blanks in ml

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EPA Method 7A Recovery and Analysis Data Sheet (2)

	Sample Log ID No.	Flask No.	Test/ Run	Final Flask Conditions t_f (^oF)				Chrom Run No.	DF	Nitrate Concentration (ug/ml) Uncorr. for blank C_{RS}		Total nitrate in Sample (ug) (M_{NO_3})
				t_f (^oF)	+	-	Δ Pg (IN.HG.)			Uncorr. for blank C_{RS}	Corr. for blank ($C_{RS} - \bar{C}_B$)	
1	3366-43	1	2/1/1	75°		—	3.0		1	0.1414	0.1414	71
2	-44	2	2/1/2			—	1.6		1	0.1667	0.1667	83
3	-45	3	2/1/3			—	0.4		1	0.1454	0.1454	73
4	-46	4	2/1/4			—	3.0		1	0.1245	0.1245	102
5	-47	5	2/2/1			—	0.2		1	0.2698	0.2698	130
6	-48	6	2/2/2			—	0.3		1	0.2881	0.2881	140
7	-49	7	2/2/3			—	4.6		1	0.1590	0.1590	80
8	-50	9	2/2/4			—	0.8		1	0.1965	0.1965	98
9	-51	10	2/3/1			—	3.5		1	0.2057	0.2057	100
10	-52	11	2/3/2			—	1.6		1	0.1204	0.1204	60
11	-53	12	2/3/3			—	0.1		1	0.1201	0.1201	60
12	-54	28	2/3/4			—	3.9		1	0.1011	0.1011	51
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												
26												
27												
Blank 1									1	CB1		
Blank 2									1	CB2		
Blank 3									1	CB3		

$\bar{C}_B$ = _____

S-340(2) R-9/85

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EPA Method 7A Recovery and Analysis Data Sheet (1)

**************SOURCE**************	**************RECOVERY****************	*************ANALYTICAL************
Job LP / Hayward	Date of Recovery 7-21-94	Date of Analysis 7-26-94
Source Line I Surfacer Dryer RTO Inlet	Recovered by C. GIERKE	Analyst KLG
Date of Sampling 7-14-94	Recovery volume 500 ml	Eluent AS4A
Test No(s) 13	Barometric at time 28.955 IN.HG.	Chromatograph: Dionex System 4000i

Samples collected in accordance with EPA Method 7, CFR Title 40, Part 60, Appendix A. Samples analyzed in accordance with EPA Method 7A by ion chromatography. Mercury manometers used to measure flask pressures/vacuums in sampling and in recovery. Thommen Model TX 19 jewel barometer calibrated against laboratory mercury in glass barometer used to measure field barometric pressure. Three field blanks are prepared and the average used to correct measured nitrate concentrations. All samples are analyzed as a batch using a Dionex Model 4270 Chromatograph Data Intergrator. The integrator is programmed to give the actual concentration of the 500 ml recovered sample even if a subsequent dilution was made. The dilution is indicated here as well as on the chromatogram.

$C_{RS} = DF(C_{DS})$ $M_{NO_3} = (C_{RS} - \overline{C}_B)V_R$ $\overline{C}_B = (C_{B1} + C_{B2} + C_{B3})/3$

where:

C_{RS} = concentration of nitrate in 500 ml recovered sample in ug/ml

DF = dilution factor

C_{DS} = concentration of nitrate of a 500 ml recovered sample which has been diluted by a factor of DF to bring it into the proper range for the ion chromatograph. This value is an intermediate number and is not outputted by the electronic integrator which is programmed to output the concentration of the original undiluted 500 ml recovered sample.

M_{NO_3} = total mass of nitrate in micrograms in the 500 ml recovered sample and/or in the 2L flask.

C_B = average conc. of nitrate in 500 ml recovered samples from the three field blanks (ug/ml)

C_{B1}, C_{B2}, C_{B3} = conc. of nitrate in 500 ml recovered samples from the three field blanks (ug/ml)

V_R = recovery volume for samples and field blanks in ml

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EPA Method 7A Recovery and Analysis Data Sheet (2)

	Sample Log ID No.	Flask No.	Test/ Run	Final Flask Conditions				Chrom Run No.	DF	Nitrate Concentration (ug/ml)		Total nitrate in Sample (ug) ($M_{NO_3^-}$)
				t_f (°F)	+	-	Δ Pg (IN.HG.)			Uncorr. for blank C_{RS}	Corr. for blank (C_{RS} - $\bar{C}_B$)	
1	3366-55	19	13/1/1	75°		—	0.4		1	0.2049	0.2049	~~102~~ 100
2	-56	20	13/1/2			—	0.7		1	0.3495	0.3495	~~175~~ 180
3	-57	21	13/1/3			—	3.5		1	0.7017	0.7017	~~353~~ 350
4	-58	22	13/1/4			—	0.9		1	0.3585	0.3585	~~179~~ 180
5	-59	23	13/2/1			—	1.9		1	0.2174	0.2174	110
6	-60	24	13/2/2				No Pressure		1	0.3938	0.3938	200
7	-61	13	13/2/3			—	1.0		1	0.2800	0.2800	140
8	-62	14	13/2/4			—	1.9		1	0.2814	0.2814	140
9	-63	15	13/3/1			—	1.2		1	0.1534	0.1534	77
10	-64	16	13/3/2			—	1.1		1	0.3003	0.3003	150
11	-65	17	13/3/3			—	0.8		1	0.5304	0.5304	270
12	-66	18	13/3/4			—	0.4		1	0.3730	0.3730	190
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												
26												
27												
Blank 1									1	CB1		
Blank 2									1	CB2		
Blank 3									1	CB3		

$\bar{C}_B$ = ______

S-340(2) R-9/85

INTERPOLL LABORATORIES INC.

Formaldehyde Results Using EPA Method 0011
For Dept. 20/LP Hayward Wi. Collected 7/12-13/94

	Field Spike			Test: 7		Source: Line 2 RTO Dryer Stack	
	Actual	Found	% Recovery	Run 0	Run 1	Run 2	Run 3
Log #		(3366-68)		(3366-67)	(3366-69)	(3366-70)	(3366-71)
Mass (ug)*	**750**	**682**	**90.9**	**1.49**	**6760**	**9010**	**8120**

	Field Spike			Test: 11		Source: Line 1 RTO Dryer Stack	
	Actual	Found	% Recovery	Run 0	Run 1	Run 2	Run 3
Log #				(3366-90)	(3366-91)	(3366-92)	(3366-93)
Mass (ug)*				**< 0.05**	**4910**	**6650**	**14400**

* = Total Mass of formaldehyde in the sample in ug.

Reviewed by:

Gregg W. Holman

Gregg W. Holman
Laboratory Director

EPA Method 10 NDIR Analysis

Job Name L.P. Heyward
Source Line 1 Core Dryer RTO Inlet
Date of Analysis 7-18-94
Technician C. Helgeson

NDIR Analyzer: ☐ Fugi ACS Model 3300
☐ Mon. Lab Model 8310
☑ Dasibi Model 3003
Range: 0 - 200 ppm
Flow rate: 1000 cc/min

Pretest Calibration

	Conc.	Reading	Vendor	Cyl. Number
Zero gas:	0 ppm	0 ppm	Scott	AAL 17431
Upscale gas:	41.5 ppm	41.5 ppm	National	CC 52502
Upscale gas:	204 ppm	209 ppm	↓	CC 81624
Upscale gas:	ppm	ppm		

Post-test Calibration

	Conc.	Reading	Vendor	Cyl. Number
Zero gas:	0 ppm	0 ppm	Scott	AAL 17431
Upscale gas:	41.5 ppm	40.0 ppm	National	CC 52502
Upscale gas:	204 ppm	209.6 ppm	↓	CC 81624
Upscale gas:	ppm	ppm		

Sample Description Test/Run	Sample Log Number	CO Conc. (ppm, Dry)		
		Dilution Factor	Reading	Actual ppm
15-1	3266-28	5.0	96.5	480
15-2	-29	5.0	110.2	550.
15-3	-30	5.0	115.5	580
15-4	-31	5.0	53.4	270

Sample Description Test/Run	Sample Log Number	CO Conc. (ppm, Dry)		
		Dilution Factor	Reading	Actual ppm

Note 1: If sample dilution is requried the sample is diluted with CO-free gas prior to analysis.
Note 2: The Fugi ACS model 3300 has a rejection ratio for CO to CO_2 greater then 100,000: 1 and the Mon. Labs Model 8310 and Dasibi Model 3003 have rejection ratios greater then 200,000:1 and thus CO_2 removal prior to analysis is not required.
Note 3: The analyzer must be zeroed and spanned immediately before and after sample analysis. Additional checks may be performed between sample analyses if required.

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EPA Method 10 NDIR Analysis

Job Name L.P. Hayward
Source Linz Core Dryer Inlet
Date of Analysis 7-18-94
Technician C. Helgeson

NDIR Analyzer:
☐ Fugi ACS Model 3300
☐ Mon. Lab Model 8310
☒ Dasibi Model 3003
Range: 0 - 200 ppm
Flow rate: 1000 cc/min

Pretest Calibration

	Conc.	Reading	Vendor	Cyl. Number
Zero gas:	0 ppm	0 ppm	Scott	AAL 17431
Upscale gas:	41.5 ppm	41.5 ppm	National	CC 52502
Upscale gas:	204 ppm	209 ppm	↓	CC 81624
Upscale gas:	ppm	ppm		

Post-test Calibration

	Conc.	Reading	Vendor	Cyl. Number
Zero gas:	0 ppm	0 ppm	Scott	AAL 17431
Upscale gas:	41.5 ppm	42.0 ppm	National	CC 52502
Upscale gas:	204 ppm	209.6 ppm	↓	CC 81624
Upscale gas:	ppm	ppm		

Sample Description Test/Run	Sample Log Number	CO Conc. (ppm, Dry)		
		Dilution Factor	Reading	Actual ppm
3-1	3366-20	5.0	86	430
3-2	-21	5.0	185	925
3-3	-22	5.0	109	550

Sample Description Test/Run	Sample Log Number	CO Conc. (ppm, Dry)		
		Dilution Factor	Reading	Actual ppm

Note 1: If sample dilution is requried the sample is diluted with CO-free gas prior to analysis.
Note 2: The Fugi ACS model 3300 has a rejection ratio for CO to CO_2 greater then 100,000:1 and the Mon. Labs Model 8310 and Dasibi Model 3003 have rejection ratios greater then 200,000:1 and thus CO_2 removal prior to analysis is not required.
Note 3: The analyzer must be zeroed and spanned immediately before and after sample analysis. Additional checks may be performed between sample analyses if required.

7-29

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BTEX/THC as Gas in Air Samples (Charcoal Tubes) by NIOSH Method 1501 Data Reporting Sheet

Client: 10020/LP Hayward

Sample Collected:
Sample Received:

Sample Log #: 3366-76
Sample Description: T9 R1 Tube A
LII

			FRONT			BACK		
Parameter	Units	Analysis Date & Initials	Detection Limit Front	Analytical Result Front	Method Blank Front	Detection Limit Back	Analytical Result Back	Method Blank Back
Benzene	Total ug	mm	x 2.1	23	<2.1	.61	<.61	<.61
Toluene	Total ug	7-21 94						
Ethylbenzene	Total ug							
Xylenes	Total ug							
Dilution factor								
Total hydrocarbons as gasoline	Total ug		~~90~~		<90	27		~~<27~~
			mm 7-26	94				
Dilution factor								

Footnotes:

In-House Comments:

LCI-127

Interpoll Laboratories, Inc.
(612)786-6020

BTEX/THC as Gas in Air Samples (Charcoal Tubes) by NIOSH Method 1501 Data Reporting Sheet

Client: ID020/LP Hayward

Sample Collected:
Sample Received:

Sample Log #: 3366-77
Sample Description: T9R1 Tube B

			FRONT			BACK		
Parameter	Units	Analysis Date & Initials	Detection Limit Front	Analytical Result Front	Method Blank Front	Detection Limit Back	Analytical Result Back	Method Blank Back
Benzene	Total ug		2.1	<2.1	<2.1	.61	<.61	<.61
Toluene	Total ug	7-21-94						
Ethylbenzene	Total ug							
Xylenes	Total ug							
Dilution factor								
Total hydrocarbons as gasoline	Total ug		90		<90	27		<27
				7-26-94				
Dilution factor								

Footnotes:

In-House Comments:

LCI-127

Interpoll Laboratories, Inc.
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BTEX/THC as Gas in Air Samples (Charcoal Tubes) by NIOSH Method 1501 Data Reporting Sheet

Client: ID020/LP Hayward

Sample Collected:
Sample Received:

Sample Log #: 3366-78
Sample Description:
Test 9 Run 2 Tube A
LT

			FRONT			BACK		
Parameter	Units	Analysis Date & Initials	Detection Limit Front	Analytical Result Front	Method Blank Front	Detection Limit Back	Analytical Result Back	Method Blank Back
Benzene	Total ug	MWH	2.1	4.8	<2.1	.61	<.61	<.61
Toluene	Total ug	7-21-94						
Ethylbenzene	Total ug							
Xylenes	Total ug							
Dilution factor								
Total hydrocarbons as gasoline	Total ug							
Dilution factor								

Footnotes:

In-House Comments:

LCI-127

Interpoll Laboratories, Inc.
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BTEX/THC as Gas in Air Samples (Charcoal Tubes) by NIOSH Method 1501 Data Reporting Sheet

Client: ID 020 / LP Hayward

Sample Collected:
Sample Received:

Sample Log #: 3366-79
Sample Description: T9 R2 TubeB

			FRONT			BACK		
Parameter	Units	Analysis Date & Initials	Detection Limit Front	Analytical Result Front	Method Blank Front	Detection Limit Back	Analytical Result Back	Method Blank Back
Benzene	Total ug	MMH	2.1	<2.1	<2.1	.61	<.61	<.61
Toluene	Total ug	7-21-94						
Ethylbenzene	Total ug							
Xylenes	Total ug							
Dilution factor								
Total hydrocarbons as gasoline	Total ug							
Dilution factor								

Footnotes:

In-House Comments:

LCI-127

Interpoll Laboratories, Inc.
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BTEX/THC as Gas in Air Samples (Charcoal Tubes) by NIOSH Method 1501 Data Reporting Sheet

Client: ID CDO / LP Hayward

Sample Collected:
Sample Received:

Sample Log #: 3366-80
Sample Description:

~~I9R~~
I9R3 Tube A

C II

Parameter	Units	Analysis Date & Initials	FRONT Detection Limit Front	FRONT Analytical Result Front	FRONT Method Blank Front	BACK Detection Limit Back	BACK Analytical Result Back	BACK Method Blank Back
Benzene	Total ug	MWH	2.1	3.4	<2.1	.61	<.61	<.61
Toluene	Total ug	7-21-94						
Ethylbenzene	Total ug							
Xylenes	Total ug							
Dilution factor								
Total hydrocarbons as gasoline	Total ug							
Dilution factor								

Footnotes:

In-House Comments:

LCI-127

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BTEX/THC as Gas in Air Samples (Charcoal Tubes) by NIOSH Method 1501 Data Reporting Sheet

Client: ID020/LP Hayward

Sample Collected:
Sample Received:

Sample Log #: 3366-81
Sample Description: T9R3 Tube B

			FRONT			BACK		
Parameter	Units	Analysis Date & Initials	Detection Limit Front	Analytical Result Front	Method Blank Front	Detection Limit Back	Analytical Result Back	Method Blank Back
Benzene	Total ug	MMW	x 2.1	<2.1	<2.1	.61	<.61	<.61
Toluene	Total ug	7-21-94						
Ethylbenzene	Total ug							
Xylenes	Total ug							
Dilution factor								
Total hydrocarbons as gasoline	Total ug							
Dilution factor								

Footnotes:

In-House Comments:

Due 7/29/94

Interpoll Laboratories, Inc.
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BTEX/THC as Gas in Air Samples (Charcoal Tubes) by NIOSH Method 1501 Data Reporting Sheet

Client: J.D. 030 L.P. Hayward

Sample Collected: 7/15/94
Sample Received: 7/15/94

Sample Log #: 3366-09
Sample Description: charcoal Tube

T~~X~~RO
~~19~~ 12 SLP

			FRONT			BACK		
Parameter	Units	Analysis Date & Initials	Detection Limit Front	Analytical Result Front	Method Blank Front	Detection Limit Back	Analytical Result Back	Method Blank Back
Benzene	Total ug	DMH	2.1	x <2.1	<2.1	.61	x <.61	<.61
Toluene	Total ug	7-19-94						
thylbenzene	Total ug							
Xylenes	Total ug							
Dilution factor								
Total hydrocarbons as gasoline	Total ug							
Dilution factor								

Footnotes:

In-House Comments:

Due 7/29/94

Interpoll Laboratories, Inc.
(612)786-6020

BTEX/THC as Gas in Air Samples (Charcoal Tubes) by NIOSH Method 1501 Data Reporting Sheet

Client: J.D. 020 L.P. Hayward

Sample Collected: 7/15/94
Sample Received: 7/18/94

Sample Log #: 3366-10
Sample Description: charcoal Tube

T~~X~~ RJ Tube
12 SP

			FRONT			BACK		
Parameter	Units	Analysis Date & Initials	Detection Limit Front	Analytical Result Front	Method Blank Front	Detection Limit Back	Analytical Result Back	Method Blank Back
Benzene	Total ug	MH	.2.1	x 14	<2.1	.61	x<.61	<.61
Toluene	Total ug	7A94						
Ethylbenzene	Total ug							
Xylenes	Total ug							
Dilution factor								
Total hydrocarbons as gasoline	Total ug							
Dilution factor								

Footnotes:

In-House Comments:

LCI-127

Due 7/29/94

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BTEX/THC as Gas in Air Samples (Charcoal Tubes) by NIOSH Method 1501 Data Reporting Sheet

Client: J.D. 020 L.P. Hayward

Sample Collected: 7/15/94
Sample Received: 7/18/94

Sample Log #: 3366-11
Sample Description: Charcoal Tube

T~~X~~R1, 1,2 SEP Tube 2

			FRONT			BACK		
Parameter	Units	Analysis Date & Initials	Detection Limit Front	Analytical Result Front	Method Blank Front	Detection Limit Back	Analytical Result Back	Method Blank Back
Benzene	Total ug	MMK	2.1	<2.1	<2.1	.61	<.61	<.61
Toluene	Total ug	7-1994						
Ethylbenzene	Total ug							
Xylenes	Total ug							
Dilution factor								
Total hydrocarbons as gasoline	Total ug							
Dilution factor								

Footnotes:

In-House Comments:

LCI-127

Due 7/29/94

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BTEX/THC as Gas in Air Samples (Charcoal Tubes) by NIOSH Method 1501 Data Reporting Sheet

Client: J.D. 020 L.P. Hayward

Sample Collected: 7/15/94
Sample Received: 7/18/94

Sample Log #: 3366 - 12
Sample Description: charcoal Tube

T~~X~~R2 Tube 1
12 Sw

			FRONT			BACK		
Parameter	Units	Analysis Date & Initials	Detection Limit Front	Analytical Result Front	Method Blank Front	Detection Limit Back	Analytical Result Back	Method Blank Back
Benzene	Total ug	7-19-94	2.1	x 12	<2.1	.01	x <.01	<.01
Toluene	Total ug							
Ethylbenzene	Total ug							
Xylenes	Total ug							
Dilution factor								
Total hydrocarbons as gasoline	Total ug							
Dilution factor								

Footnotes:

In-House Comments:

LCI-127

Due 7/29/94

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BTEX/THC as Gas in Air Samples (Charcoal Tubes) by NIOSH Method 1501 Data Reporting Sheet

Client: J.D. 020 L.P. Hayward

Sample Collected: 7/15/94
Sample Received: 7/18/94

Sample Log #: 3366-13
Sample Description: charcoal Tube

TIX R2 Tube 2
12 SCP

			FRONT			BACK		
Parameter	Units	Analysis Date & Initials	Detection Limit Front	Analytical Result Front	Method Blank Front	Detection Limit Back	Analytical Result Back	Method Blank Back
Benzene	Total ug	JJM	2.1	x <2.1	<2.1	.61	x <.61	<.61
Toluene	Total ug	7-19-94						
Ethylbenzene	Total ug							
Xylenes	Total ug							
Dilution factor								
Total hydrocarbons as gasoline	Total ug							
Dilution factor								

Footnotes:

In-House Comments:

LCI-127

Due 7/29/94

Interpoll Laboratories, Inc.
(612)786-6020

BTEX/THC as Gas in Air Samples (Charcoal Tubes) by NIOSH Method 1501 Data Reporting Sheet

Client: J.D. 020 L.P. Hayward

Sample Collected: 7/15/94
Sample Received: 7/18/94

Sample Log #: 3366 - 14
Sample Description: charcoal Tube
TKR3 Tube 1
12 sep

			FRONT			BACK		
Parameter	Units	Analysis Date & Initials	Detection Limit Front	Analytical Result Front	Method Blank Front	Detection Limit Back	Analytical Result Back	Method Blank Back
Benzene	Total ug	MM	2.1	x 8.4	<2.1	.61	x <.61	<.61
Toluene	Total ug	71994						
Ethylbenzene	Total ug							
Xylenes	Total ug							
Dilution factor								
Total hydrocarbons as gasoline	Total ug							
Dilution factor								

Footnotes:

In-House Comments:

LCI-127

Due 7/29/94

Interpoll Laboratories, Inc.
(612)786-6020

BTEX/THC as Gas in Air Samples (Charcoal Tubes) by NIOSH Method 1501 Data Reporting Sheet

Client: J.D. 020 L.P. Hayward

Sample Collected: 7/15/94
Sample Received: 7/18/94

Sample Log #: 3366-15
Sample Description: charcoal Tube

TX4R3 Tube 2
12SEP

			FRONT			BACK		
Parameter	Units	Analysis Date & Initials	Detection Limit Front	Analytical Result Front	Method Blank Front	Detection Limit Back	Analytical Result Back	Method Blank Back
Benzene	Total ug	7/27/KL	2.1	x <2.1	<2.1	.01	x <.01	<.01
Toluene	Total ug	7 1994						
Ethylbenzene	Total ug							
Xylenes	Total ug							
Dilution factor								
Total hydrocarbons as gasoline	Total ug							
Dilution factor								

Footnotes:

In-House Comments:

LCI-127

INTERPOLL LABORATORIES INC.

Phenol Result By EPA Method 8270
For Dept. 20/LP Hayward, Collected 7/15/94

	Detection Limit	Test: 10		Source: Line 2 RTO Dryer Stack	
		Run 0	Run 1	Run 2	Run 3
Log #		3366-82/83	3366-84/85	3366-86/87	3366-88/89
Phenol*	840	**BDL**	**BDL**	**BDL**	**BDL**
Surrrogates					
2-Fluorophenol**		63.3	19.4	17.2	19.4
D6-Phenol***		24.2	12.6	12.3	10.6
2,4,6-Tribromophenol***		62.3	66.4	52.7	60.2

	Detection Limit	Test: 19		Source: Line 1 RTO Dryer Stack	
		Run 0	Run 1	Run 2	Run 3
Log #		3366-01/02	3366-03/04	3366-05/06	3366-07/08
Phenol*	840	**BDL**	**BDL**	**BDL**	**BDL**
Surrrogates					
2-Fluorophenol**		54.3	12.9	15.4	11.6
D6-Phenol***		22.4	11.2	12.7	10.4
2,4,6-Tribromophenol***		45.3	52.1	64.6	52.0

* = Total mass of the specified compound in the sample in ug.
** = Percent recovery of the field surrogate.
*** = Percent recovery of the lab surrogates.

Reviewed By:
Gregg W. Hol
Gregg W. Holman
Laboratory Director

Interpoll Laboratories
(612) 786-6020

IMPINGER CATCHES

Project Name: L. P. Hayward
Date Required: 7/8/94
Order Date:
Delivery Date: 7/8/94

Nature of Spiking Material	Spike Concentration	Spike Volume	Total Mass of Spike
D-6 Phenol (P-67)	5.3316 mg/mL	1.0 mL	5.3316 mg
2-fluorophenol (P-68)	49.8140 mg/mL	1.2 mL	59.7768 mg

SPECIAL REQUIREMENTS

WNO 7/8/94

**Please return this form with the samples.

Interpoll Laboratories
(612) 786-6020

XAD-2 & VOST Trap Preparation Work Order Form

Project Name: L.P. Hayward
Order Date:
Date Required: 7/8/94
Delivery Date: 7/8/94

Number of XAD-2 Traps Required: 8

Number of VOST Tubes Required: ______Tenax
______Tenax/Charcoal

XAD-2 TRAP HISTORY

XAD-2 Lot Number: 1992
Date of Spiking: 7/8/94
XAD-2 Lot Date:
Technician: B. Drake
XAD-2 Lot Technician: Alltech

Nature of Spiking Material	Spike Concentration	Spike Volume	Total Mass of Spike
D_{10}-Fluorathene	4.0ug/ul	5.0ul	20.0ug

VOST TUBE HISTORY

Date of Thermal Disorption: ______ Technician: ______

Total Hydrocarbon Analysis: ____ppm

SPECIAL REQUIREMENTS

**Please return this form with the samples.

INTERPOLL LABORATORIES INC.

Polycyclic Organic Matter Results By EPA Method 8270
For Dept. 20/ LP Hayward

	Detection Limit	Test : 8			Source: Line 2 Dryer RTO Stack
		Run 0	Run 1	Run 2	Run 3
Date Collected		7/12/94	7/13/94	7/13/94	7/13/94
Log #		3366-72	3366-73	3366-74	3366-75
Compounds of Interest*					
Naphthalene	1.5	42	21	41	25
1-Methyl naphthalene	0.8	< 0.8	< 0.8	< 0.8	< 0.8
2-Methyl naphthalene	8.3	< 8.3	< 8.3	< 8.3	< 8.3
Acenaphthylene	0.9	< 0.9	< 0.9	< 0.9	< 0.9
Acenaphthene	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Fluorene	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Phenanthrene	0.9	< 0.9	< 0.9	< 0.9	< 0.9
Anthracene	0.8	< 0.8	< 0.8	< 0.8	< 0.8
Fluoranthene	1.2	< 1.2	< 1.2	< 1.2	< 1.2
Pyrene	1.5	< 1.5	< 1.5	< 1.5	< 1.5
Benzo-a-anthracene	1.8	< 1.8	< 1.8	< 1.8	< 1.8
Chrysene	0.9	< 0.9	< 0.9	< 0.9	< 0.9
Benzo-b-fluoranthene	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Benzo-k-fluoranthene	1.7	< 1.7	< 1.7	< 1.7	< 1.7
Benzo-a-pyrene	1.2	< 1.2	< 1.2	< 1.2	< 1.2
enzo-a,h-anthracene	0.9	< 0.9	< 0.9	< 0.9	< 0.9
Benzo-g,h,i-perylene	1.2	< 1.2	< 1.2	< 1.2	< 1.2
Indeno-1,2,3-pyrene	0.9	< 0.9	< 0.9	< 0.9	< 0.9
Field Surrogate Recovery					
D10-Fluoranthene**		68.5	52.5	80.5	43.0
Lab Surrogate Recovery					
2-Fluorophenol***		52.5	26.5	57.4	14.7
Phenol-D6***		46.8	25.6	54.2	14.2
Nitrobenzene-D6***		61.6	28.0	65.4	15.7
2-Fluorobiphenyl***		64.8	27.0	73.0	16.0
2,4,6-Tribromophenol***		10.6	31.3	65.4	16.3
D14-Terphenyl***		103	57.4	96.0	20.1

* = Total mass of the specified compound in the sample in ug.
** = Percent recovery of the field surrogate.
*** = Percent recovery of the lab surrogates.

Reviewed By:
Gregg W. Hol
Gregg W. Holman
Laboratory Director

INTERPOLL LABORATORIES INC.

Polycyclic Organic Matter Results By EPA Method 8270
For Dept. 20/ LP Hayward

	Detection Limit	Test : 20		Source: Line 1 Dryer RTO Stack	
		Run 0	Run 1	Run 2	Run 3
Date Collected		7/14/94	7/15/94	7/15/94	7/15/94
Log #		3366-103	3366-104	3366-105	3366-106
Compounds of Interest*					
Naphthalene	1.5	32	48	54	50
1-Methyl naphthalene	0.8	< 0.8	3.1	2.2	1.5
2-Methyl naphthalene	8.3	< 8.3	< 8.3	< 8.3	< 8.3
Acenaphthylene	0.9	< 0.9	2.8	3.0	< 0.9
Acenaphthene	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Fluorene	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Phenanthrene	0.9	< 0.9	1.9	1.3	< 0.9
Anthracene	0.8	< 0.8	< 0.8	< 0.8	< 0.8
Fluoranthene	1.2	< 1.2	< 1.2	< 1.2	< 1.2
Pyrene	1.5	< 1.5	< 1.5	< 1.5	< 1.5
Benzo-a-anthracene	1.8	< 1.8	< 1.8	< 1.8	< 1.8
Chrysene	0.9	< 0.9	< 0.9	< 0.9	< 0.9
Benzo-b-fluoranthene	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Benzo-k-fluoranthene	1.7	< 1.7	< 1.7	< 1.7	< 1.7
Benzo-a-pyrene	1.2	< 1.2	1.3	1.4	1.2
Dibenzo-a,h-anthracene	0.9	< 0.9	< 0.9	< 0.9	< 0.9
Benzo-g,h,i-perylene	1.2	< 1.2	< 1.2	< 1.2	< 1.2
Indeno-1,2,3-pyrene	0.9	< 0.9	< 0.9	< 0.9	< 0.9
Field Surrogate Recovery					
D10-Fluoranthene**		91.0	74.0	85.0	83.5
Lab Surrogate Recovery					
2-Fluorophenol***		51.1	63.0	72.2	71.4
Phenol-D6***		53.7	60.7	71.7	78.6
Nitrobenzene-D6***		62.6	78.0	86.8	83.8
2-Fluorobiphenyl***		63.2	67.8	75.2	73.4
2-Fluorobiphenyl***		4.3	59.8	58.4	57.4
D14-Terphenyl***		90.8	94.0	55.7	101

* = Total mass of the specified compound in the sample in ug.

** = Percent recovery of the field surrogate.

*** = Percent recovery of the lab surrogates.

Reviewed By:

Gregg W. Holman
Laboratory Director

INTERPOLL LAB ATORIES, INC.
(612) 7[illegible]-6020

Sample Chain of Custody

Job L.P./Hayward, WI
Field Engineer M. Kaehler
Source Line 2 Dryer RTO
Date of Test 7-12-94
Site Stack
Test No. 1
Log No. 3366
No. of Runs 3

No. Items	Sample Type		Analysis		Sequence No.	Comments
3+1	**Probe Wash:** ☒Acetone ☐ MeCl$_2$	☐DI Water ☐ ______	☒EPA M-5 ☐EPA M-29	☐EPA M-201A ☐ ______		
3+1	**Filter:** ☒4" Glass ☐ SS Thimble	☐Pallflex ☐2.5" Glass	☒EPA M-5 ☐EPA M-29 ☐EPA M-201A	☐EPA M-17		
3+1	**Impingers:** ☒DI Water ☐3%H$_2$O$_2$ ☐1N NaOH ☐2,4-DNPH	☐H$_2$SO$_4$ ☐HNO$_3$/H$_2$O$_2$ ☐KMnO$_4$/H$_2$SO$_4$ ☐ ______	☐MN Protocol ☒WI Protocol ☐EPA M-202 ☐EPA M6,8 ☐Acid Gases	☐IA Protocol ☐Formaldehyde ☐EPA M-29 ☐EPA M-26 ☐ ______		
3	**Integrated Gas:** ☒Tedlar Bag	☐ ______	☒EPA M-3 ☐ ______	☐EPA M-10		Analyzed in Field
—	**Oxides of Nitrogen:**		☐EPA M-7A ☐ ______			
—	**Fuel Lab:** ☐Fuel Sample	☐Aggregate	☐Per S-0163			
—	**Particle Sizing:**		☐X-Ray Sdgraph ☐ ______	☐Cascade Imp		
—	**Miscellaneous:**	☐ ______	☐ ______			

Fuel Type:
Coal: ☐Bituminous ☐Anthracite ☐Lignite
Wood: ☐Wood Waste ☒Dust ☐Bark
Oil: ☐Waste Oil ☐No. 2 ☐No. 6
Misc: ☒Natural Gas ☐RDF ☐ ______

Relinquished by/Affiliation	Accepted by/Affiliation	Date
Mark Kaehler / Interpoll Labs	/ Interpoll	7/18/94 0900

033094-G:\STACK\WP\FORMS\S-278.2

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Sample Chain of Custody

Job LP / HAYWARD
Field Engineer BOB
Source Line 2, SURFACER DRYER
Date of Test 7-12-94
Site RTO Duct
Test No. 2
Log No. 3366
No. of Runs 3

No. Items	Sample Type		Analysis		Sequence No.	Comments
4	Probe Wash: ☒ Acetone ☐ MeCl$_2$	☐ DI Water ☐ ________	☒ EPA M-5 ☐ EPA M-29	☐ EPA M-201A ☐ ________		3 sample 1 blank
5	Filter: ☒ 4" Glass ☐ SS Thimble	☐ Pallflex ☐ 2.5" Glass	☒ EPA M-5 ☐ EPA M-29 ☐ EPA M-201A	☐ EPA M-17		4 Sample 1 blank
4	Impingers: ☒ DI Water ☐ 3%H$_2$O$_2$ ☐ 1N NaOH ☐ 2,4-DNPH	☐ H$_2$SO$_4$ ☐ HNO$_3$/H$_2$O$_2$ ☐ KMnO$_4$/H$_2$SO$_4$ ☐ ________	☐ MN Protocol ☐ WI Protocol ☒ EPA M-202 ☐ EPA M6,8 ☐ Acid Gases	☐ IA Protocol ☐ Formaldehyde ☐ EPA M-29 ☐ EPA M-26 ☐ ________		3 Sample 1 blank
3	Integrated Gas: ☒ Tedlar Bag	☐ ________	☒ EPA M-3 ☐ ________	☒ EPA M-10		
12	Oxides of Nitrogen:		☒ EPA M-7A ☐ ________			7-18-94 0800
—	Fuel Lab: ☐ Fuel Sample	☐ Aggregate	☐ Per S-0163			
—	Particle Sizing:		☐ X-Ray Sdgraph ☐ ________	☐ Cascade Imp		
—	Miscellaneous:	☐ ________	☐ ________			

Fuel Type:
Coal: ☐ Bituminous ☐ Anthracite ☐ Lignite
Wood: ☒ Wood Waste ☐ Dust ☐ Bark
Oil: ☐ Waste Oil ☐ No. 2 ☐ No. 6
Misc: ☒ Natural Gas ☐ RDF ☐ ________

Relinquished by/Affiliation	Accepted by/Affiliation	Date
Field Eng	/ Interpoll	7/15/94 0900

033094-GASTACK\WP\FORMS\S-278.2

INTERPOLL LAB ATORIES, INC.
(612) 7[illegible]-6020

Sample Chain of Custody

Job LP / Hayward ~~Line 2 Core Dryer Stack~~ Source Line 2 Core Dryer Stack Site Inlet Log No. 33666
Field Engineer D/M Date of Test 7-12-94 Test No. 3 No. of Runs 3

No. Items	Sample Type		Analysis		Sequence No.	Comments
4	**Probe Wash:** ☒ Acetone ☐ MeCl₂	☐ DI Water ☐ ________	☒ EPA M-5 ☐ EPA M-29	☐ EPA M-201A ☐ ________		
4	**Filter:** ☒ 4" Glass ☐ SS Thimble	☐ Pallflex ☐ 2.5" Glass	☒ EPA M-5 ☐ EPA M-29 ☐ EPA M-201A	☐ EPA M-17		
4	**Impingers:** ☒ DI Water ☐ 3% H_2O_2 ☐ 1N NaOH ☐ 2,4-DNPH	☐ H_2SO_4 ☐ HNO_3/H_2O_2 ☐ $KMnO_4/H_2SO_4$ ☐ ________	☐ MN Protocol ☒ WI Protocol ☐ EPA M-202 ☐ EPA M6,8 ☐ Acid Gases	☐ IA Protocol ☐ Formaldehyde ☐ EPA M-29 ☐ EPA M-26 ☐ ________		
3	**Integrated Gas:** ☒ Tedlar Bag	☐ ________	☒ EPA M-3 ☐ ________	☒ EPA M-10		Tresler
3	**Oxides of Nitrogen:**		☐ EPA M-7A ☐ ________			
	Fuel Lab: ☐ Fuel Sample	☐ Aggregate	☐ Per S-0163			
	Particle Sizing:		☐ X-Ray Sdgraph ☐ ________	☐ Cascade Imp		
	Miscellaneous:	☐ ________	☐ ________			

Fuel Type:
Coal: ☐ Bituminous ☐ Anthracite ☐ Lignite
Wood: ☐ Wood Waste ☐ Dust ☐ Bark
Oil: ☐ Waste Oil ☐ No. 2 ☐ No. 6
Misc: ☒ Natural Gas ☐ RDF ☐ ________

Relinquished by/Affiliation	Accepted by/Affiliation	Date
Dennis G Morse Interpoll Labs	Interpoll	7/18/94 0700

033094-GASTACK\WP\FORMS\S-278.2

E-52

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Sample Chain of Custody

Job L.P./Hayward, WI Source Line 2 Dryer RTO Site Stack Log No. 3366
Field Engineer M. Kaehler Date of Test 7-12-94 Test No. 7 No. of Runs 3

No. Items	Sample Type		Analysis		Sequence No.	Comments
3 Spike Blank	**Probe Wash:** ☐ Acetone ☒ MeCl$_2$	☐ DI Water ☐ ______	☐ EPA M-5 ☐ EPA M-29	☐ EPA M-201A ☐ ______		Added to Impinger Rinse
–	**Filter:** ☐ 4" Glass ☐ SS Thimble	☐ Pallflex ☐ 2.5" Glass	☐ EPA M-5 ☐ EPA M-29 ☐ EPA M-201A	☐ EPA M-17		
3 Spike Blank	**Impingers:** ☐ DI Water ☐ 3%H$_2$O$_2$ ☐ 1N NaOH ☒ 2,4-DNPH	☐ H$_2$SO$_4$ ☐ HNO$_3$/H$_2$O$_2$ ☐ KMnO$_4$/H$_2$SO$_4$ ☐ ______	☐ MN Protocol ☐ WI Protocol ☐ EPA M-202 ☐ EPA M6,8 ☐ Acid Gases	☐ IA Protocol ☒ Formaldehyde ☐ EPA M-29 ☐ EPA M-26 ☐ ______		
3	**Integrated Gas:** ☒ Tedlar Bag	☐ ______	☒ EPA M-3 ☐ ______	☐ EPA M-10		
–	**Oxides of Nitrogen:**		☐ EPA M-7A ☐ ______			
–	**Fuel Lab:** ☐ Fuel Sample	☐ Aggregate	☐ Per S-0163			
–	**Particle Sizing:**		☐ X-Ray Sdgraph ☐ ______	☐ Cascade Imp		
–	**Miscellaneous:**	☐ ______	☐ ______			

Fuel Type:

Coal: ☐ Bituminous ☐ Anthracite ☐ Lignite

Wood: ☐ Wood Waste ☒ Dust ☐ Bark

Oil: ☐ Waste Oil ☐ No. 2 ☐ No. 6

Misc: ☒ Natural Gas ☐ RDF ☐ ______

Relinquished by/Affiliation	Accepted by/Affiliation	Date
Mark Kaehler / Interpoll Labs	/ Interpoll	7/15/94 0900

033094-GASTACK\WP\FORMS\S-278.2

Interpoll Laboratories
(612) 786-6020

SAMPLE CHAIN OF CUSTODY

Job L.P. / Hayward, WI
Source Line 2 Dryer RTO
Site Stack
Field Engineer M. Kuehler
Date of Test 7-13-94
Test No. 9
No. of Runs 3

# ITEMS	SAMPLE TYPE		ANALYSIS		LOG NUMBER	COMMENTS
—	**Probe Wash:** ☐ Acetone ☐ MeCl$_2$	☐DI Water ☐ ______	☐EPA M-5 ☐EPA M-29	☐EPA M-201A ☐ ______		
—	**Filter:** ☐ 4" Glass ☐ SS Thimble	☐Pallflex ☐2.5" Glass	☐EPA M-5 ☐EPA M-29 ☐EPA M-201A	☐EPA M-17		
6	**Impingers:** ☐DI Water ☐3%H$_2$O$_2$ ☐1N NaOH ☐2,4-DNPH	☐H$_2$SO$_4$ ☐HNO$_3$/H$_2$O$_2$ ☐KMnO$_4$/H$_2$SO$_4$ ☒ Charcoal Tubes	☐MN Protocol ☐WI Protocol ☐EPA M-202 ☐EPA M6,8 ☐Acid Gases	☐IA Protocol ☐Formaldehyde ☐EPA M-29 ☐EPA M-26 ☒ Benzene		
—	**Integrated Gas:** ☐Tedlar Bag	☐ ______	☐EPA M-3 ☐ ______	☐EPA M-10		
—	**Oxides of Nitrogen:**		☐EPA M-7A ☐ ______			
—	**Fuel Lab:** ☐Fuel Sample	☐Aggregate	☐Per S-0163			
—	**Particle Sizing:**		☐X-Ray Sdgraph ☐ ______	☐Cascade Imp		
—	**Miscellaneous:**	☐ ______	☐ ______			

Fuel Type:

Coal: ☐Bituminous ☐Anthracite ☐Lignite

Wood: ☐Wood Waste ☒Dust ☐Bark

Oil: ☐Waste Oil ☐No. 2 ☐No. 6

Misc: ☒Natural Gas ☐RDF ☐ ______

Relinquished by/Affiliation	Accepted by/Affiliation	Date
Mark Kuehler / Interpoll Labs	Interpoll	7/18/94 0920

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S-278

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Sample Chain of Custody

Job L.P. / Hayward, WI
Field Engineer M. Kaehler
Source Lime 2 Dryer R/O
Date of Test 2-13-94
Site Stack
Test No. 10
Log No. 3366
No. of Runs 3

No. Items	Sample Type		Analysis		Sequence No.	Comments
~~3~~	**Probe Wash:** ☐ Acetone ☐ MeCl$_2$	☐DI Water ☐	☐EPA M-5 ☐EPA M-29	☐EPA M-201A ☐		
–	**Filter:** ☐ 4" Glass ☐ SS Thimble	☐Pallflex ☐2.5" Glass	☐EPA M-5 ☐EPA M-29 ☐EPA M-201A	☐EPA M-17		
3+1	**Impingers:** ☐DI Water ☐3%H$_2$O$_2$ ☐1N NaOH ☐2,4-DNPH	☐H$_2$SO$_4$ ☐HNO$_3$/H$_2$O$_2$ ☐KMnO$_4$/H$_2$SO$_4$ ☒ Phenol A+B	☐MN Protocol ☐WI Protocol ☐EPA M-202 ☐EPA M6,8 ☐Acid Gases	☐IA Protocol ☐Formaldehyde ☐EPA M-29 ☐EPA M-26 ☒ Phenols		
–	**Integrated Gas:** ☐Tedlar Bag	☐	☐EPA M-3 ☐	☐EPA M-10		
–	**Oxides of Nitrogen:**		☐EPA M-7A ☐			
–	**Fuel Lab:** ☐Fuel Sample	☐Aggregate	☐Per S-0163			
–	**Particle Sizing:**		☐X-Ray Sdgraph ☐	☐Cascade Imp		
–	**Miscellaneous:**	☐	☐			

Fuel Type:

Coal: ☐Bituminous ☐Anthracite ☐Lignite
Wood: ☐Wood Waste ☒Dust ☐Bark
Oil: ☐Waste Oil ☐No. 2 ☐No. 6
Misc: ☒Natural Gas ☐RDF ☐

Relinquished by/Affiliation	Accepted by/Affiliation	Date
Mark Kaehler / Interpoll Labs	/ Interpoll	7/18/94 0900

E-55

033094-G:\STACK\WP\FORMS\S-270.2

INTERPOLL LA ORATORIES, INC.
(612) 786-6020

Sample Chain of Custody

Job CP/HAYWARD
Field Engineer
Source LINE 1 DRYER RTO
Date of Test 7-13-94
Site STACK
Test No. 11
Log No. 3366
No. of Runs 3

No. Items	Sample Type		Analysis		Sequence No.	Comments
	Probe Wash: ☐ Acetone ☒ MeCl₂	☐ DI Water ☐ ______	☐ EPA M-5 ☐ EPA M-29	☐ EPA M-201A ☐ ______		
	Filter: ☐ 4" Glass ☐ SS Thimble	☐ Pallflex ☐ 2.5" Glass	☐ EPA M-5 ☐ EPA M-29 ☐ EPA M-201A	☐ EPA M-17		
7	**Impingers:** ☐ DI Water ☐ 3% H_2O_2 ☐ 1N NaOH ☐ 2,4-DNPH	☐ H_2SO_4 ☐ HNO_3/H_2O_2 ☐ $KMnO_4/H_2SO_4$ ☒ MeCl2	☐ MN Protocol ☒ WI Protocol ☐ EPA M-202 ☐ EPA M6,8 ☐ Acid Gases	☐ IA Protocol ☒ Formaldehyde ☐ EPA M-29 ☐ EPA M-26 ☐ ______		
3	**Integrated Gas:** ☒ Tedlar Bag	☐ ______	☒ EPA M-3 ☐ ______	☐ EPA M-10		
	Oxides of Nitrogen:		☐ EPA M-7A ☐ ______			
	Fuel Lab: ☐ Fuel Sample	☐ Aggregate	☐ Per S-0163			
	Particle Sizing:		☐ X-Ray Sdgraph ☐ ______	☐ Cascade Imp		
	Miscellaneous:	☐ ______	☐ ______			

Fuel Type:
Coal: ☐ Bituminous ☐ Anthracite ☐ Lignite
Wood: ☐ Wood Waste ☐ Dust ☐ Bark
Oil: ☐ Waste Oil ☐ No. 2 ☐ No. 6
Misc: ☐ Natural Gas ☐ RDF ☐ ______

Relinquished by/Affiliation	Accepted by/Affiliation	Date
[illegible] / Interpoll Labs	[illegible] / Interpoll	7/18/94 0900

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INTERPOLL LABORATORIES, INC.
(612) 786-6020

Sample Chain of Custody

Job CP / HAYWARD Source Line / Surfacer Site Dryer RTO Duct Log No. 3368
Field Engineer Bob Date of Test 7-14-94 Test No. 13 No. of Runs

No. Items	Sample Type		Analysis		Sequence No.	Comments
~~8~~ 5	**Probe Wash:** ☒ Acetone ☐ MeCl$_2$	☐ DI Water ☐	☒ EPA M-5 ☐ EPA M-29	☐ EPA M-201A ☐		
5-SS 3-4"	**Filter:** ☒ 4" Glass ☒ SS Thimble	☐ Pallflex ☐ 2.5" Glass	☒ EPA M-5 ☐ EPA M-29 ☐ EPA M-201A	☐ EPA M-17		
4	**Impingers:** ☒ DI Water ☐ 3% H_2O_2 ☐ 1N NaOH ☐ 2,4-DNPH	☐ H_2SO_4 ☐ HNO_3/H_2O_2 ☐ $KMnO_4/H_2SO_4$ ☐	☐ MN Protocol ☒ WI Protocol ☐ EPA M-202 ☐ EPA M6,8 ☐ Acid Gases	☐ IA Protocol ☐ Formaldehyde ☐ EPA M-29 ☐ EPA M-26 ☐		
4	**Integrated Gas:** ☒ Tedlar Bag	☐	☒ EPA M-3 ☐	☐ EPA M-10		
12	**Oxides of Nitrogen:**		☒ EPA M-7A ☐			7-18-94 0800
—	**Fuel Lab:** ☐ Fuel Sample	☐ Aggregate	☐ Per S-0163			
—	**Particle Sizing:**		☐ X-Ray Sdgraph ☐	☐ Cascade Imp		
—	**Miscellaneous:**	☐	☐			

Fuel Type:

Coal: ☐ Bituminous ☐ Anthracite ☐ Lignite

Wood: ☒ Wood Waste ☐ Dust ☐ Bark

Oil: ☐ Waste Oil ☐ No. 2 ☐ No. 6

Misc: ☒ Natural Gas ☐ RDF ☐

Relinquished by/Affiliation	Accepted by/Affiliation	Date
[illegible]	/ Interpoll	7/18/94 0900

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INTERPOLL LA RATORIES, INC.
(612) -6020

Sample Chain of Custody

Job L.P. / Hayward, CA Source Line 1 Dryer RTO Site Stack Log No. 3366
Field Engineer M. Kaehler Date of Test 7-14-94 Test No. 1B No. of Runs 3

No. Items	Sample Type		Analysis		Sequence No.	Comments
3	Probe Wash: ☒ Acetone ☐ MeCl$_2$	☐ DI Water ☐ ________	☒ EPA M-5 ☐ EPA M-29	☐ EPA M-201A ☐ ________		
3	Filter: ☒ 4" Glass ☐ SS Thimble	☐ Pallflex ☐ 2.5" Glass	☒ EPA M-5 ☐ EPA M-29 ☐ EPA M-201A	☐ EPA M-17		
3	Impingers: ☒ DI Water ☐ 3%H$_2$O$_2$ ☐ 1N NaOH ☐ 2,4-DNPH	☐ H$_2$SO$_4$ ☐ HNO$_3$/H$_2$O$_2$ ☐ KMnO$_4$/H$_2$SO$_4$ ☐ ________	☐ MN Protocol ☒ WI Protocol ☐ EPA M-202 ☐ EPA M6,8 ☐ Acid Gases	☐ IA Protocol ☐ Formaldehyde ☐ EPA M-29 ☐ EPA M-26 ☐ ________		
3	Integrated Gas: ☒ Tedlar Bag	☐ ________	☒ EPA M-3 ☐ ________	☐ EPA M-10		
-	Oxides of Nitrogen:		☐ EPA M-7A ☐ ________			
-	Fuel Lab: ☐ Fuel Sample	☐ Aggregate	☐ Per S-0163			
-	Particle Sizing:		☐ X-Ray Sdgraph ☐ ________	☐ Cascade Imp		
-	Miscellaneous:	☐ ________	☐ ________			

Fuel Type: Coal: ☐ Bituminous ☐ Anthracite ☐ Lignite Wood: ☐ Wood Waste ☒ Dust ☐ Bark Oil: ☐ Waste Oil ☐ No. 2 ☐ No. 6 Misc: ☒ Natural Gas ☐ RDF ☐ ________

Relinquished by/Affiliation	Accepted by/Affiliation	Date
Mark Kaehler / Interpoll Labs	/ Interpoll	7/15/94 0900

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Sample Chain of Custody

Job LP/Hayward
Field Engineer DM
Source Line 1 core Dryer
Date of Test 7-14-94
Site RTO Inlet
Test No. 15
Log No. 3366
No. of Runs 3

No. Items	Sample Type		Analysis		Sequence No.	Comments
5	**Probe Wash:** ☒ Acetone ☐ MeCl$_2$	☐DI Water ☐	☒EPA M-5 ☐EPA M-29	☐EPA M-201A ☐		
4	**Filter:** ☐ 4" Glass ☒SS Thimble	☐Pallflex ☐2.5" Glass	☒EPA M-5 ☐EPA M-29 ☐EPA M-201A	☐EPA M-17		
9	**Impingers:** ☒DI Water ☐3%H$_2$O$_2$ ☐1N NaOH ☐2,4-DNPH	☐H$_2$SO$_4$ ☐HNO$_3$/H$_2$O$_2$ ☐KMnO$_4$/H$_2$SO$_4$ ☐	☐MN Protocol ☒WI Protocol ☐EPA M-202 ☐EPA M6,8 ☐Acid Gases	☐IA Protocol ☐Formaldehyde ☐EPA M-29 ☐EPA M-26 ☐		
4	**Integrated Gas:** ☒Tedlar Bag	☐	☒EPA M-3 ☐	☒EPA M-10		Box 33 /1,2,3 Box 25 - 1
—	**Oxides of Nitrogen:**		☐EPA M-7A ☐			
—	**Fuel Lab:** ☐Fuel Sample	☐Aggregate	☐Per S-0163			
—	**Particle Sizing:**		☐X-Ray Sdgraph ☐	☐Cascade Imp		
—	**Miscellaneous:**	☐	☐			

Fuel Type:
Coal: ☐Bituminous ☐Anthracite ☐Lignite
Wood: ☐Wood Waste ☐Dust ☐Bark
Oil: ☐Waste Oil ☐No. 2 ☐No. 6
Misc: ☐Natural Gas ☐RDF ☐

Relinquished by/Affiliation	Accepted by/Affiliation	Date
Dennis S. Maso	Bob Sons, InterPoll	7/15/94 0700

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INTERPOLL LA   RATORIES, INC.
(612) 786-6020

Sample Chain of Custody

Job LP/Hayward
Field Engineer D. Marso
Source Line 1 Dryer RTO
Date of Test 7-15-94
Site Stack
Test No. 19
Log No. 3366
No. of Runs 3

No. Items	Sample Type		Analysis		Sequence No.	Comments
—	**Probe Wash:** ☐ Acetone ☐ MeCl$_2$	☐DI Water ☐	☐EPA M-5 ☐EPA M-29	☐EPA M-201A ☐		
—	**Filter:** ☐ 4" Glass ☐ SS Thimble	☐Pallflex ☐2.5" Glass	☐EPA M-5 ☐EPA M-29 ☐EPA M-201A	☐EPA M-17		
✓ 8	**Impingers:** ☐DI Water ☐3%H_2O_2 ☐1N NaOH ☐2,4-DNPH	☐H_2SO_4 ☐HNO_3/H_2O_2 ☐$KMnO_4/H_2SO_4$ ☒ Phenol solution	☐MN Protocol ☐WI Protocol ☐EPA M-202 ☐EPA M6,8 ☐Acid Gases	☐IA Protocol ☐Formaldehyde ☐EPA M-29 ☐EPA M-26 ☒ Phenol	3366 01-08	
—	**Integrated Gas:** ☐Tedlar Bag	☐	☐EPA M-3 ☐	☐EPA M-10		
—	**Oxides of Nitrogen:**		☐EPA M-7A ☐			
—	**Fuel Lab:** ☐Fuel Sample	☐Aggregate	☐Per S-0163			
—	**Particle Sizing:**		☐X-Ray Sdgraph ☐	☐Cascade Imp		
—	**Miscellaneous:**	☐	☐			

Fuel Type:

Coal: ☐Bituminous ☐Anthracite ☐Lignite
Wood: ☐Wood Waste ☐Dust ☐Bark
Oil: ☐Waste Oil ☐No. 2 ☐No. 6
Misc: ☐Natural Gas ☐RDF ☐

Relinquished by/Affiliation	Accepted by/Affiliation	Date
Dennis G. Marso	Bob Berg, Interpoll	7/15/94 0700

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Sample Chain of Custody

Job LP/Hayward
Field Engineer D. Marso
Source Line1 Dryer RTO
Date of Test 7-15-94
Site Stack
Test No. 19
Log No. 3366
No. of Runs 3

No. Items	Sample Type	Analysis	Sequence No.	Comments
—	**Probe Wash:** ☐ Acetone ☐ MeCl$_2$ ☐DI Water ☐ ______	☐EPA M-5 ☐EPA M-29 ☐EPA M-201A ☐ ______		
—	**Filter:** ☐ 4" Glass ☐ SS Thimble ☐Pallflex ☐2.5" Glass	☐EPA M-5 ☐EPA M-29 ☐EPA M-201A ☐EPA M-17		
7 8	**Impingers:** ☐DI Water ☐3%H$_2$O$_2$ ☐1N NaOH ☐2,4-DNPH ☐H$_2$SO$_4$ ☐HNO$_3$/H$_2$O$_2$ ☐KMnO$_4$/H$_2$SO$_4$ ☒Charcoal Tubes	☐MN Protocol ☐WI Protocol ☐EPA M-202 ☐EPA M6,8 ☐Acid Gases ☐IA Protocol ☐Formaldehyde ☐EPA M-29 ☐EPA M-26 ☒Method 18		
—	**Integrated Gas:** ☐Tedlar Bag ☐ ______	☐EPA M-3 ☐ ______ ☐EPA M-10		
—	**Oxides of Nitrogen:**	☐EPA M-7A ☐ ______		
—	**Fuel Lab:** ☐Fuel Sample ☐Aggregate	☐Per S-0163		
—	**Particle Sizing:**	☐X-Ray Sdgraph ☐ ______ ☐Cascade Imp		
—	**Miscellaneous:** ☐ ______	☐ ______		

Fuel Type:

Coal: ☐Bituminous ☐Anthracite ☐Lignite

Wood: ☐Wood Waste ☐Dust ☐Bark

Oil: ☐Waste Oil ☐No. 2 ☐No. 6

Misc: ☐Natural Gas ☐RDF ☐ ______

Relinquished by/Affiliation	Accepted by/Affiliation	Date
Dennis G. Marso	Bob Borg, Interpoll	7/18/94 0700

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APPENDIX F

TOTAL HYDROCARBONS STRIPCHARTS / DATA LOGGER PRINTOUTS

Interpoll Laboratories, Inc.
(612) 786-6020

Printout of ESC Model 80 DAS for CEM Trailer No. 1
- 1994 -

File Name: LP15
Job Number: 4-3366
Client: Louisiana Pacific Corporation
Location: Hayward, Wisconsin

Line 1 Core Dryer RTO Inlet -- Run 1

Julian	Time	Conc. (dry basis unless noted)			
Date	(Hrs)	NOx (ppmv)	CO (ppmv)	CO2 (%v/v)	O2 (%v/v)
195	16:26:00	23.2	9442	3.80	16.67
195	16:27:00	22.7	370	3.90	16.51
195	16:28:00	22.5	368	3.97	16.49
195	16:29:00	23.7	424	4.20	16.22
195	16:30:00	22.8	466	4.27	16.15
195	16:43:00	22.2	410	4.11	16.35
195	16:44:00	21.7	447	4.16	16.30
195	16:45:00	23.1	499	4.32	16.10
195	16:46:00	24.5	538	4.60	15.88
195	16:47:00	25.6	666	4.62	15.77
195	16:48:00	27.0	524	4.33	16.06
195	16:49:00	25.3	448	3.83	16.60
195	16:50:00	24.8	332	3.64	16.88
195	16:51:00	24.3	323	3.53	16.96
195	16:52:00	24.8	302	3.32	17.23
195	16:53:00	20.5	315	3.75	16.79
195	16:54:00	20.5	346	3.95	16.59
195	16:55:00	21.6	460	4.21	16.24
195	16:56:00	21.5	450	4.17	16.30
195	16:57:00	22.5	487	4.27	16.18
195	16:58:00	23.6	528	4.46	15.98
195	16:59:00	24.6	630	4.51	15.93
195	17:00:00	24.5	617	4.47	15.94
195	17:01:00	26.0	572	4.30	16.12
195	17:02:00	25.6	492	4.16	16.29
195	17:03:00	24.4	444	3.96	16.48
195	17:04:00	23.4	359	3.80	16.75
195	17:05:00	22.7	428	4.20	16.29
195	17:06:00	23.0	490	4.23	16.24
195	17:07:00	22.8	519	4.27	16.16
195	17:08:00	15.6	454	2.38	17.76
195	17:09:00	4.1	36.5	0.08	20.74
195	17:10:00	2.5	0.5	0.06	20.75
195	17:11:00	2.0	0.2	0.06	20.75

Interpoll Laboratories, Inc.
(612) 786-6020

Printout of ESC Model 80 DAS
for CEM Trailer No. 1
- 1994 -

File Name: LP15
Job Number: 4-3366
Client: Louisiana Pacific Corporation
Location: Hayward, Wisconsin

Line 1 Core Dryer RTO Inlet -- Run 1

Julian Date	Time (Hrs)	Conc. (dry basis unless noted) NOx (ppmv)	CO (ppmv)	CO2 (%v/v)	O2 (%v/v)
195	17:12:00	1.7	0.2	0.05	20.76
195	17:13:00	8.7	70.5	2.39	18.72
195	17:14:00	15.5	381	3.98	16.52
195	17:15:00	22.8	434	4.24	16.21
195	17:16:00	22.3	400	4.03	16.42
195	17:17:00	23.1	392	4.03	16.45
195	17:18:00	22.5	375	3.85	16.65
195	17:19:00	22.6	346	3.75	16.75
195	17:20:00	21.3	342	3.99	16.55
195	17:21:00	22.8	434	4.22	16.25
195	17:22:00	23.2	470	4.33	16.14
195	17:23:00	23.8	524	4.34	16.07
195	17:24:00	23.6	449	4.16	16.32
195	17:25:00	24.7	451	4.25	16.20
195	17:26:00	24.2	441	4.17	16.30
195	17:27:00	23.5	422	4.15	16.33
195	17:28:00	22.8	432	4.16	16.34
195	17:29:00	23.7	438	4.22	16.24
195	17:30:00	24.1	425	4.30	16.18
195	17:31:00	24.0	428	4.18	16.27
195	17:32:00	23.2	382	4.10	16.40
195	17:33:00	23.2	469	4.45	16.01
195	17:34:00	24.7	521	4.49	15.96
195	17:35:00	25.1	538	4.61	15.86
195	18:28:00	26.8	651	4.72	15.73
195	18:29:00	27.3	686	4.88	15.59
195	18:30:00	27.7	715	4.87	15.58
195	18:31:00	28.8	768	5.08	15.41
195	18:32:00	28.3	801	4.83	15.59
195	18:33:00	26.9	699	4.73	15.72
195	18:34:00	27.4	682	4.62	15.80
195	18:35:00	27.2	581	4.46	15.97
195	18:36:00	27.3	527	4.36	16.05
195	18:37:00	29.5	452	4.41	16.07

Interpoll Laboratories, Inc.
(612) 786-6020

Printout of ESC Model 80 DAS
for CEM Trailer No. 1
- 1994 -

File Name: LP15
Job Number: 4-3366
Client: Louisiana Pacific Corporation
Location: Hayward, Wisconsin

Line 1 Core Dryer RTO Inlet -- Run 1

Julian Date	Time (Hrs)	Conc. (dry basis unless noted) NOx (ppmv)	CO (ppmv)	CO2 (%v/v)	O2 (%v/v)
195	18:38:00	26.5	563	4.42	15.99
195	18:39:00	25.4	478	4.30	16.17
	Run Average	22.5	576	3.94	16.54

Interpoll Laboratories, Inc.
(612) 786-6020

Printout of ESC Model 80 DAS
for CEM Trailer No. 1
- 1994 -

File Name: LP153
Job Number: 4-3366
Client: Louisiana Pacific Corporation
Location: Hayward, Wisconsin

Line 1 Core Dryer RTO Inlet -- Run 2

Julian Date	Time (Hrs)	Conc. (dry basis unless noted)			
		NOx (ppmv)	CO (ppmv)	CO2 (%v/v)	O2 (%v/v)
195	22:31:00	36.2	%-9999.0	4.81	15.78
195	22:32:00	35.8	%-9999.0	4.70	15.84
195	22:33:00	34.6	920	4.33	16.22
195	22:34:00	35.4	841	4.42	16.17
195	22:35:00	34.7	905	4.40	16.17
195	22:36:00	33.7	853	4.37	16.22
195	22:37:00	34.5	962	4.53	16.03
195	22:38:00	34.5	947	4.48	16.08
195	22:39:00	34.7	875	4.38	16.20
195	22:40:00	35.3	900	4.44	16.11
195	22:41:00	32.2	717	3.96	16.61
195	22:42:00	31.3	545	4.01	16.66
195	22:43:00	30.7	586	4.00	16.65
195	22:44:00	31.2	544	3.99	16.64
195	22:45:00	30.3	530	3.92	16.73
195	22:46:00	31.7	540	4.10	16.55
195	22:47:00	31.5	596	4.11	16.51
195	22:48:00	32.0	626	4.23	16.39
195	22:49:00	32.0	743	4.31	16.26
195	22:50:00	33.4	819	4.55	16.05
195	22:51:00	34.7	951	4.56	16.00
195	22:52:00	34.8	920	4.59	15.98
195	22:53:00	36.5	918	4.42	16.12
195	22:54:00	35.5	769	4.23	16.32
195	22:55:00	32.3	576	3.68	16.96
195	22:56:00	30.9	427	3.76	16.92
195	22:57:00	29.2	402	3.53	17.16
195	22:58:00	28.7	382	3.74	16.97
195	22:59:00	29.1	447	3.79	16.89
195	23:00:00	30.4	506	4.11	16.55
195	23:01:00	10.2	458	1.36	19.04
195	23:02:00	0.5	19.7	-0.08	21.19
195	23:03:00	-0.0	-1.2	-0.10	21.20
195	23:04:00	-0.1	-1.2	-0.10	21.19

Interpoll Laboratories, Inc.
(612) 786-6020

Printout of ESC Model 80 DAS
for CEM Trailer No. 1
- 1994 -

File Name: LP153
Job Number: 4-3366
Client: Louisiana Pacific Corporation
Location: Hayward, Wisconsin

Line 1 Core Dryer RTO Inlet -- Run 2

Julian Date	Time (Hrs)	Conc. (dry basis unless noted)			
		NOx (ppmv)	CO (ppmv)	CO2 (%v/v)	O2 (%v/v)
195	23:05:00	14.0	274	3.82	17.37
195	23:06:00	22.5	730	4.34	16.20
195	23:07:00	26.0	849	4.23	16.27
195	23:08:00	26.6	719	4.25	16.33
195	23:09:00	28.0	762	4.25	16.25
195	23:10:00	26.8	703	4.19	16.36
195	23:11:00	25.7	678	4.01	16.53
195	23:12:00	25.7	570	4.07	16.51
195	23:13:00	25.2	653	4.08	16.46
195	23:14:00	24.4	646	4.11	16.44
195	23:15:00	25.3	681	4.13	16.40
195	23:16:00	25.6	789	4.38	16.10
195	23:17:00	25.7	810	4.16	16.31
195	23:18:00	24.6	617	3.93	16.58
195	23:19:00	26.1	496	3.79	16.74
195	23:20:00	24.9	386	3.37	17.18
195	23:21:00	23.7	281	3.13	17.48
195	23:22:00	22.6	268	3.42	17.22
195	23:23:00	22.6	322	3.56	17.03
195	23:24:00	21.8	373	3.75	16.84
195	23:49:00	20.2	322	3.76	16.89
195	23:50:00	25.8	454	3.91	16.69
195	23:51:00	25.3	568	4.13	16.44
195	23:52:00	23.1	649	4.17	16.41
195	23:53:00	24.0	754	4.31	16.21
195	23:54:00	24.7	752	4.24	16.30
195	23:55:00	25.0	755	4.20	16.34
195	23:56:00	24.5	694	4.08	16.47
195	23:57:00	23.8	539	3.75	16.84
195	23:58:00	22.6	449	3.84	16.80
195	23:59:00	22.0	485	3.88	16.75
196	00:00:00	21.9	510	3.86	16.73
	Run Average	28.1	>647	4.05	16.54

Interpoll Laboratories, Inc.
(612) 786-6020

Printout of ESC Model 80 DAS
for CEM Trailer No. 1
- 1994 -

File Name: LP154
Job Number: 4-3366
Client: Louisiana Pacific Corporation
Location: Hayward, Wisconsin

Line 1 Core Dryer RTO Inlet -- Run 3

Julian Date	Time (Hrs)	Conc. (dry basis unless noted) NOx (ppmv)	CO (ppmv)	CO2 (%v/v)	O2 (%v/v)
196	00:49:00	24.0	349	3.52	16.86
196	00:50:00	24.5	253	3.27	17.21
196	00:51:00	25.3	236	3.11	17.34
196	00:52:00	22.6	215	3.31	17.20
196	00:53:00	21.5	232	3.53	16.96
196	00:54:00	19.7	289	3.84	16.61
196	00:55:00	20.5	303	3.72	16.71
196	00:56:00	21.8	286	3.73	16.71
196	00:57:00	22.8	282	3.56	16.85
196	00:58:00	21.8	239	3.54	16.94
196	00:59:00	24.0	233	3.34	17.10
196	01:00:00	23.0	230	3.46	17.02
196	01:01:00	22.8	254	3.42	17.00
196	01:02:00	21.9	223	3.36	17.14
196	01:03:00	21.2	243	3.57	16.91
196	01:04:00	21.1	249	3.65	16.81
196	01:05:00	21.4	272	3.64	16.80
196	01:06:00	21.5	267	3.61	16.83
196	01:07:00	24.4	244	3.39	17.06
196	01:08:00	23.2	230	3.35	17.10
196	01:09:00	23.6	217	3.15	17.31
196	01:10:00	20.0	217	3.47	17.04
196	01:11:00	19.8	251	3.58	16.89
196	01:12:00	19.0	292	3.91	16.55
196	01:13:00	21.3	326	3.60	16.77
196	01:14:00	23.7	227	3.19	17.25
196	01:15:00	26.9	195	2.98	17.47
196	01:16:00	26.6	183	2.96	17.53
196	01:17:00	24.6	193	3.08	17.42
196	01:18:00	19.6	218	3.46	17.05
196	01:19:00	9.4	222	1.42	18.78
196	01:20:00	1.4	11.0	-0.12	20.91
196	01:21:00	0.3	-1.9	-0.13	20.92
196	01:22:00	0.0	-2.2	-0.13	20.91

Interpoll Laboratories, Inc.

(612) 786-6020

Printout of ESC Model 80 DAS
for CEM Trailer No. 1
- 1994 -

File Name: LP154
Job Number: 4-3366
Client: Louisiana Pacific Corporation
Location: Hayward, Wisconsin

Line 1 Core Dryer RTO Inlet -- Run 3

Julian Date	Time (Hrs)	Conc. (dry basis unless noted) NOx (ppmv)	CO (ppmv)	CO2 (%v/v)	O2 (%v/v)
196	01:23:00	16.0	86.4	2.67	18.23
196	01:24:00	20.4	199	3.00	17.48
196	01:25:00	22.9	214	3.08	17.37
196	01:26:00	22.3	205	3.36	17.18
196	01:27:00	20.2	296	4.00	16.45
196	01:28:00	20.5	357	3.78	16.58
196	01:29:00	25.1	258	3.22	17.18
196	01:30:00	32.4	210	2.57	17.81
196	01:31:00	33.5	220	2.27	18.17
196	01:32:00	29.0	159	2.58	17.94
196	01:33:00	22.9	183	3.13	17.41
196	01:34:00	17.9	219	3.62	16.87
196	01:35:00	18.0	294	3.81	16.65
196	01:36:00	18.3	344	3.97	16.43
196	01:37:00	19.3	350	3.90	16.48
196	01:38:00	23.3	277	3.28	17.13
196	01:39:00	25.8	230	3.11	17.34
196	01:40:00	26.6	204	2.97	17.51
196	01:41:00	25.6	190	3.04	17.42
196	01:42:00	20.2	204	3.41	17.11
196	01:43:00	21.4	244	3.36	17.06
196	01:44:00	20.1	245	3.57	16.90
196	01:45:00	21.9	258	3.44	16.97
196	01:46:00	22.4	220	3.36	17.13
196	01:47:00	21.6	264	3.72	16.74
196	01:48:00	21.2	313	3.77	16.66
196	01:49:00	22.4	301	3.60	16.81
196	01:50:00	21.6	275	3.73	16.73
196	01:51:00	23.2	342	3.89	16.54
	Run Average	22.3	247	3.37	17.09

Interpoll Laboratories, Inc.
(612) 786-6020

Printout of ESC Model 80 DAS
for CEM Trailer No. 2
- 1994 -

File Name: LP1OUT1
Job Number: 4-3366
Client: Louisiana Pacific Corporation
Location: Hayward, Wisconsin

Line 1 Dryer RTO Outlet -- Run 1

Julian Date	Time (Hrs)	Conc. (dry basis unless noted)			
		NOx (ppmv)	CO (ppmv)	CO2 (%v/v)	O2 (%v/v)
195	16:26:00	29.4	164	4.49	16.62
195	16:27:00	31.1	203	4.42	16.56
195	16:28:00	28.4	146	4.29	16.65
195	16:29:00	27.4	134	4.26	16.79
195	16:30:00	29.4	131	4.40	16.73
195	16:43:00	30.5	212	4.37	16.53
195	16:44:00	27.8	147	4.17	16.75
195	16:45:00	26.5	152	4.42	16.60
195	16:46:00	28.2	161	4.47	16.56
195	16:47:00	30.7	219	4.68	16.31
195	16:48:00	28.5	191	4.56	16.31
195	16:49:00	27.3	171	4.39	16.54
195	16:50:00	27.7	138	4.20	16.86
195	16:51:00	30.3	195	4.40	16.58
195	16:52:00	28.4	170	4.32	16.55
195	16:53:00	27.0	169	4.11	16.83
195	16:54:00	27.9	131	4.24	16.85
195	16:55:00	30.4	197	4.44	16.53
195	16:56:00	28.8	170	4.51	16.37
195	16:57:00	27.0	183	4.49	16.47
195	16:58:00	29.3	171	4.67	16.41
195	16:59:00	31.5	270	4.78	16.13
195	17:00:00	29.3	218	4.74	16.14
195	17:01:00	27.4	212	4.56	16.37
195	17:02:00	29.4	172	4.54	16.51
195	17:03:00	31.7	235	4.61	16.33
195	17:04:00	28.9	185	4.48	16.39
195	17:05:00	27.0	174	4.41	16.57
195	17:06:00	28.6	165	4.55	16.52
195	17:07:00	30.9	251	4.66	16.29
195	17:08:00	28.5	201	4.53	16.35
195	17:09:00	26.5	184	4.44	16.52
195	17:10:00	28.9	159	4.45	16.61
195	17:11:00	31.3	229	4.63	16.34

Interpoll Laboratories, Inc.

(612) 786-6020

Printout of ESC Model 80 DAS
for CEM Trailer No. 2
- 1994 -

File Name: LP1OUT1
Job Number: 4-3366
Client: Louisiana Pacific Corporation
Location: Hayward, Wisconsin

Line 1 Dryer RTO Outlet -- Run 1

Julian Date	Time (Hrs)	Conc. (dry basis unless noted) NOx (ppmv)	CO (ppmv)	CO2 (%v/v)	O2 (%v/v)
195	17:12:00	28.9	194	4.42	16.42
195	17:13:00	26.8	172	4.29	16.68
195	17:14:00	28.5	152	4.45	16.63
195	17:15:00	30.7	229	4.55	16.39
195	17:16:00	29.1	188	4.56	16.31
195	17:17:00	26.5	178	4.34	16.56
195	17:18:00	27.7	147	4.32	16.74
195	17:19:00	29.7	209	4.29	16.64
195	17:20:00	27.7	153	4.23	16.67
195	17:21:00	26.1	157	4.38	16.57
195	17:22:00	28.0	152	4.49	16.57
195	17:23:00	30.7	235	4.57	16.32
195	17:24:00	28.7	181	4.47	16.39
195	17:25:00	26.7	173	4.39	16.55
195	17:26:00	28.5	149	4.43	16.64
195	17:27:00	31.2	225	4.58	16.34
195	17:28:00	29.2	190	4.59	16.29
195	17:29:00	28.2	203	4.73	16.20
195	17:30:00	30.1	191	4.68	16.34
195	17:31:00	33.1	277	4.94	15.98
195	17:32:00	30.5	242	4.82	16.02
195	17:33:00	28.7	242	4.83	16.12
195	17:34:00	30.8	213	4.83	16.20
195	17:35:00	33.2	290	4.87	16.03
195	18:28:00	29.7	203	4.75	16.07
195	18:29:00	27.7	213	4.77	16.12
195	18:30:00	28.3	183	4.65	16.31
195	18:31:00	31.5	231	4.49	16.42
195	18:32:00	30.0	185	4.42	16.41
195	18:33:00	27.8	172	4.46	16.47
195	18:34:00	27.0	157	4.61	16.45
195	18:35:00	33.5	220	4.90	15.98
195	18:36:00	34.4	236	4.98	15.88
195	18:37:00	30.7	212	4.91	15.86

Interpoll Laboratories, Inc.
(612) 786-6020

Printout of ESC Model 80 DAS
for CEM Trailer No. 2
- 1994 -

File Name: LP1OUT1
Job Number: 4-3366
Client: Louisiana Pacific Corporation
Location: Hayward, Wisconsin

Line 1 Dryer RTO Outlet -- Run 1

Julian Date	Time (Hrs)	Conc. (dry basis unless noted)			
		NOx (ppmv)	CO (ppmv)	CO2 (%v/v)	O2 (%v/v)
195	18:38:00	29.6	198	4.75	16.13
195	18:39:00	29.8	191	4.50	16.48
195	18:40:00	31.6	203	4.59	16.46
	Run Average	29.2	191	4.53	16.42

Interpoll Laboratories, Inc.
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Printout of ESC Model 80 DAS
for CEM Trailer No. 2
- 1994 -

File Name: LP1OUT3
Job Number: 4-3366
Client: Louisiana Pacific Corporation
Location: Hayward, Wisconsin

Line 1 Dryer RTO Outlet -- Run 2

Julian Date	Time (Hrs)	Conc. (dry basis unless noted) NOx (ppmv)	CO (ppmv)	CO2 (%v/v)	O2 (%v/v)
195	22:31:00	29.4	270	4.35	16.49
195	22:32:00	28.8	238	4.43	16.32
195	22:33:00	28.2	206	4.21	16.51
195	22:34:00	31.4	177	4.03	16.82
195	22:35:00	30.7	185	4.19	16.49
195	22:36:00	28.0	163	4.08	16.67
195	22:37:00	27.0	174	4.31	16.63
195	22:38:00	31.2	248	4.43	16.42
195	22:39:00	30.7	259	4.29	16.41
195	22:40:00	29.7	177	4.11	16.62
195	22:41:00	28.9	153	4.22	16.50
195	22:42:00	29.9	161	4.03	16.89
195	22:43:00	30.0	186	4.17	16.58
195	22:44:00	27.6	163	4.02	16.71
195	22:45:00	26.6	137	3.69	17.18
195	22:46:00	30.0	136	3.99	16.94
195	22:47:00	32.3	155	4.18	16.38
195	22:48:00	29.4	130	4.25	16.41
195	22:49:00	27.9	142	4.20	16.59
195	22:50:00	28.8	170	3.89	17.02
195	22:51:00	29.1	215	3.98	16.92
195	22:52:00	28.2	190	4.22	16.59
195	22:53:00	28.8	186	4.42	16.35
195	22:54:00	32.2	183	4.33	16.41
195	22:55:00	31.2	197	4.26	16.38
195	22:56:00	28.4	128	4.00	16.70
195	22:57:00	26.3	117	3.73	17.07
195	22:58:00	27.8	118	3.52	17.39
195	22:59:00	28.3	139	3.63	17.27
195	23:00:00	27.5	121	3.85	16.95
195	23:01:00	27.2	125	4.05	16.75
195	23:02:00	29.9	152	4.14	16.72
195	23:03:00	30.4	199	4.11	16.54
195	23:04:00	27.9	146	3.79	16.95

Interpoll Laboratories, Inc.
(612) 786-6020

Printout of ESC Model 80 DAS
for CEM Trailer No. 2
- 1994 -

File Name: LP1OUT3
Job Number: 4-3366
Client: Louisiana Pacific Corporation
Location: Hayward, Wisconsin

Line 1 Dryer RTO Outlet -- Run 2

Julian	Time	Conc. (dry basis unless noted)			
Date	(Hrs)	NOx (ppmv)	CO (ppmv)	CO2 (%v/v)	O2 (%v/v)
195	23:05:00	25.6	133	3.81	17.07
195	23:06:00	28.8	164	4.17	16.81
195	23:07:00	30.6	242	4.23	16.46
195	23:08:00	28.9	170	3.91	16.82
195	23:09:00	27.0	139	3.97	16.86
195	23:10:00	29.2	170	4.21	16.72
195	23:11:00	30.5	243	4.25	16.42
195	23:12:00	29.0	157	3.66	17.07
195	23:13:00	26.2	125	3.90	17.01
195	23:14:00	28.6	163	4.10	16.85
195	23:15:00	30.7	235	4.47	16.29
195	23:16:00	28.6	210	4.29	16.41
195	23:17:00	27.3	185	4.07	16.69
195	23:18:00	29.1	168	3.88	16.98
195	23:19:00	30.5	178	3.90	16.85
195	23:20:00	28.0	136	3.98	16.80
195	23:21:00	26.1	137	3.77	16.98
195	23:22:00	28.6	125	3.77	17.12
195	23:23:00	30.2	157	3.90	16.81
195	23:24:00	27.6	119	3.67	17.03
195	23:25:00	26.5	118	3.89	16.96
195	23:26:00	28.0	134	4.10	16.77
195	23:27:00	31.2	230	4.52	16.27
195	23:28:00	29.7	217	4.38	16.31
195	23:29:00	28.9	220	4.51	16.27
195	23:30:00	30.0	216	4.34	16.46
195	23:31:00	32.6	248	4.00	16.71
195	23:32:00	28.9	156	3.96	16.76
195	23:33:00	26.9	158	4.12	16.66
195	23:34:00	28.1	151	4.13	16.75
195	23:35:00	30.6	224	4.14	16.57
195	23:36:00	30.5	150	3.66	17.04
195	23:37:00	26.2	124	3.79	17.06
195	23:38:00	26.6	131	3.99	16.92

Interpoll Laboratories, Inc.
(612) 786-6020

Printout of ESC Model 80 DAS
for CEM Trailer No. 2
- 1994 -

File Name: LP1OUT3
Job Number: 4-3366
Client: Louisiana Pacific Corporation
Location: Hayward, Wisconsin

Line 1 Dryer RTO Outlet -- Run 2

Julian Date	Time (Hrs)	Conc. (dry basis unless noted) NOx (ppmv)	CO (ppmv)	CO2 (%v/v)	O2 (%v/v)
195	23:39:00	29.9	193	4.04	16.71
195	23:40:00	28.2	153	3.89	16.80
195	23:41:00	27.1	137	4.03	16.79
195	23:42:00	27.9	158	4.29	16.62
195	23:43:00	31.1	269	4.55	16.27
195	23:44:00	29.2	241	4.41	16.29
195	23:45:00	28.3	218	4.13	16.55
195	23:46:00	28.6	125	3.66	17.24
195	23:47:00	30.0	149	3.97	16.90
195	23:48:00	28.6	156	4.04	16.66
195	23:49:00	27.1	169	4.09	16.70
195	23:50:00	27.1	140	3.92	16.96
195	23:51:00	29.9	183	4.00	16.84
195	23:52:00	28.7	161	4.04	16.70
195	23:53:00	27.3	176	4.36	16.49
195	23:54:00	28.5	186	4.47	16.46
195	23:55:00	32.4	311	4.63	16.16
195	23:56:00	29.9	237	4.18	16.47
195	23:57:00	28.0	176	3.80	16.93
195	23:58:00	26.5	118	3.77	17.23
	Run Average	28.9	174	4.08	16.71

Interpoll Laboratories, Inc.
(612) 786-6020

Printout of ESC Model 80 DAS
for CEM Trailer No. 2
- 1994 -

File Name: LP1OUT4
Job Number: 4-3366
Client: Louisiana Pacific Corporation
Location: Hayward, Wisconsin

Line 1 Dryer RTO Outet -- Run 3

Julian Date	Time (Hrs)	Conc. (dry basis unless noted)			
		NOx (ppmv)	CO (ppmv)	CO2 (%v/v)	O2 (%v/v)
196	00:49:00	29.7	148	4.18	16.47
196	00:50:00	28.6	108	3.49	17.12
196	00:51:00	28.5	73.4	3.27	17.51
196	00:52:00	29.6	68.2	3.25	17.61
196	00:53:00	30.6	81.5	3.54	17.22
196	00:54:00	27.5	77.5	3.68	17.07
196	00:55:00	26.4	86.9	3.72	17.02
196	00:56:00	27.6	91.4	3.68	17.18
196	00:57:00	29.3	108	3.78	16.93
196	00:58:00	27.6	85.5	3.59	17.12
196	00:59:00	27.2	76.6	3.51	17.27
196	01:00:00	28.2	79.8	3.54	17.33
196	01:01:00	29.5	101	3.82	16.93
196	01:02:00	28.6	87.0	3.53	17.16
196	01:03:00	27.0	76.3	3.48	17.30
196	01:04:00	27.8	76.9	3.62	17.28
196	01:05:00	29.0	113	4.03	16.77
196	01:06:00	27.3	116	3.94	16.75
196	01:07:00	27.0	96.3	3.56	17.16
196	01:08:00	29.0	80.7	3.39	17.47
196	01:09:00	32.3	87.6	3.42	17.34
196	01:10:00	27.6	71.9	3.54	17.27
196	01:11:00	25.4	90.7	3.83	16.95
196	01:12:00	27.4	102	3.82	17.00
196	01:13:00	29.6	117	3.90	16.80
196	01:14:00	27.5	91.9	3.56	17.08
196	01:15:00	28.0	72.9	3.33	17.46
196	01:16:00	27.3	68.9	3.32	17.61
196	01:17:00	29.6	94.8	3.50	17.29
196	01:18:00	28.7	74.5	3.38	17.32
196	01:19:00	28.0	75.2	3.44	17.34
196	01:20:00	26.2	73.8	3.66	17.29
196	01:21:00	28.2	133	4.00	16.73
196	01:22:00	26.2	111	3.70	16.99

Interpoll Laboratories, Inc.
(612) 786-6020

Printout of ESC Model 80 DAS
for CEM Trailer No. 2
- 1994 -

File Name: LP1OUT4
Job Number: 4-3366
Client: Louisiana Pacific Corporation
Location: Hayward, Wisconsin

Line 1 Dryer RTO Outet -- Run 3

Julian	Time	Conc. (dry basis unless noted)			
Date	(Hrs)	NOx (ppmv)	CO (ppmv)	CO2 (%v/v)	O2 (%v/v)
196	01:23:00	25.9	111	3.72	17.06
196	01:24:00	28.2	96.1	3.49	17.33
196	01:25:00	31.8	92.8	3.43	17.39
196	01:26:00	28.8	84.4	3.52	17.14
196	01:27:00	28.5	75.8	3.49	17.36
196	01:28:00	26.1	87.9	3.91	17.03
196	01:29:00	27.8	146	3.90	16.80
196	01:30:00	28.0	98.2	3.53	17.10
196	01:31:00	28.9	79.7	3.26	17.49
196	01:32:00	30.8	59.1	2.96	17.90
196	01:33:00	31.9	72.6	3.38	17.46
196	01:34:00	28.4	79.8	3.55	17.13
196	01:35:00	27.3	80.1	3.60	17.20
196	01:36:00	25.9	86.0	3.68	17.19
196	01:37:00	29.1	120	3.83	16.93
196	01:38:00	26.9	105	3.83	16.83
196	01:39:00	28.6	91.3	3.33	17.35
196	01:40:00	27.8	64.1	3.32	17.59
196	01:41:00	30.4	90.2	3.49	17.28
196	01:42:00	28.5	78.6	3.51	17.17
196	01:43:00	27.1	79.8	3.55	17.22
196	01:44:00	26.2	73.3	3.53	17.35
196	01:45:00	28.9	111	3.75	17.02
196	01:46:00	28.0	96.7	3.69	16.97
196	01:47:00	26.6	95.8	3.75	17.00
196	01:48:00	26.3	89.5	3.73	17.11
196	01:49:00	29.7	120	3.61	17.18
196	01:50:00	28.1	97.9	3.61	17.06
196	01:51:00	27.0	92.6	3.66	17.10
196	01:52:00	26.0	91.3	3.80	17.10
196	01:53:00	29.7	139	3.70	16.96
196	01:54:00	30.1	90.4	3.36	17.29
	Run Average	28.2	92.0	3.60	17.17

Interpoll Laboratories, Inc.

(612) 786-6020

Printout of ESC Model 80 DAS
for CEM Trailer No. 2
- 1994 -

File Name: LP2OUT1
Job Number: 4-3366
Client: Louisiana Pacific Corporation
Location: Hayward, Wisconsin

Line 2 Dryer RTO Outlet -- Run 1

Julian Date	Time (Hrs)	Conc. (dry basis unless noted) NOx (ppmv)	CO (ppmv)	CO2 (%v/v)	O2 (%v/v)
193	10:18:00	23.3	120	3.15	17.43
193	10:19:00	24.0	104	3.27	17.33
193	10:20:00	23.8	116	3.28	17.17
193	10:21:00	24.4	129	3.45	17.06
193	10:22:00	26.5	181	3.75	16.67
193	10:23:00	25.8	160	3.51	16.88
193	10:24:00	24.7	121	3.05	17.53
193	10:25:00	24.1	93.2	3.29	17.34
193	10:26:00	24.2	139	3.46	17.00
193	10:27:00	24.3	172	3.63	16.85
193	10:28:00	25.1	214	3.67	16.74
193	10:29:00	25.2	150	3.49	17.00
193	10:30:00	24.3	115	3.26	17.37
193	10:31:00	23.8	116	3.38	17.13
193	10:32:00	23.8	114	3.23	17.33
193	10:33:00	24.9	173	3.61	16.79
193	10:34:00	24.6	164	3.42	16.90
193	10:35:00	23.6	123	3.24	17.41
193	10:57:00	21.5	136	3.01	17.29
193	10:58:00	22.2	112	2.98	17.45
193	10:59:00	21.8	119	3.30	17.04
193	11:00:00	22.1	136	3.16	17.21
193	11:01:00	23.0	173	3.33	16.88
193	11:02:00	22.4	135	3.26	17.02
193	11:03:00	22.1	103	2.82	17.61
193	11:04:00	22.7	74.7	2.98	17.55
193	11:05:00	22.1	101	3.21	17.14
193	11:06:00	24.4	114	3.32	17.07
193	11:07:00	24.9	144	3.54	16.82
193	11:08:00	23.8	137	3.15	17.09
193	11:09:00	23.4	98.4	2.98	17.50
193	11:10:00	23.0	95.8	3.32	17.19
193	11:11:00	22.6	109	3.17	17.33
193	11:12:00	23.3	134	3.31	17.06

Interpoll Laboratories, Inc.
(612) 786-6020

Printout of ESC Model 80 DAS
for CEM Trailer No. 2
- 1994 -

File Name: LP2OUT1
Job Number: 4-3366
Client: Louisiana Pacific Corporation
Location: Hayward, Wisconsin

Line 2 Dryer RTO Outlet -- Run 1

Julian Date	Time (Hrs)	Conc. (dry basis unless noted)			
		NOx (ppmv)	CO (ppmv)	CO2 (%v/v)	O2 (%v/v)
193	11:13:00	24.6	126	3.37	17.08
193	11:14:00	23.0	133	3.17	17.33
193	11:15:00	23.1	120	3.29	17.25
193	11:16:00	23.1	138	3.62	16.86
193	11:17:00	23.7	162	3.59	16.88
193	11:18:00	25.2	207	3.96	16.46
193	11:19:00	24.8	180	3.27	16.94
193	11:20:00	24.6	95.1	3.04	17.53
193	11:21:00	24.9	91.1	3.13	17.35
193	11:22:00	25.8	108	4.00	16.88
193	11:23:00	22.7	120	4.09	17.60
193	11:24:00	24.4	132	3.93	16.88
193	11:25:00	23.7	137	3.68	17.22
193	11:26:00	23.4	132	3.55	17.33
193	11:27:00	21.6	126	3.85	17.27
193	11:54:00	24.8	138	3.17	17.11
193	11:55:00	24.4	119	3.34	17.02
193	11:56:00	24.4	157	3.46	16.85
193	11:57:00	25.5	228	3.62	16.55
193	11:58:00	25.9	178	3.29	16.90
193	11:59:00	25.1	131	3.33	17.16
193	12:00:00	24.8	136	3.51	16.94
193	12:01:00	25.0	185	3.69	16.67
193	12:02:00	26.8	251	3.97	16.31
193	12:03:00	27.7	268	3.90	16.33
193	12:04:00	25.8	192	3.54	16.82
193	12:05:00	25.5	136	3.26	17.17
193	12:06:00	25.4	113	3.40	17.02
193	12:07:00	24.7	125	3.30	17.12
193	12:08:00	25.4	162	3.54	16.78
193	12:09:00	27.4	147	3.73	16.70
193	12:10:00	25.7	122	3.19	17.17
	Run Average	24.2	140	3.41	17.07

Interpoll Laboratories, Inc.
(612) 786-6020

Printout of ESC Model 80 DAS for CEM Trailer No. 2
- 1994 -

File Name: LP2OUT2
Job Number: 4-3366
Client: Louisiana Pacific Corporation
Location: Hayward, Wisconsin

Line 2 Dryer RTO Outlet -- Run 2

Julian Date	Time (Hrs)	Conc. (dry basis unless noted)			
		NOx (ppmv)	CO (ppmv)	CO2 (%v/v)	O2 (%v/v)
193	13:06:00	24.5	108	3.11	17.37
193	13:07:00	24.5	156	3.54	16.89
193	13:08:00	22.7	163	3.22	17.15
193	13:09:00	22.8	225	3.24	17.18
193	13:10:00	25.0	152	3.45	16.93
193	13:11:00	25.6	108	3.24	17.09
193	13:12:00	24.2	115	3.23	17.25
193	13:13:00	24.3	143	3.42	16.98
193	13:14:00	24.8	190	3.57	16.85
193	13:15:00	26.6	215	3.25	17.06
193	13:16:00	25.9	130	3.45	16.89
193	13:17:00	23.6	95.8	3.04	17.45
193	13:18:00	24.0	110	3.36	17.23
193	13:19:00	23.4	132	3.28	17.15
193	13:20:00	23.5	202	3.48	17.15
193	13:21:00	24.9	240	3.72	16.62
193	13:22:00	24.9	129	3.21	17.26
193	13:23:00	24.5	131	3.41	17.07
193	13:24:00	24.1	109	3.42	17.13
193	13:25:00	24.1	147	3.60	16.91
193	13:26:00	26.1	216	3.87	16.59
193	13:27:00	27.3	208	4.01	16.35
193	13:28:00	26.1	141	3.67	16.89
193	13:29:00	25.1	157	3.57	16.92
193	13:30:00	24.7	113	3.03	17.45
193	13:31:00	21.2	126	3.20	17.46
193	13:32:00	25.6	114	2.91	17.53
193	13:33:00	25.1	60.1	3.34	17.23
193	13:34:00	24.5	99.3	3.32	17.22
193	13:35:00	23.8	121	3.84	16.81
193	13:36:00	23.8	178	3.91	16.55
193	13:37:00	25.1	266	4.11	16.34
193	13:38:00	24.9	230	3.91	16.51
193	13:39:00	23.8	169	3.52	17.07

Interpoll Laboratories, Inc.

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Printout of ESC Model 80 DAS
for CEM Trailer No. 2
- 1994 -

File Name: LP2OUT2
Job Number: 4-3366
Client: Louisiana Pacific Corporation
Location: Hayward, Wisconsin

Line 2 Dryer RTO Outlet -- Run 2

Julian Date	Time (Hrs)	Conc. (dry basis unless noted)			
		NOx (ppmv)	CO (ppmv)	CO2 (%v/v)	O2 (%v/v)
193	13:40:00	23.1	105	3.10	17.51
193	13:41:00	22.5	80.1	3.25	17.32
193	13:42:00	24.7	94.8	3.28	17.26
193	13:43:00	24.6	148	3.75	16.79
193	13:44:00	25.6	143	3.69	16.76
193	13:45:00	25.1	134	3.68	16.90
193	13:46:00	24.2	137	3.93	16.68
193	13:47:00	23.9	158	3.91	16.60
193	13:48:00	24.5	216	3.82	16.72
193	13:49:00	25.2	197	3.96	16.53
193	13:50:00	23.7	143	3.48	17.10
193	13:51:00	24.1	102	3.11	17.48
193	13:52:00	23.5	78.0	3.50	17.20
193	13:53:00	23.4	130	3.63	16.90
193	13:54:00	23.5	165	3.84	16.64
193	13:55:00	23.5	150	3.61	16.95
193	13:56:00	24.9	141	3.85	16.77
193	13:57:00	23.3	125	3.71	16.89
193	13:58:00	23.2	139	3.75	16.80
193	13:59:00	25.5	174	3.81	16.66
193	14:00:00	26.1	176	3.91	16.60
193	14:01:00	25.3	139	3.76	16.79
193	14:02:00	24.7	144	3.77	16.84
193	14:03:00	23.6	136	3.81	16.81
193	14:04:00	22.7	164	3.85	16.78
193	14:05:00	23.8	226	3.90	16.58
193	14:06:00	24.3	184	3.88	16.58
193	14:07:00	24.8	126	3.42	17.23
193	14:08:00	23.5	117	3.58	17.06
193	14:09:00	23.5	128	3.60	16.98
193	14:10:00	23.6	182	3.89	16.68
	Run Average	24.3	149	3.56	16.95

Printout of ESC Model 80 DAS
for CEM Trailer No. 2
- 1994 -

File Name: LP2OUT3
Job Number: 4-3366
Client: Louisiana Pacific Corporation
Location: Hayward, Wisconsin

Line 2 Dryer RTO Outlet -- Run 3

Julian	Time	Conc. (dry basis unless noted)			
Date	(Hrs)	NOx (ppmv)	CO (ppmv)	CO2 (%v/v)	O2 (%v/v)
193	15:01:00	25.1	244	3.92	16.52
193	15:02:00	24.8	168	3.80	16.69
193	15:03:00	23.9	148	3.44	17.10
193	15:04:00	23.1	113	3.51	17.13
193	15:05:00	22.5	129	3.45	17.12
193	15:06:00	23.2	189	3.59	16.90
193	15:07:00	23.7	160	3.61	16.90
193	15:08:00	22.9	131	3.23	17.30
193	15:09:00	22.9	108	3.46	17.17
193	15:10:00	22.0	108	3.33	17.19
193	15:11:00	22.8	135	3.56	17.01
193	15:12:00	24.0	182	3.75	16.66
193	15:13:00	24.3	144	3.52	16.85
193	15:14:00	22.8	119	3.17	17.42
193	15:15:00	22.5	105	3.47	17.14
193	15:16:00	21.9	110	3.30	17.28
193	15:17:00	22.2	152	3.49	17.02
193	15:18:00	23.2	172	3.59	16.80
193	15:19:00	21.7	114	3.11	17.42
193	15:20:00	21.9	101	3.19	17.36
193	15:21:00	21.9	83.5	3.30	17.29
193	15:22:00	22.7	136	3.38	17.07
193	15:23:00	25.4	151	3.48	16.93
193	15:24:00	24.3	139	3.65	16.78
193	15:25:00	24.1	137	3.10	17.39
193	15:26:00	22.4	100	3.42	17.28
193	15:27:00	21.4	134	3.30	17.16
193	15:28:00	22.0	163	3.65	16.93
193	15:29:00	23.5	215	3.39	16.95
193	15:30:00	23.5	119	3.21	17.33
193	15:31:00	22.8	121	3.13	17.36
193	15:32:00	23.3	106	3.30	17.29
193	15:33:00	22.1	175	3.54	16.91
193	15:34:00	23.5	224	3.57	16.85

Interpoll Laboratories, Inc.
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Printout of ESC Model 80 DAS
for CEM Trailer No. 2
- 1994 -

File Name: LP2OUT3
Job Number: 4-3366
Client: Louisiana Pacific Corporation
Location: Hayward, Wisconsin

Line 2 Dryer RTO Outlet -- Run 3

Julian Date	Time (Hrs)	Conc. (dry basis unless noted) NOx (ppmv)	CO (ppmv)	CO2 (%v/v)	O2 (%v/v)
193	15:35:00	23.7	195	3.68	16.70
193	15:36:00	22.3	138	3.12	17.40
193	15:37:00	22.1	99.9	3.14	17.50
193	15:38:00	22.2	118	3.36	17.12
193	15:39:00	23.3	142	3.36	17.17
193	15:40:00	23.1	222	3.75	16.68
193	15:41:00	24.3	162	3.09	17.25
193	15:42:00	23.1	108	3.27	17.42
193	15:43:00	22.8	139	3.33	17.05
193	15:44:00	22.6	108	3.33	17.31
193	15:45:00	24.0	186	3.51	16.85
193	15:46:00	25.0	153	3.53	16.83
193	15:47:00	23.2	142	3.44	17.08
193	15:48:00	22.9	129	3.35	17.20
193	15:49:00	22.9	135	3.59	16.92
193	15:50:00	23.0	179	3.26	17.14
193	15:51:00	23.4	160	3.53	17.05
193	15:52:00	23.3	172	3.25	16.98
193	15:53:00	22.8	101	3.21	17.49
193	15:54:00	22.0	126	3.28	17.17
193	15:55:00	22.7	113	3.20	17.33
193	15:56:00	23.9	189	3.75	16.68
193	15:57:00	24.8	193	3.39	16.95
193	15:58:00	22.4	130	3.28	17.20
193	15:59:00	22.9	110	3.13	17.49
193	16:00:00	23.0	132	3.53	16.99
193	16:01:00	23.1	172	3.44	16.99
193	16:02:00	23.8	176	3.54	16.96
193	16:03:00	23.9	176	3.67	16.71
193	16:04:00	23.9	140	3.31	17.27
193	16:05:00	23.2	140	3.69	16.89
193	16:06:00	22.9	150	3.39	17.07
193	16:07:00	24.8	220	4.00	16.47
193	16:08:00	26.1	265	3.93	16.40

Interpoll Laboratories, Inc.
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Printout of ESC Model 80 DAS
for CEM Trailer No. 2
- 1994 -

File Name: LP2OUT3
Job Number: 4-3366
Client: Louisiana Pacific Corporation
Location: Hayward, Wisconsin

Line 2 Dryer RTO Outlet -- Run 3

Julian Date	Time (Hrs)	Conc. (dry basis unless noted) NOx (ppmv)	CO (ppmv)	CO2 (%v/v)	O2 (%v/v)
193	16:09:00	24.5	157	3.36	17.08
193	16:10:00	24.0	135	3.59	16.98
193	16:11:00	23.6	135	3.40	17.07
	Run Average	23.2	148	3.43	17.06

Interpoll Laboratories, Inc.

(612) 786-6020

Printout of ESC Model 80 DAS
for CEM Trailer No. 1
- 1994 -

File Name: LP31
Job Number: 4-3366
Client: Louisiana Pacific Corporation
Location: Hayward, Wisconsin

Line 2 Core Dryer RTO Inlet -- Run 1

Julian Date	Time (Hrs)	Conc. (dry basis unless noted)			
		NOx (ppmv)	CO (ppmv)	CO2 (%v/v)	O2 (%v/v)
193	10:18:00	24.0	357	3.55	16.80
193	10:19:00	24.4	290	3.63	16.76
193	10:20:00	22.8	297	3.72	16.73
193	10:21:00	23.4	360	3.69	16.76
193	10:22:00	24.6	411	3.79	16.65
193	10:23:00	25.9	688	3.90	16.41
193	10:24:00	25.8	560	3.84	16.49
193	10:25:00	24.1	402	3.70	16.72
193	10:26:00	24.8	446	3.97	16.45
193	10:27:00	24.7	558	3.78	16.63
193	10:28:00	25.5	484	3.87	16.54
193	10:29:00	26.2	500	3.61	16.81
193	10:30:00	26.8	570	3.61	16.69
193	10:31:00	28.8	380	3.65	16.64
193	10:32:00	27.1	343	3.30	16.97
193	10:33:00	23.7	318	2.70	17.51
193	10:34:00	19.8	229	2.10	18.09
193	10:35:00	17.1	196	1.74	18.54
193	10:36:00	14.8	146	1.48	18.89
193	10:37:00	12.7	135	1.29	19.14
193	10:38:00	11.2	105	1.10	19.37
193	10:39:00	11.0	98.3	1.05	19.45
193	10:40:00	16.0	163	1.50	18.88
193	10:41:00	6.1	134	0.51	20.08
193	10:42:00	3.5	23.1	0.46	20.24
193	10:43:00	4.5	61.1	1.43	19.43
193	10:44:00	13.8	381	2.99	17.43
193	10:45:00	18.4	368	3.59	16.89
193	10:46:00	23.2	457	3.71	16.73
193	10:47:00	23.6	485	3.54	16.93
193	10:48:00	25.7	369	3.32	17.12
193	10:49:00	24.0	382	3.54	16.83
193	10:50:00	24.5	348	3.69	16.75
193	10:51:00	23.7	325	3.73	16.70

Interpoll Laboratories, Inc.
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Printout of ESC Model 80 DAS
for CEM Trailer No. 1
- 1994 -

File Name: LP31
Job Number: 4-3366
Client: Louisiana Pacific Corporation
Location: Hayward, Wisconsin

Line 2 Core Dryer RTO Inlet -- Run 1

Julian Date	Time (Hrs)	Conc. (dry basis unless noted)			
		NOx (ppmv)	CO (ppmv)	CO2 (%v/v)	O2 (%v/v)
193	10:52:00	25.4	315	3.72	16.72
193	10:53:00	25.7	292	3.69	16.76
193	10:54:00	26.3	291	3.76	16.71
193	10:55:00	25.3	298	3.64	16.85
193	10:56:00	28.2	419	3.75	16.61
193	10:57:00	27.0	390	3.82	16.57
193	10:58:00	26.6	337	3.76	16.63
193	10:59:00	25.8	297	3.65	16.83
193	11:00:00	26.5	375	3.83	16.58
193	11:01:00	26.4	292	3.81	16.67
193	11:02:00	26.5	349	3.76	16.69
193	11:03:00	26.5	320	3.62	16.79
193	11:04:00	26.8	232	3.62	16.86
193	11:05:00	26.5	290	3.72	16.72
193	11:06:00	27.6	303	3.57	16.83
193	11:07:00	25.8	349	3.82	16.62
193	11:08:00	27.1	370	4.03	16.45
193	11:09:00	24.6	404	3.33	16.85
193	11:10:00	16.0	208	1.50	19.22
193	11:11:00	22.3	353	3.46	17.10
193	11:12:00	23.2	312	3.43	17.06
193	11:13:00	25.8	353	3.65	16.82
193	11:14:00	28.1	470	3.86	16.55
193	11:15:00	28.6	383	3.82	16.63
193	11:16:00	27.3	467	3.33	16.94
193	11:17:00	24.2	303	2.73	17.60
193	11:18:00	19.2	308	1.70	18.57
193	11:19:00	8.0	64.8	0.76	20.01
193	11:20:00	10.9	150	2.39	18.41
193	11:21:00	14.6	223	3.02	17.48
193	11:22:00	17.3	213	3.47	17.10
193	11:23:00	19.7	302	3.50	17.02
193	11:24:00	22.4	339	3.83	16.66
193	11:25:00	25.4	467	4.05	16.40

Interpoll Laboratories, Inc.
(612) 786-6020

Printout of ESC Model 80 DAS
for CEM Trailer No. 1
- 1994 -

File Name: LP31
Job Number: 4-3366
Client: Louisiana Pacific Corporation
Location: Hayward, Wisconsin

Line 2 Core Dryer RTO Inlet -- Run 1

Julian Date	Time (Hrs)	Conc. (dry basis unless noted) NOx (ppmv)	CO (ppmv)	CO2 (%v/v)	O2 (%v/v)
193	11:26:00	27.5	498	4.06	16.37
193	11:27:00	27.1	485	4.06	16.43
193	11:28:00	28.3	527	4.00	16.47
193	11:29:00	27.7	462	4.05	16.46
193	11:30:00	28.7	534	3.97	16.48
193	11:31:00	28.3	467	4.03	16.44
193	11:32:00	18.7	298	1.67	18.70
193	11:33:00	19.2	398	3.77	16.96
193	11:34:00	19.8	381	3.69	16.89
193	11:35:00	22.9	439	3.83	16.77
193	11:36:00	24.0	630	3.94	16.54
193	11:37:00	25.3	663	3.91	16.50
193	11:38:00	26.1	501	3.99	16.44
193	11:39:00	27.2	488	4.17	16.34
193	11:40:00	27.8	551	4.14	16.39
193	11:41:00	28.6	870	4.24	16.19
193	11:42:00	29.8	767	4.28	16.17
193	11:43:00	29.9	717	4.10	16.35
193	11:44:00	28.2	2.0	4.16	16.33
193	11:45:00	27.8	567	4.03	16.50
193	11:46:00	26.6	495	3.99	16.61
193	11:47:00	26.3	645	4.08	16.43
193	11:48:00	26.0	610	4.02	16.45
193	11:49:00	26.3	491	4.31	16.29
193	11:50:00	27.3	764	4.36	16.19
193	11:51:00	28.0	751	4.08	16.44
193	11:52:00	28.1	734	4.36	16.13
193	11:53:00	28.3	744	4.30	16.19
193	11:54:00	28.0	646	4.06	16.51
193	11:55:00	27.7	662	4.10	16.43
193	11:56:00	28.0	613	4.12	67.58
193	11:57:00	28.0	473	4.12	16.48
193	11:58:00	28.8	637	4.26	16.33
193	11:59:00	28.6	808	4.16	16.34

Interpoll Laboratories, Inc.
(612) 786-6020

Printout of ESC Model 80 DAS
for CEM Trailer No. 1
- 1994 -

File Name: LP31
Job Number: 4-3366
Client: Louisiana Pacific Corporation
Location: Hayward, Wisconsin

Line 2 Core Dryer RTO Inlet -- Run 1

Julian Date	Time (Hrs)	Conc. (dry basis unless noted) NOx (ppmv)	CO (ppmv)	CO2 (%v/v)	O2 (%v/v)
193	12:00:00	28.5	625	4.17	16.37
193	12:01:00	28.5	618	4.34	16.25
193	12:02:00	28.7	854	4.13	16.35
193	12:03:00	29.3	670	4.38	16.18
193	12:04:00	29.1	722	4.14	16.46
193	12:05:00	28.6	667	4.05	16.50
193	12:06:00	27.7	515	3.97	16.64
	Run Average	24.0	424	3.49	17.45

Interpoll Laboratories, Inc.
(612) 786-6020

Printout of ESC Model 80 DAS
for CEM Trailer No. 1
- 1994 -

File Name: LP32
Job Number: 4-3366
Client: Louisiana Pacific Corporation
Location: Hayward, Wisconsin

Line 2 Core Dryer RTO Inlet -- Run 2

Julian Date	Time (Hrs)	Conc. (dry basis unless noted)			
		NOx (ppmv)	CO (ppmv)	CO2 (%v/v)	O2 (%v/v)
193	13:04:00	18.6	691	4.06	16.66
193	13:05:00	19.6	810	4.08	16.66
193	13:06:00	21.1	938	4.12	16.58
193	13:07:00	23.2	848	4.46	16.27
193	13:08:00	23.0	786	3.98	16.73
193	13:09:00	24.1	787	4.10	16.61
193	13:10:00	22.9	572	3.80	17.06
193	13:11:00	22.8	505	3.98	16.87
193	13:12:00	22.8	717	4.00	16.80
193	13:13:00	25.0	736	4.33	16.45
193	13:14:00	26.8	913	4.63	16.23
193	13:15:00	25.9	962	4.18	16.56
193	13:16:00	25.8	872	4.15	16.63
193	13:17:00	24.7	641	3.86	17.07
193	13:18:00	25.5	702	4.30	16.56
193	13:19:00		778	4.22	16.70
193	13:20:00	26.5	936	4.58	16.24
193	13:21:00	26.1	%-9999.0	4.56	16.25
193	13:22:00	24.0	772	4.01	16.86
193	13:23:00	26.0	721	4.43	16.45
193	13:24:00	25.3	695	4.26	16.74
193	13:25:00	26.2	876	4.44	16.46
193	13:26:00	25.4	999	4.63	16.29
193	13:27:00	25.7	%-9999.0	4.98	15.96
193	13:28:00	25.8	%-9999.0	5.03	15.89
193	13:29:00	25.8	%-9999.0	4.61	16.24
193	13:30:00	24.0	896	4.21	16.69
193	13:31:00	22.1	584	3.98	17.00
193	13:32:00	22.1	486	3.90	17.10
193	13:33:00	22.2	328	3.90	17.21
193	13:34:00	22.3	515	4.36	16.69
193	13:35:00	23.6	924	4.68	16.33
193	13:36:00	24.2	1050	4.90	16.09
193	13:37:00	16.3	%-9999.0	2.68	17.91

* Please note: The negative numbers are numbers that went off scale. They were not included in the average.

Interpoll Laboratories, Inc.

(612) 786-6020

Printout of ESC Model 80 DAS
for CEM Trailer No. 1
- 1994 -

File Name: LP32
Job Number: 4-3366
Client: Louisiana Pacific Corporation
Location: Hayward, Wisconsin

Line 2 Core Dryer RTO Inlet -- Run 2

Julian Date	Time (Hrs)	Conc. (dry basis unless noted)			
		NOx (ppmv)	CO (ppmv)	CO2 (%v/v)	O2 (%v/v)
193	13:38:00	20.3	421	3.53	18.36
193	13:39:00	26.8	%-9999.0	4.74	16.16
193	13:40:00	23.7	819	3.93	17.07
193	13:41:00	22.7	356	3.96	17.17
193	13:42:00	22.7	441	4.08	17.03
193	13:43:00	24.1	666	4.65	16.42
193	13:44:00	24.2	941	4.77	16.29
193	13:45:00	24.9	1026	5.04	16.04
193	13:46:00	25.4	%-9999.0	5.07	16.00
193	13:47:00	26.2	%-9999.0	5.05	15.99
193	13:48:00	26.0	%-9999.0	4.95	16.12
193	13:49:00	25.7	1070	4.78	16.29
193	13:50:00	24.7	1040	4.52	16.50
193	13:51:00	23.5	669	4.10	17.02
193	13:52:00	23.3	460	4.27	16.92
193	13:53:00	23.1	659	4.35	16.74
193	13:54:00	22.8	543	4.25	16.90
193	13:55:00	23.3	620	4.59	16.58
193	13:56:00	24.8	821	4.74	16.39
193	13:57:00	23.9	933	4.76	16.39
193	13:58:00	22.9	995	4.79	16.33
193	13:59:00	23.4	934	4.80	16.35
193	14:00:00	23.3	986	4.83	16.33
193	14:01:00	23.1	986	4.85	16.35
193	14:02:00	22.5	1057	4.87	16.27
193	14:03:00	22.2	1062	4.83	16.35
193	14:04:00	22.8	1039	4.76	16.38
193	14:05:00	22.3	1001	4.72	16.42
193	14:06:00	22.3	981	4.79	16.38
193	14:07:00	22.5	999	4.72	16.48
193	14:08:00	22.4	1006	4.82	16.36
193	14:09:00	22.5	1046	4.84	16.34
193	14:10:00	23.4	1049	4.78	16.41
	Run Average	23.7	>831	4.43	16.57

Interpoll Laboratories, Inc.
(612) 786-6020

Printout of ESC Model 80 DAS
for CEM Trailer No. 1
- 1994 -

File Name: LP33
Job Number: 4-3366
Client: Louisiana Pacific Corporation
Location: Hayward, Wisconsin

Line 2 Core Dryer RTO Inlet -- Run 3

Julian Date	Time (Hrs)	Conc. (dry basis unless noted)			
		NOx (ppmv)	CO (ppmv)	CO2 (%v/v)	O2 (%v/v)
193	15:01:00	16.4	603	4.08	16.67
193	15:02:00	17.1	625	4.16	16.56
193	15:03:00	16.7	690	4.02	16.65
193	15:04:00	16.9	511	4.08	16.71
193	15:05:00	17.2	730	4.14	16.55
193	15:06:00	18.0	688	4.23	16.45
193	15:07:00	18.0	659	3.94	16.86
193	15:08:00	19.2	756	3.96	16.58
193	15:09:00	17.9	452	3.91	16.98
193	15:10:00	17.8	516	3.61	17.18
193	15:11:00	17.5	381	3.86	16.87
193	15:12:00	17.5	419	3.81	17.02
193	15:13:00	18.0	414	3.98	16.84
193	15:14:00	17.5	558	3.87	16.87
193	15:15:00	17.2	431	3.89	16.94
193	15:16:00	17.8	496	3.86	16.93
193	15:17:00	18.0	508	3.76	16.97
193	15:18:00	18.8	416	4.06	16.77
193	15:19:00	17.8	529	3.56	17.23
193	15:20:00	17.6	281	3.58	17.24
193	15:21:00	17.5	284	3.64	17.27
193	15:22:00	17.6	451	3.75	16.91
193	15:23:00	18.1	417	3.95	16.93
193	15:24:00	19.1	606	4.06	16.70
193	15:25:00	19.3	657	4.03	16.67
193	15:26:00	19.1	584	3.79	16.96
193	15:27:00	19.2	516	50.68	16.80
193	15:28:00	19.7	521	3.93	16.89
193	15:29:00	19.9	705	3.96	16.67
193	15:30:00	20.1	541	4.00	16.75
193	15:31:00	19.5	652	3.81	16.90
193	15:32:00	20.0	512	4.01	16.80
193	15:33:00	16.8	707	3.36	16.90
193	15:34:00	8.8	316	0.40	21.03

Interpoll Laboratories, Inc.
(612) 786-6020

Printout of ESC Model 80 DAS
for CEM Trailer No. 1
- 1994 -

File Name: LP33
Job Number: 4-3366
Client: Louisiana Pacific Corporation
Location: Hayward, Wisconsin

Line 2 Core Dryer RTO Inlet -- Run 3

Julian Date	Time (Hrs)	Conc. (dry basis unless noted)			
		NOx (ppmv)	CO (ppmv)	CO2 (%v/v)	O2 (%v/v)
193	15:35:00	17.0	298	3.92	17.10
193	15:36:00	18.7	514	3.77	17.07
193	15:37:00	18.3	440	3.61	17.16
193	15:38:00	18.5	359	3.81	17.03
193	15:39:00	19.0	477	3.97	16.85
193	15:40:00	19.5	695	4.13	16.58
193	15:41:00	20.2	755	4.12	16.58
193	15:42:00	20.0	677	3.90	16.84
193	15:43:00	20.6	569	4.03	16.68
193	15:44:00	21.0	527	3.50	17.37
193	15:45:00	19.6	461	3.54	17.22
193	15:46:00	20.0	392	3.95	16.82
193	15:47:00	20.0	567	3.89	16.83
193	15:48:00	19.9	539	4.02	16.82
193	15:49:00	20.5	662	4.07	16.67
193	15:50:00	20.3	725	4.06	16.63
193	15:51:00	20.4	606	3.87	16.98
193	15:52:00	21.2	729	4.09	16.55
193	15:53:00	20.7	488	3.62	17.29
193	15:54:00	19.5	502	3.64	17.08
193	15:55:00	20.3	444	3.93	16.84
193	15:56:00	21.0	537	3.98	16.84
193	15:57:00	21.0	662	4.01	16.70
193	15:58:00	20.7	611	4.02	16.72
193	15:59:00	20.6	591	3.89	16.94
193	16:00:00	20.9	724	4.16	16.52
193	16:01:00	20.7	752	4.13	16.58
193	16:02:00	19.8	643	3.85	16.97
193	16:03:00	20.4	583	3.93	16.85
193	16:04:00	20.6	661	4.16	16.55
193	16:05:00	19.8	715	3.90	16.87
193	16:06:00	19.9	575	3.83	16.96
193	16:07:00	21.0	601	4.33	16.46
193	16:08:00	21.1	1001	4.19	16.54

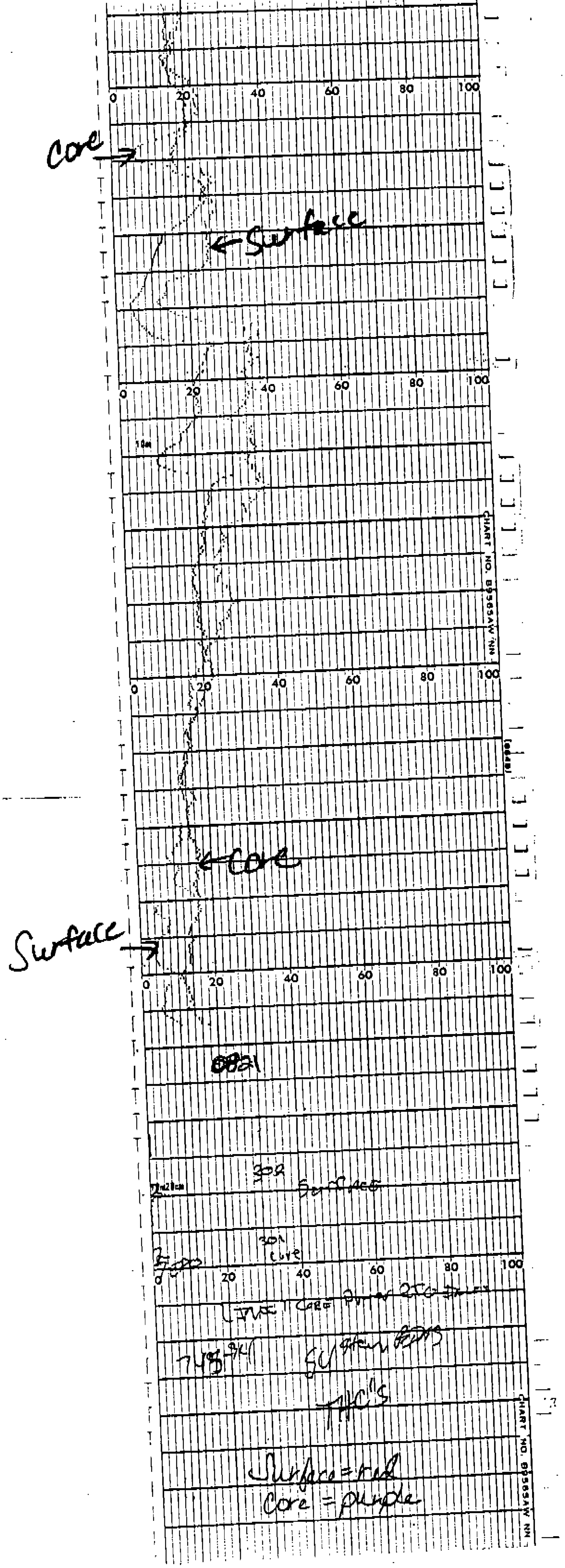
Interpoll Laboratories, Inc.
(612) 786-6020

Printout of ESC Model 80 DAS
for CEM Trailer No. 1
- 1994 -

File Name: LP33
Job Number: 4-3366
Client: Louisiana Pacific Corporation
Location: Hayward, Wisconsin

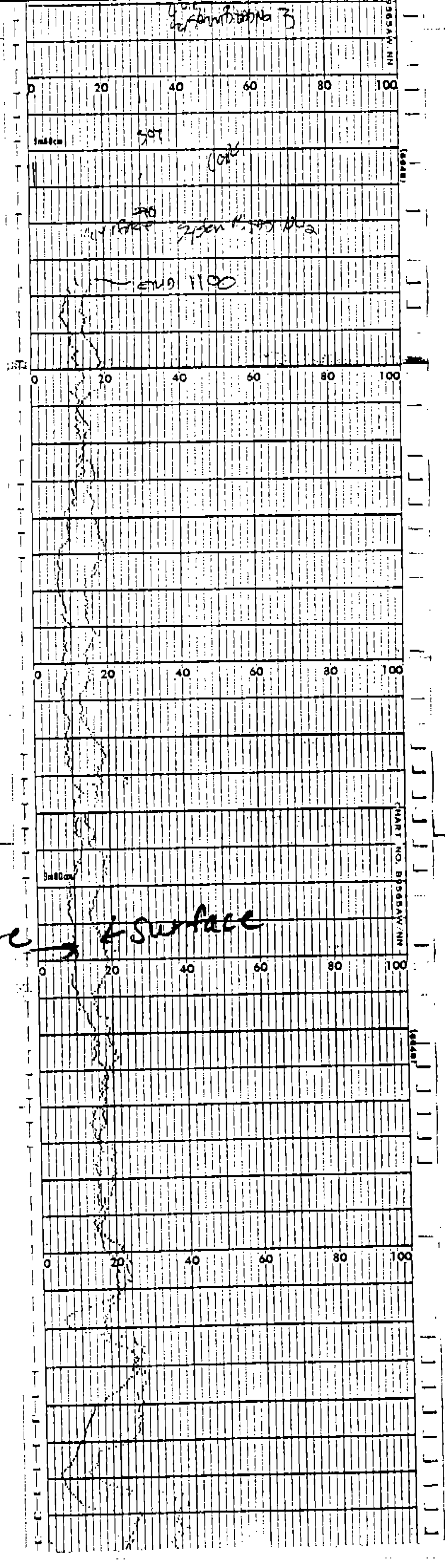
Line 2 Core Dryer RTO Inlet -- Run 3

Julian	Time	Conc. (dry basis unless noted)			
Date	(Hrs)	NOx (ppmv)	CO (ppmv)	CO2 (%v/v)	O2 (%v/v)
193	16:09:00	21.0	903	4.04	16.60
193	16:10:00	20.6	606	3.89	17.02
	Run Average	19.0	567	4.54	16.90



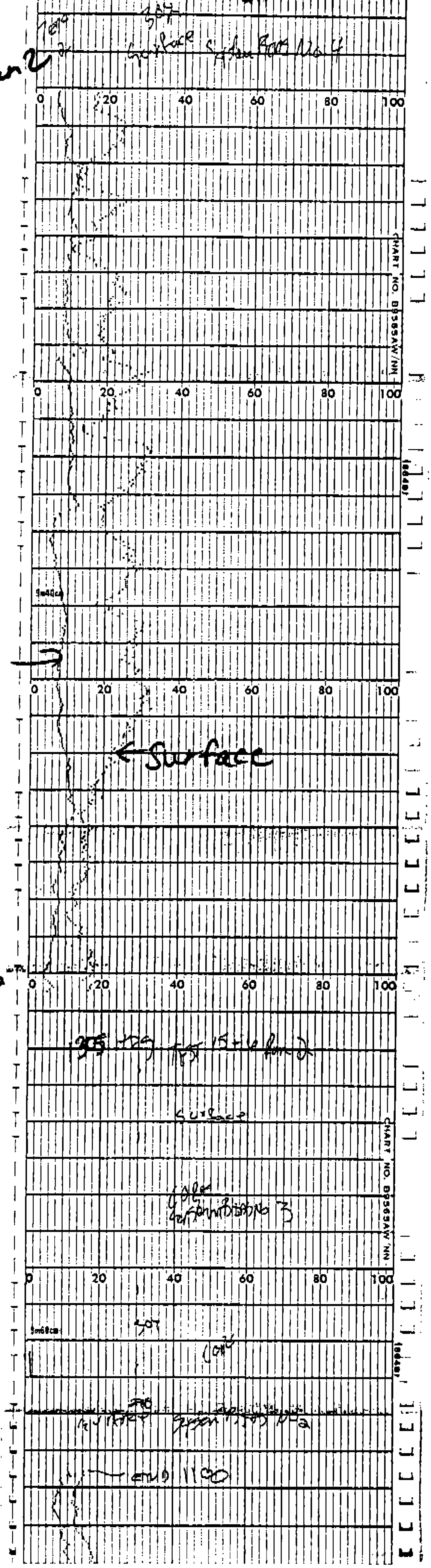
LP-Hayward
Line 1 Surface Dryer
Line 1 Core Dryer
(Inlets)

THC's



LP-Hayward
Line 1 Core Dryer
Line 1 Surface Dryer

THC's



End Run 2

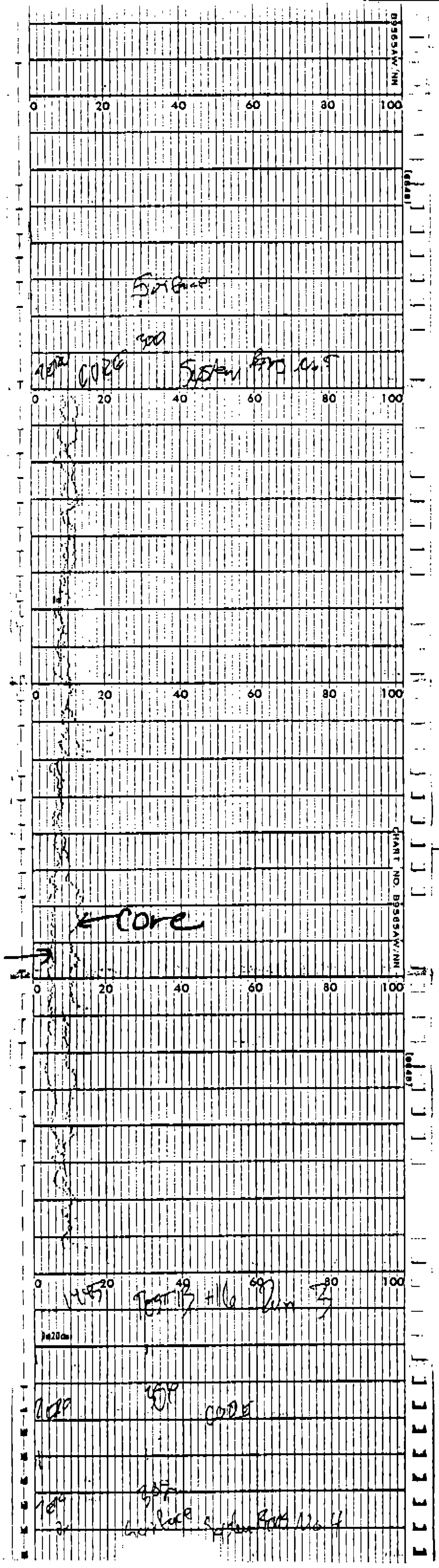
Core →

← Surface

Run 2 Start →

LP-Hayward
Line 1 Core Dryer
Line 1 Surface Dryer

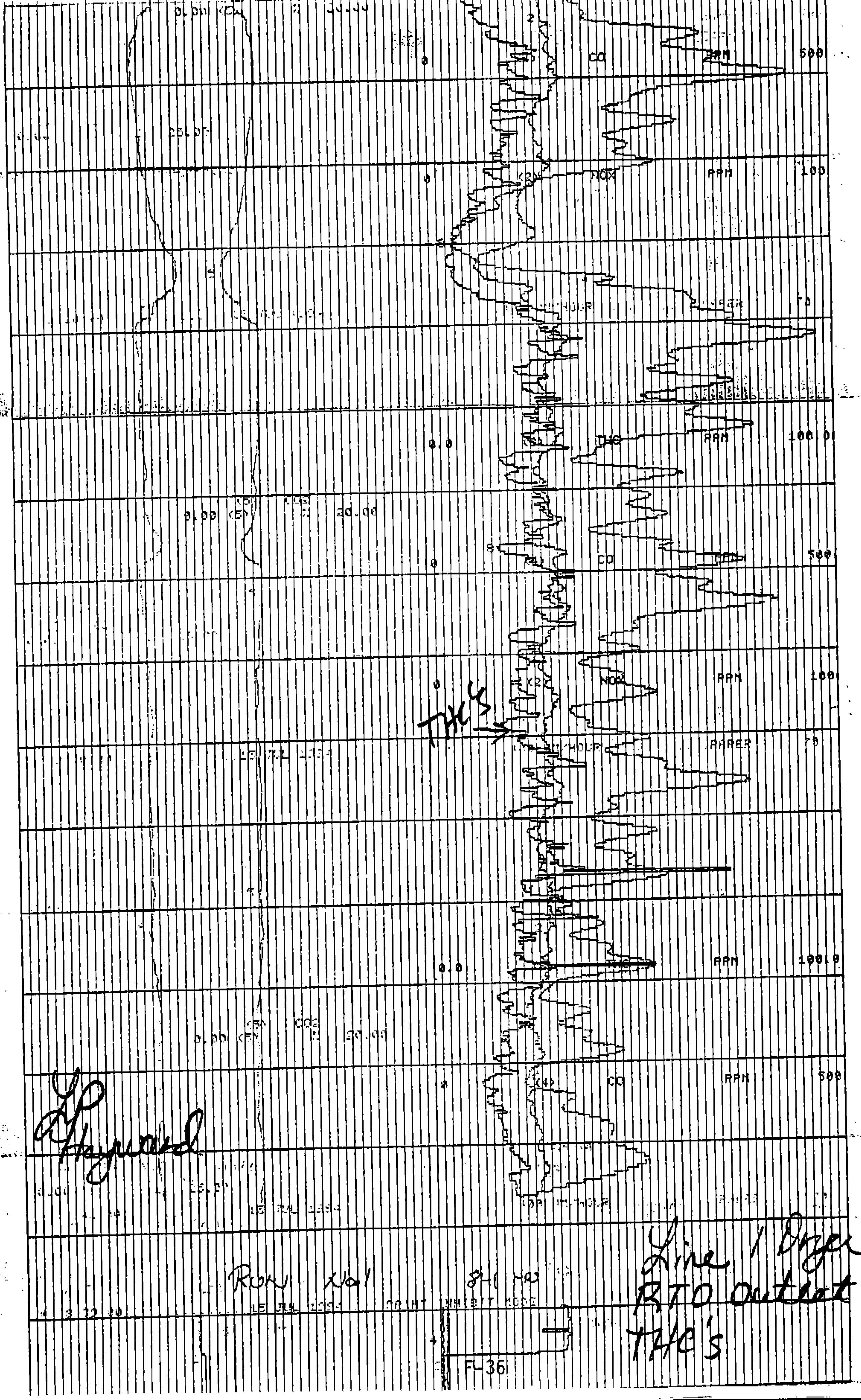
THC's



Surface Dryer

LP-Hayward
Line 1 Core Dryer
Line 1 Surface Dryer
(pellets)

THC's



THC's →

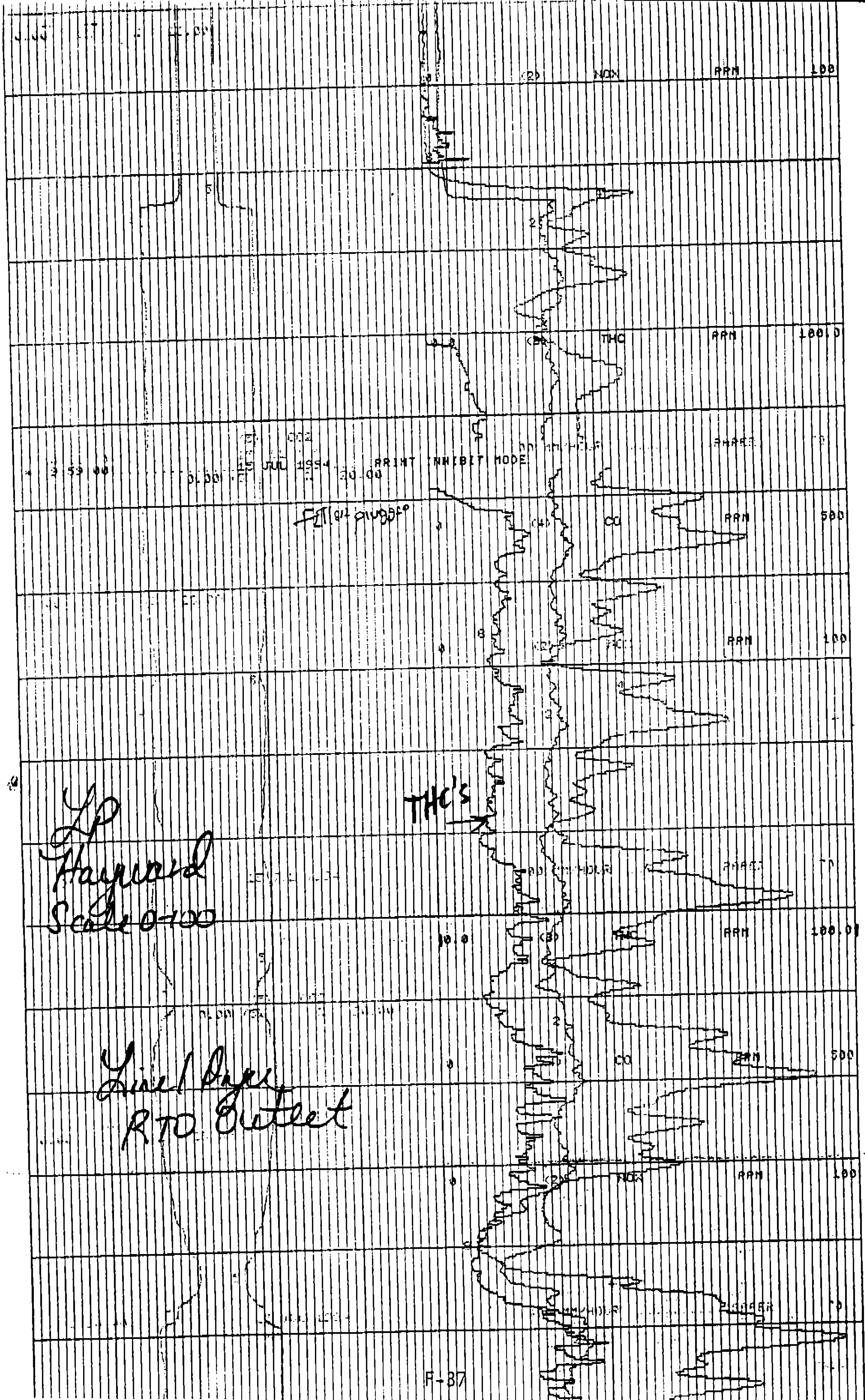
L Hayward

Run No 1 8-1-94

Line 1 Dryer
RTO Outlet
THC's

7-1
THC

F-36

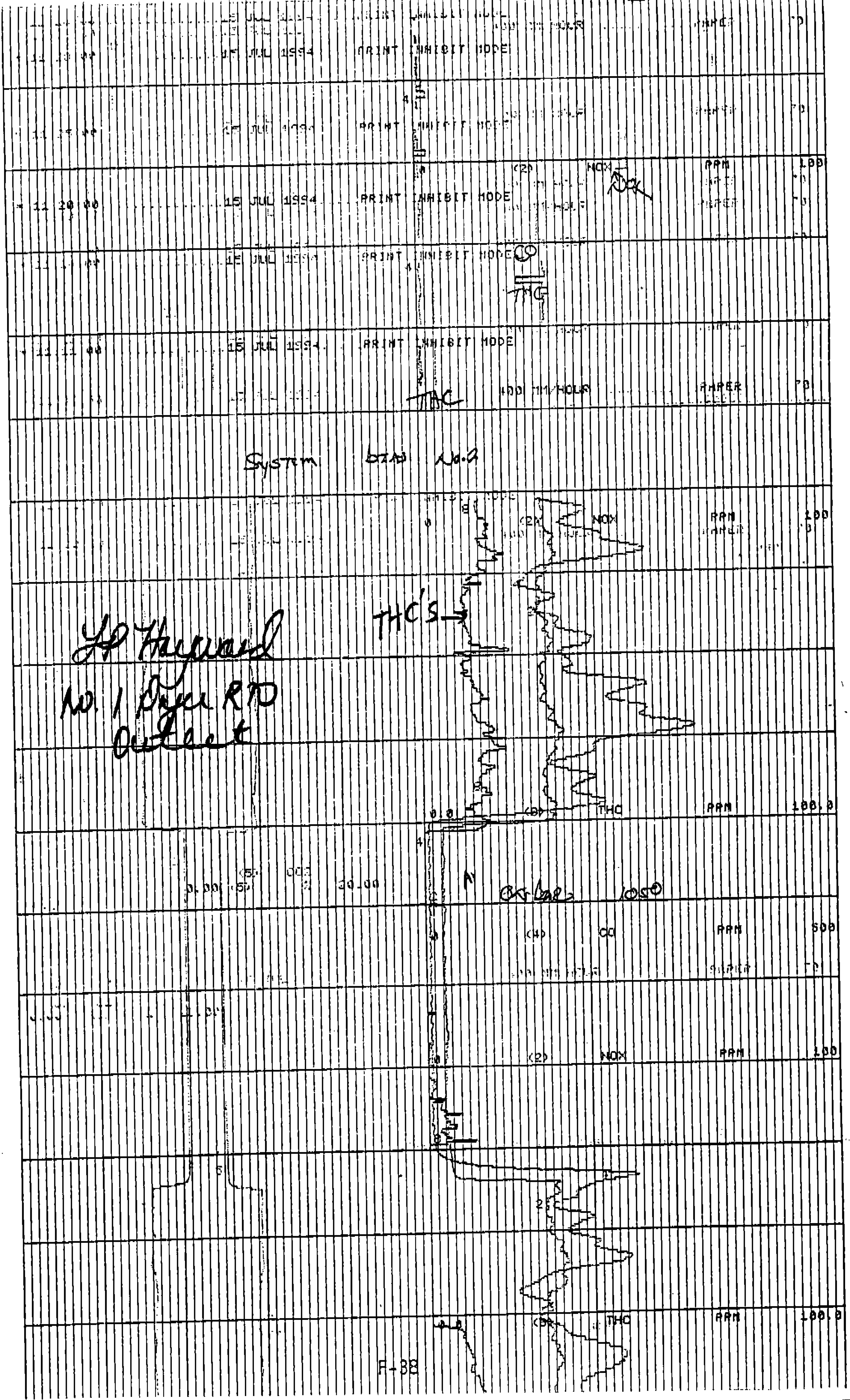


Filter plugged

THC's

LP Haywood Scale 0-100

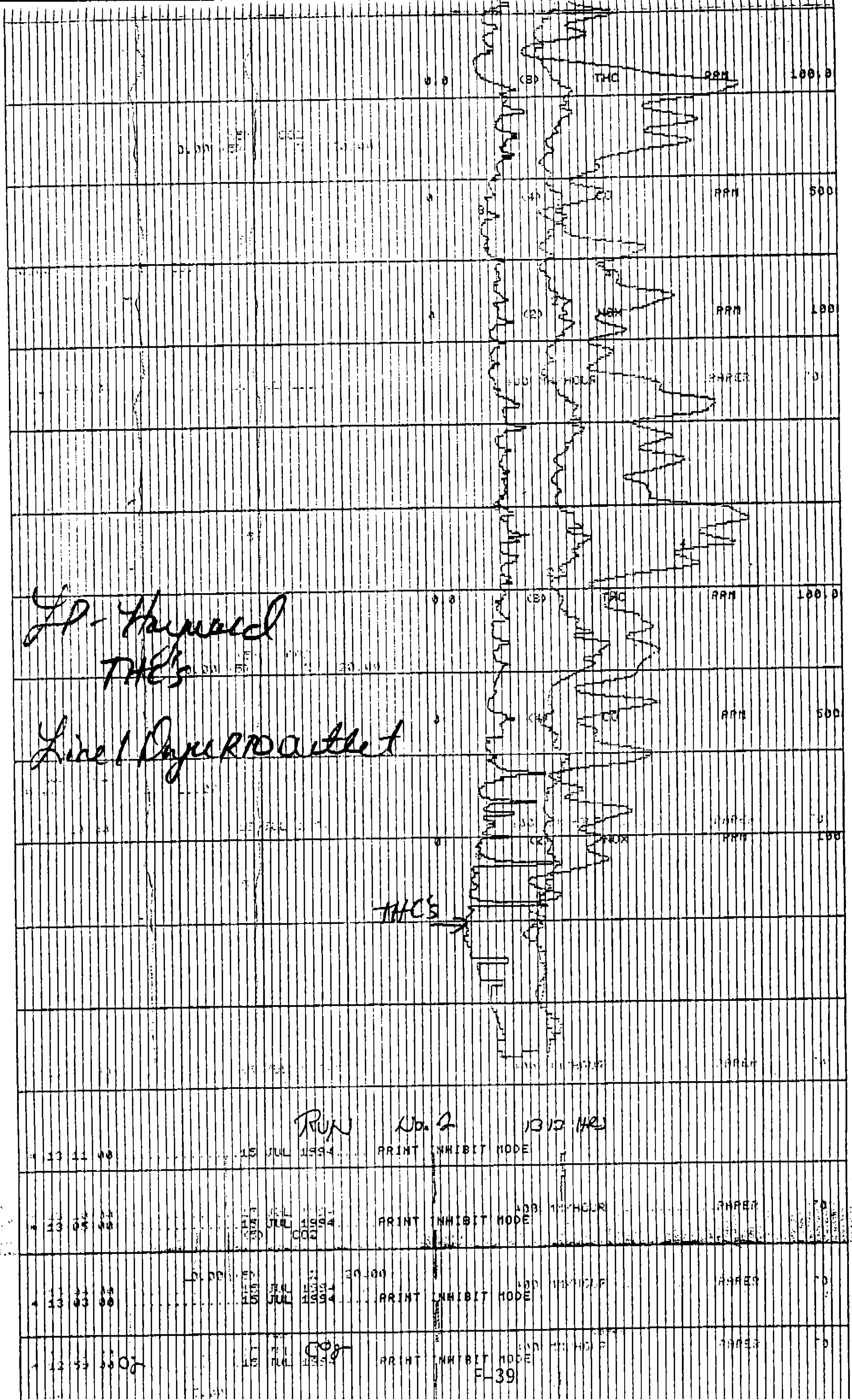
Line 1 Dryer RTO Outlet



System b??? No.2

LP Hayward
No. 1 Dryer RTO
Outlet

Cal Gas 1050



LP-Haywood
THC's

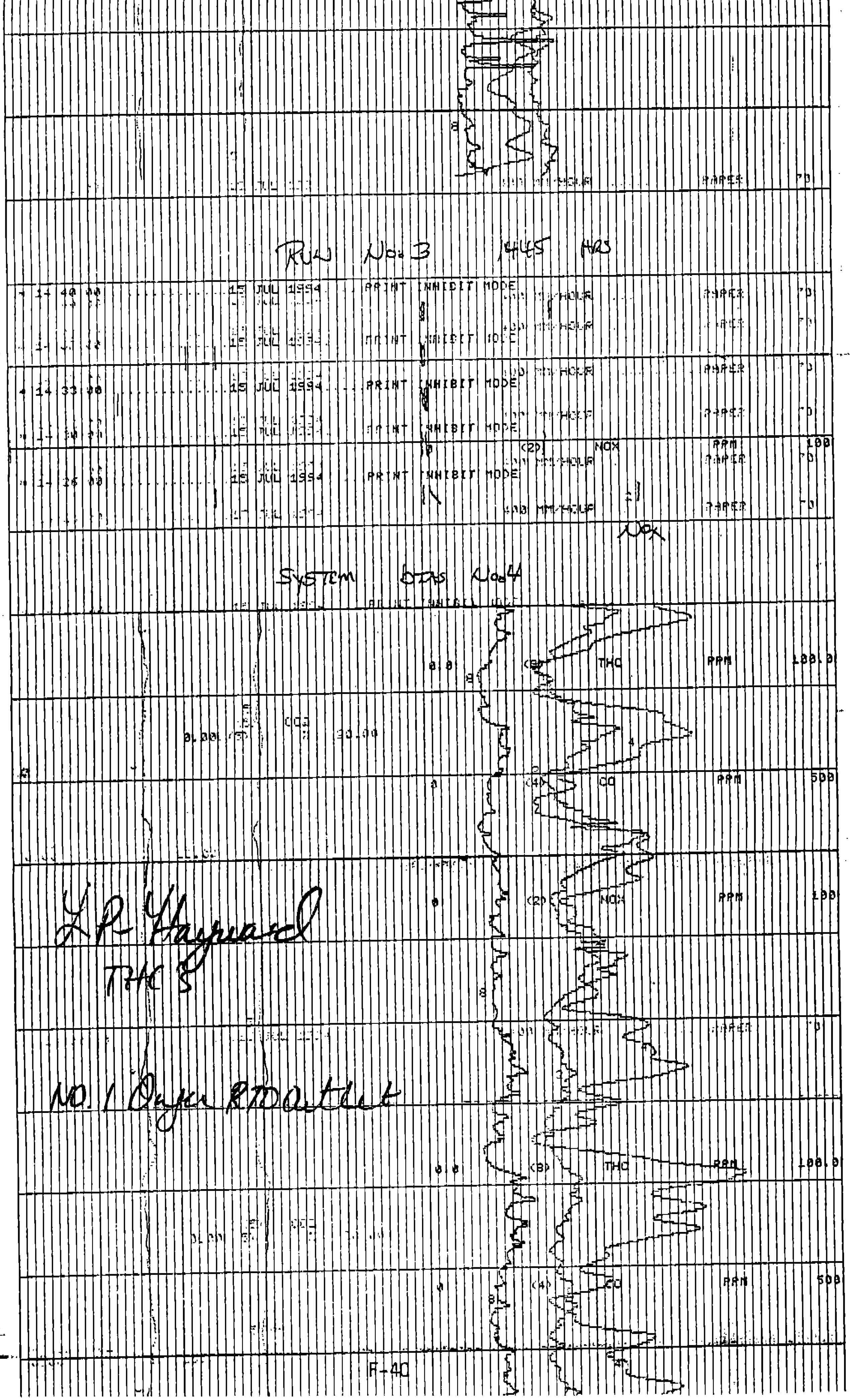
Line 1 Dryer outlet

THC's

RUN No. 2 1313 HRS

O2

CO2



Run No. 3 1445 Hrs

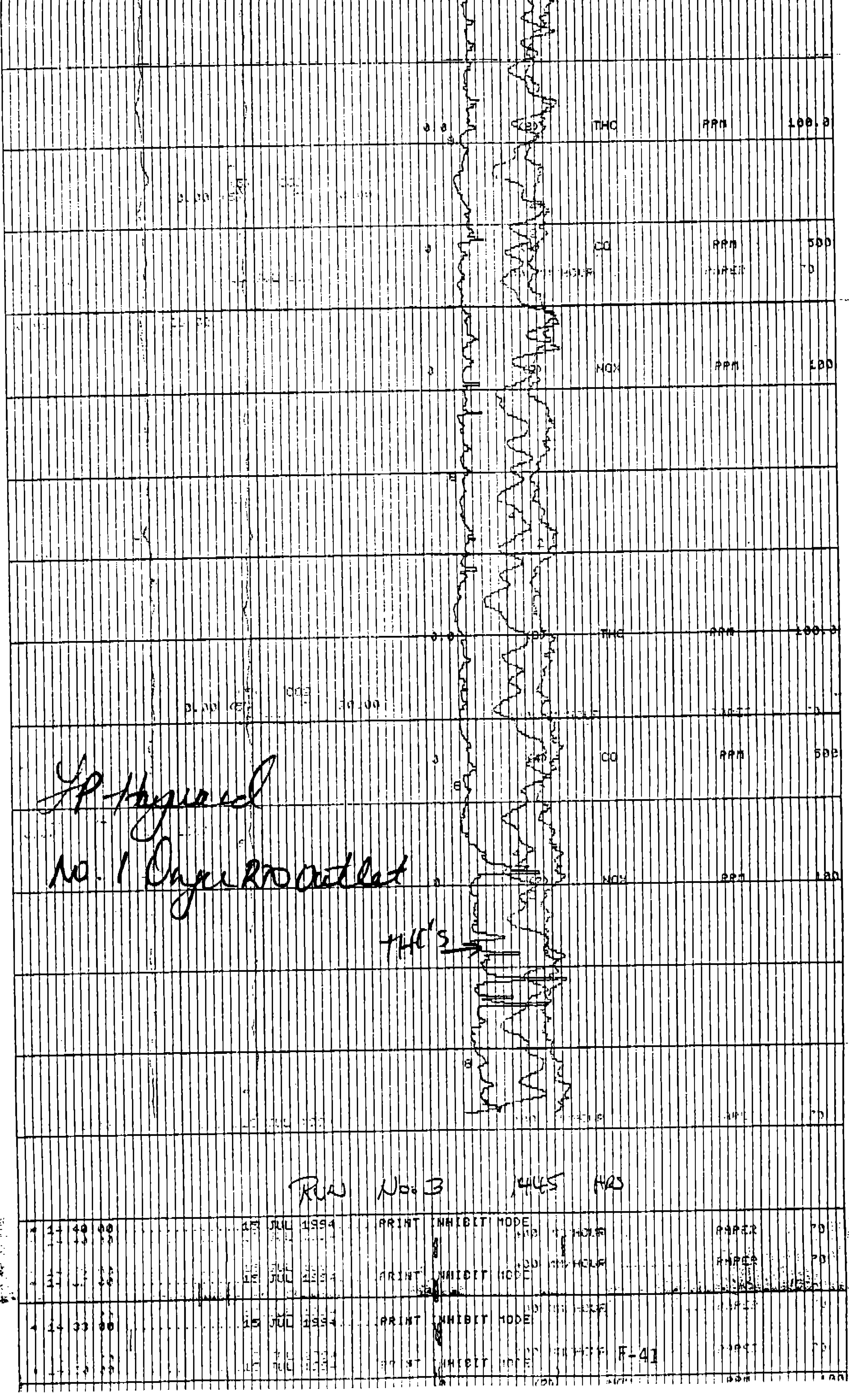
NOx

System Bias No. 4

LR Hayward

THC 3

No. 1 Dryer RTO Outlet



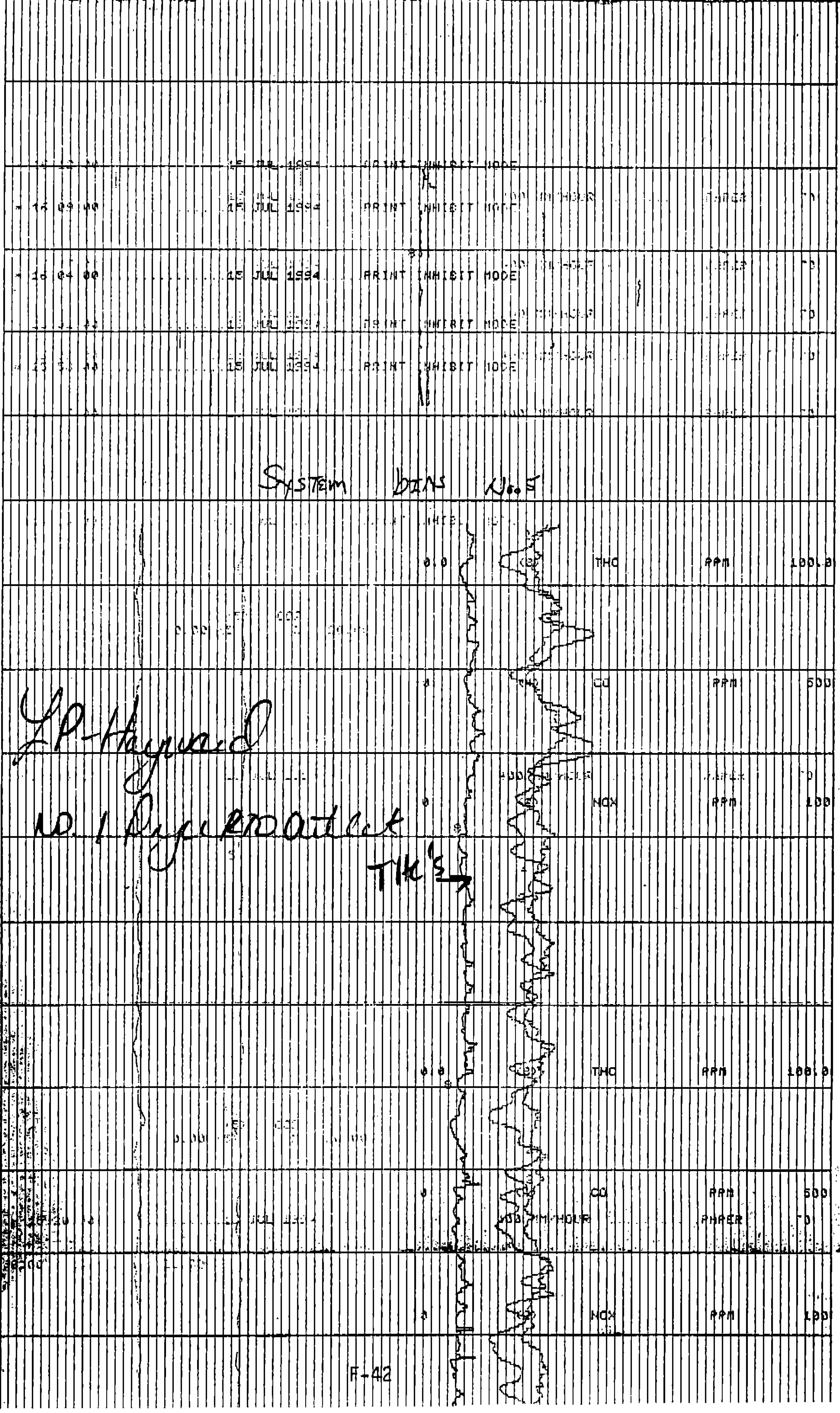
LP Hayward

No. 1 Dryer RTO outlet

THC's →

RUN No. 3 1445 HRS

```
14 40 00    15 JUL 1994    PRINT INHIBIT MODE    PAPER    70
            15 JUL 1994    PRINT INHIBIT MODE    PAPER    70
14 33 00    15 JUL 1994    PRINT INHIBIT MODE
            15 JUL 1994    PRINT INHIBIT MODE
```

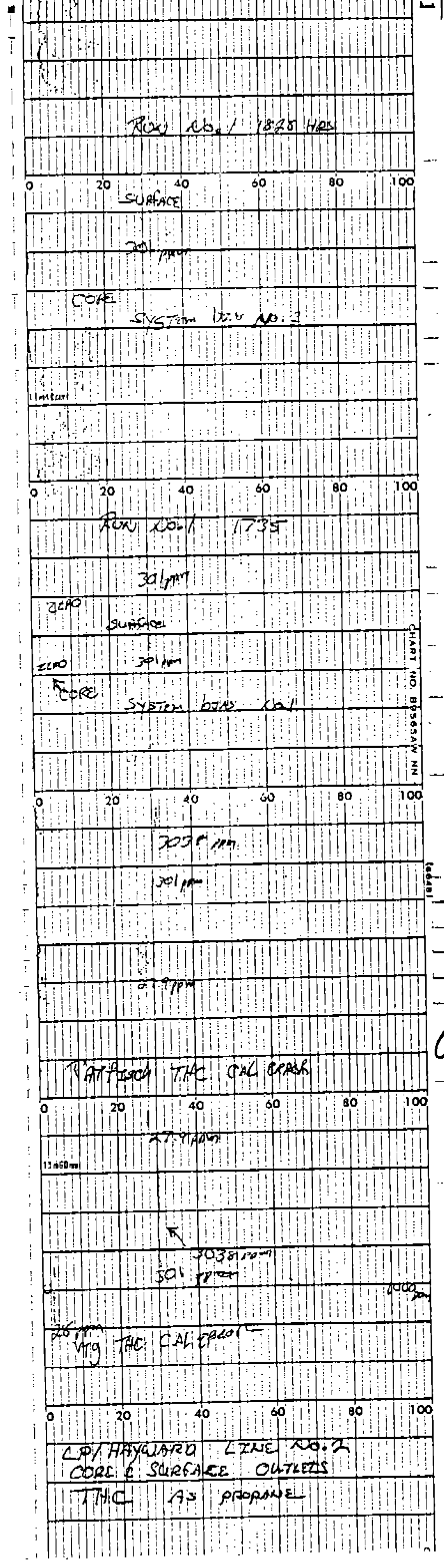


System bins No. 5

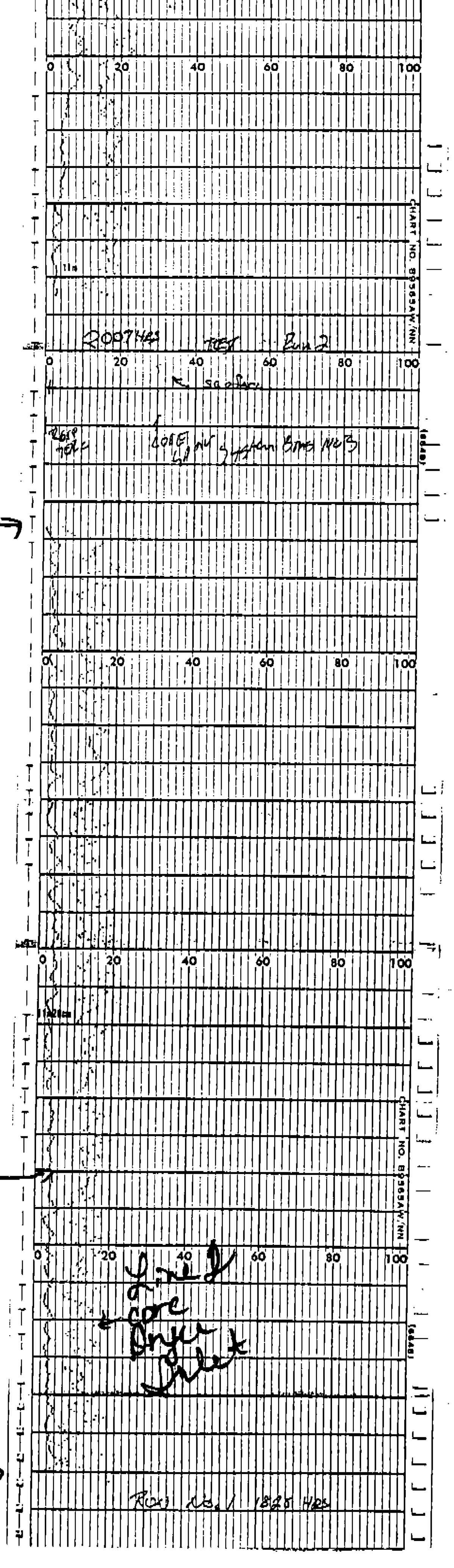
LP-Hayward

No. 1 Dryer outlet

THC's →



LP Hayward
Line 2 Core Dryer
Line 2 Surface Dryer
(Inlets)



Run 1 End →

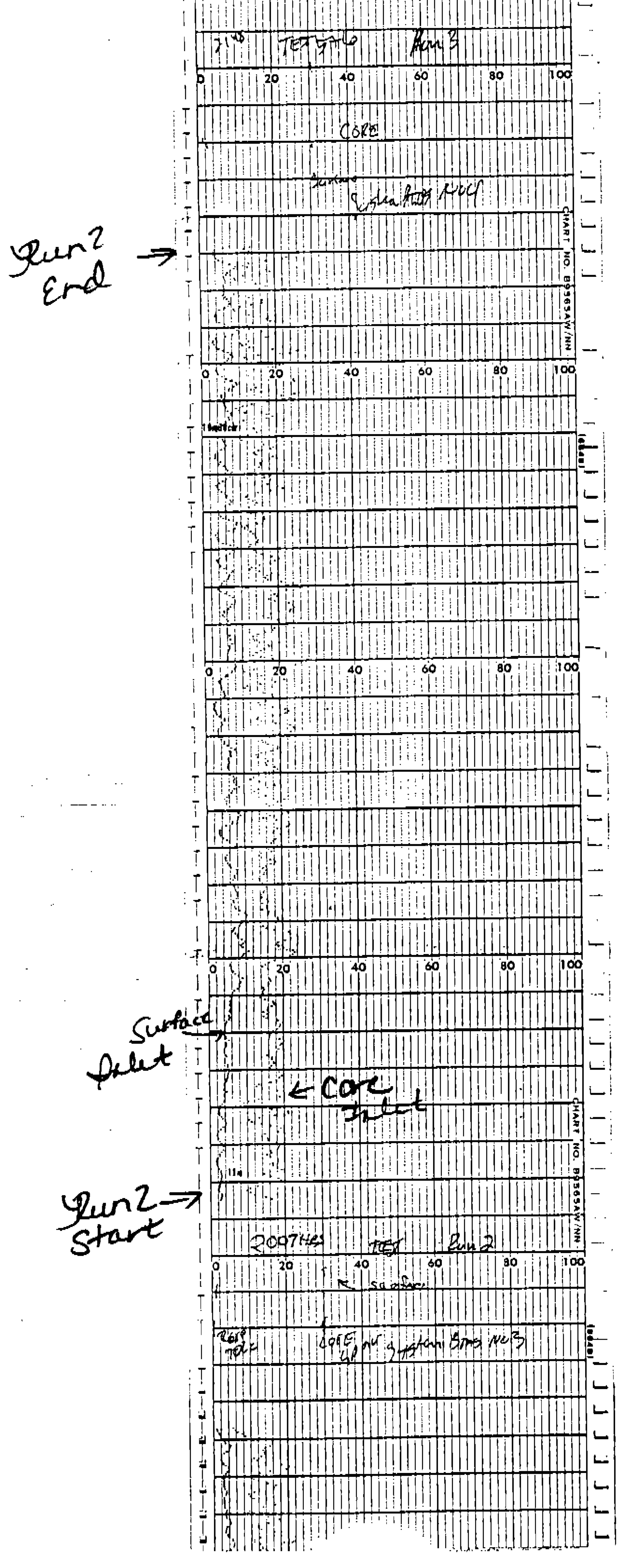
Line 2 Surface Dryer Inlet →

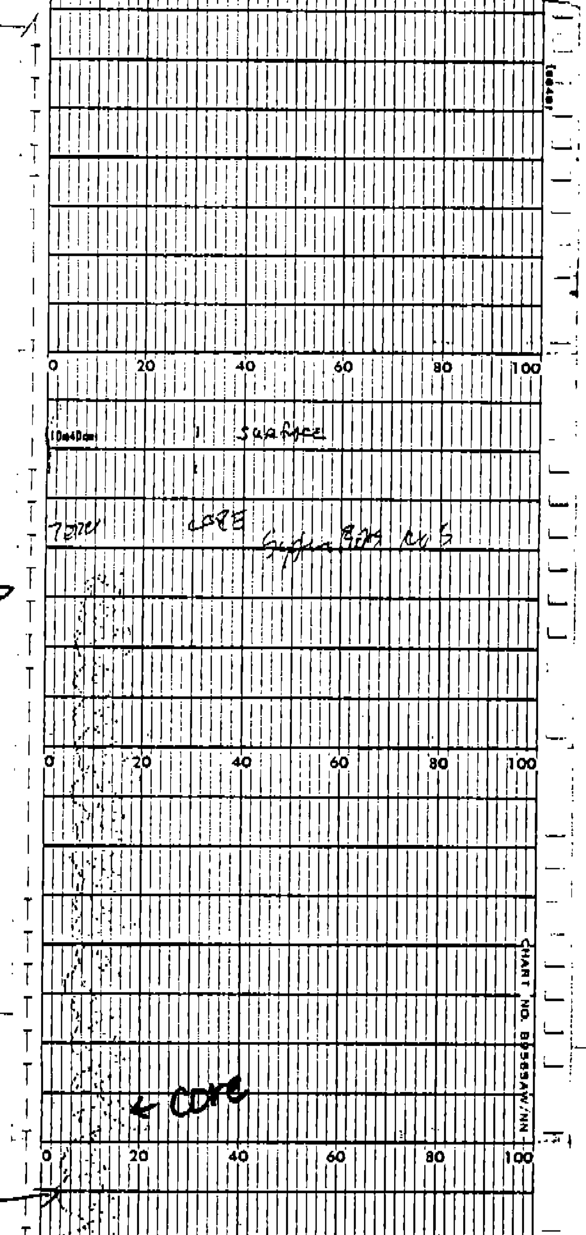
Run 1 Start →

LP-Hayward
THC's
Scale 0-1000

LP-Hayward
THC's

Line 2 Core Dryer
Line 2 Surface Dryer





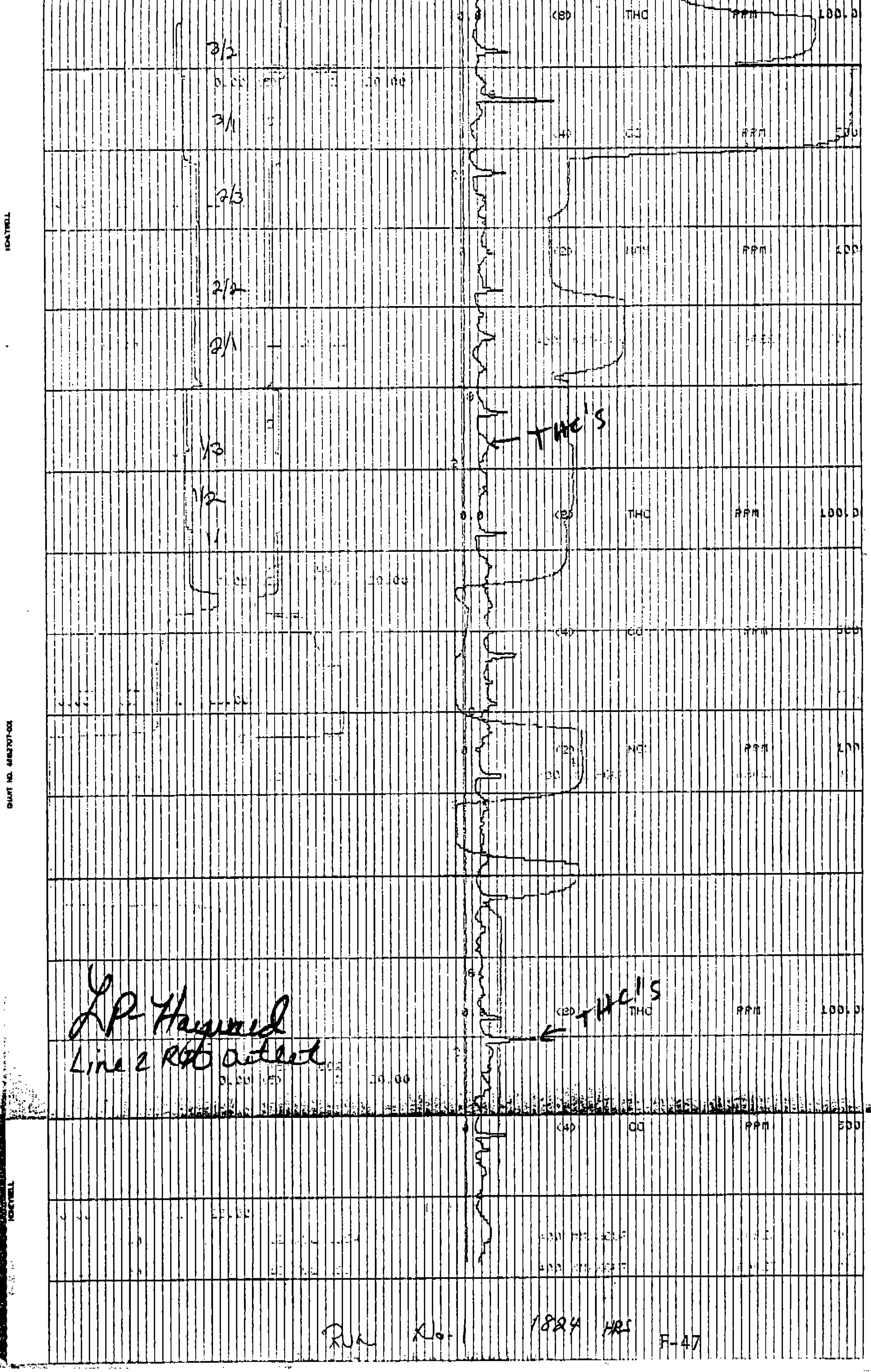
Run 3 End →

Surface →

Run 3 Start →

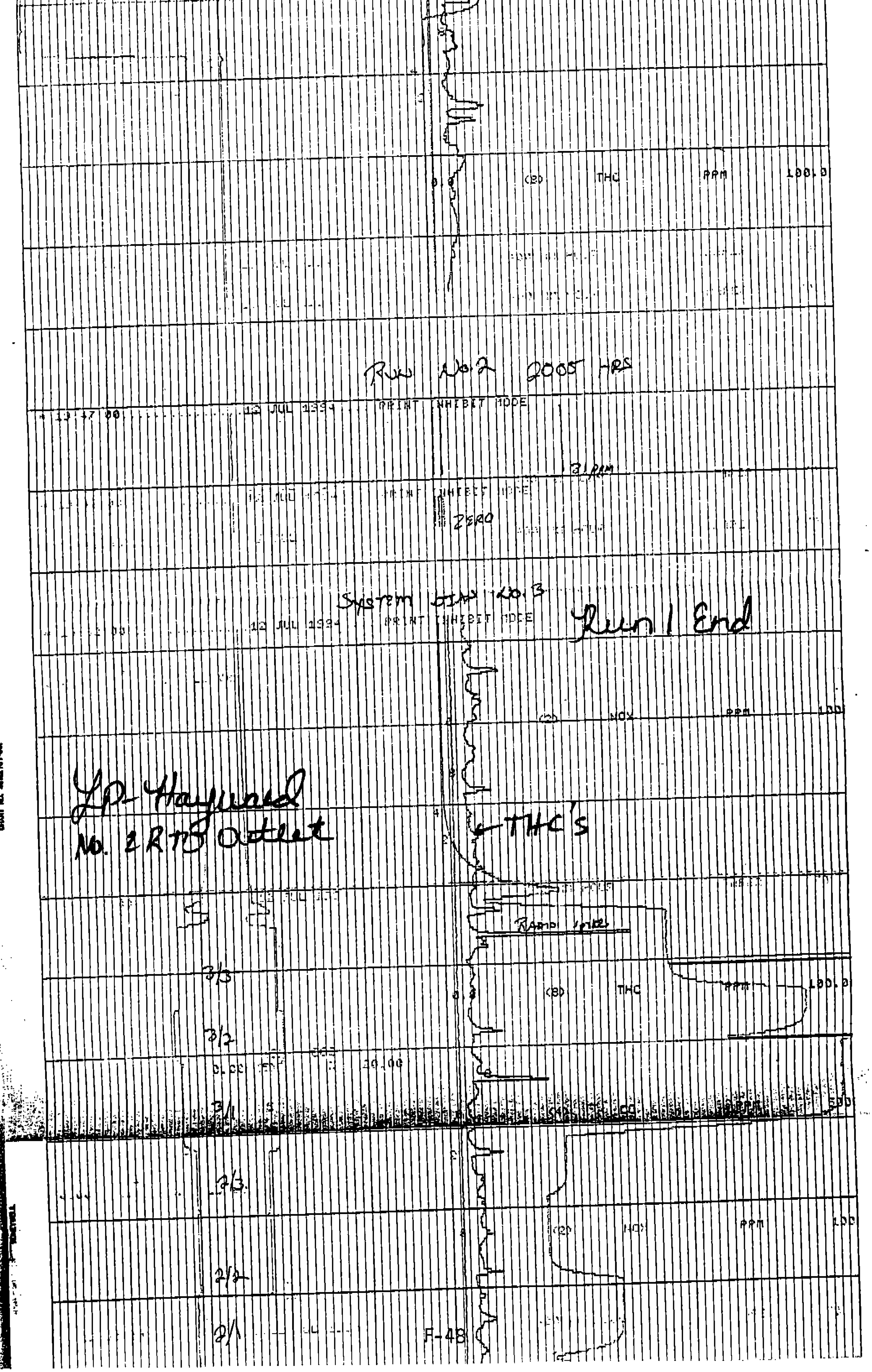
LP Hayward
Line 2 Core Dryer (Inlet)

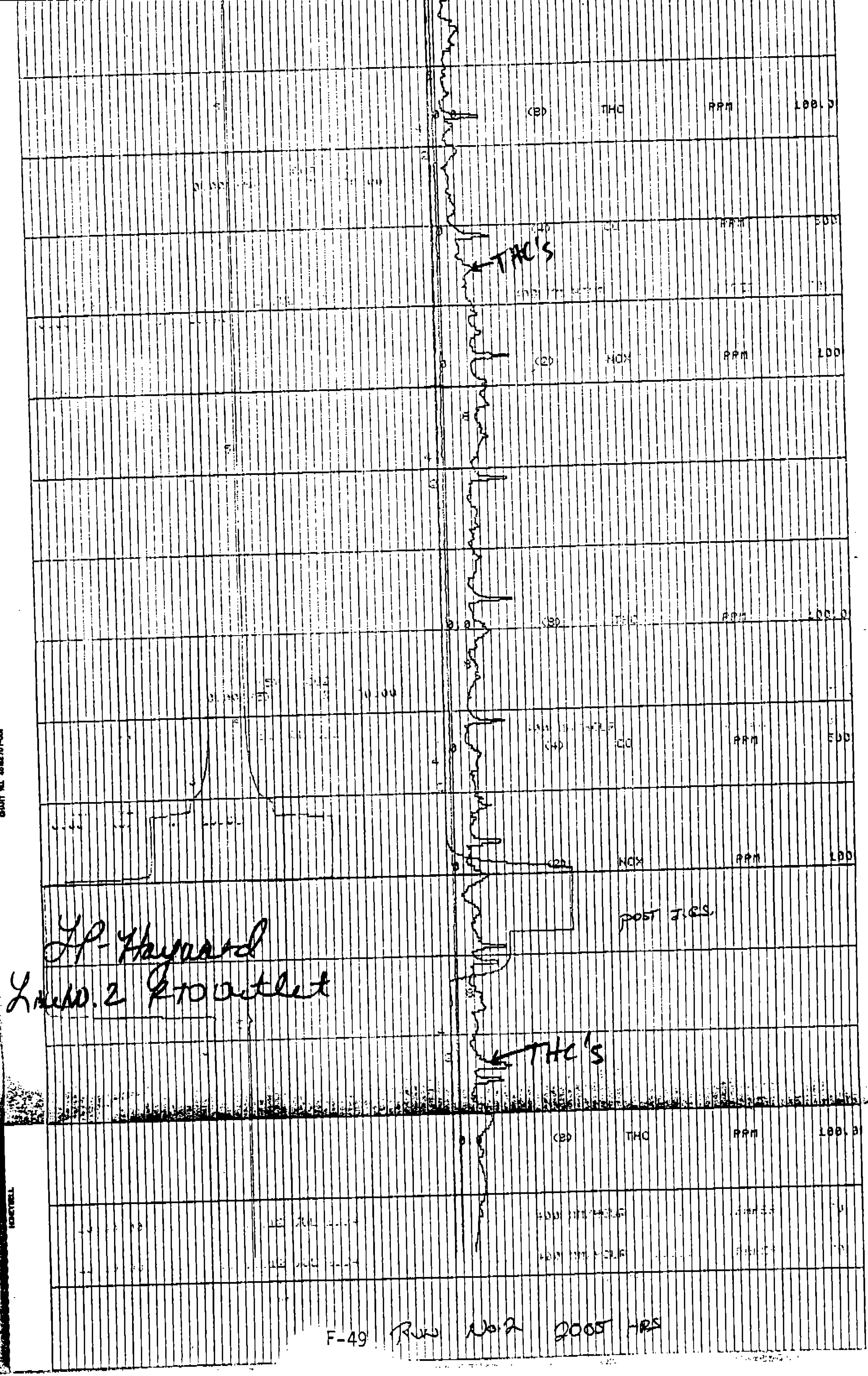
Line 2 Surface Dryer (Inlet)
THC's



LP Hayward
Line 2 RTO outlet

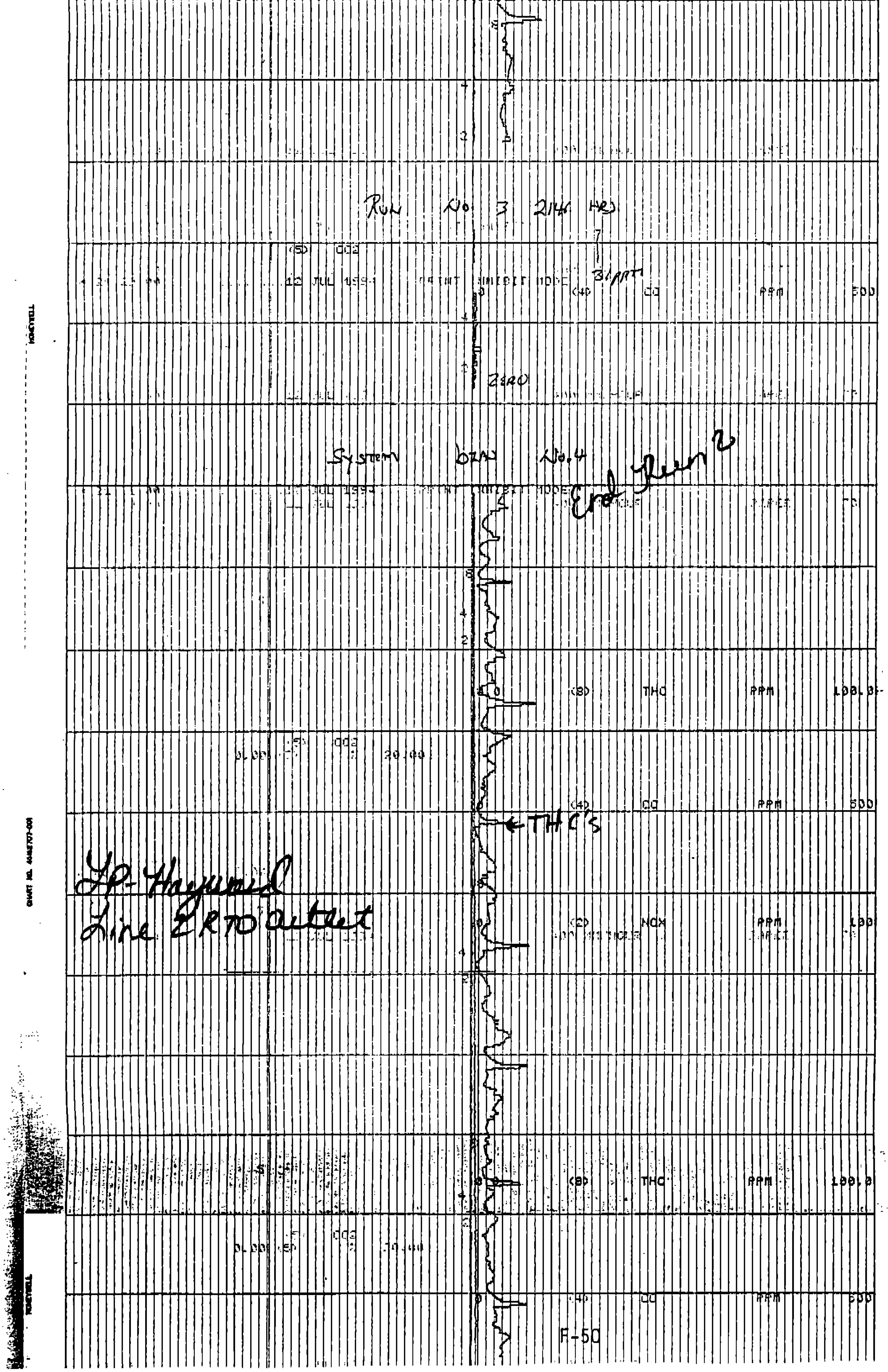
Run No. 1 1824 HRS


(B) THC PPM 100.0
RUN No 2 2005 HRS
13:47:00
12 JUL 1994 PRINT INHIBIT MODE
3 PPM
PRINT INHIBIT MODE
ZERO
System OFF No. 3
12 JUL 1994 PRINT INHIBIT MODE
Run 1 End
(2) NOX PPM 100
LP Hayward
No. 2 RTO Outlet
THC's
RAMP
3/3
(B) THC PPM 100.0
3/2
0.00 10.00
3/1
2/3
(2) NOX PPM 100
2/2
2/1
HONEYWELL



LP-Hayward
Line No. 2 RTO outlet

F-49 Run No. 2 2000 HRS



RUN No 3 2146 HRS

START

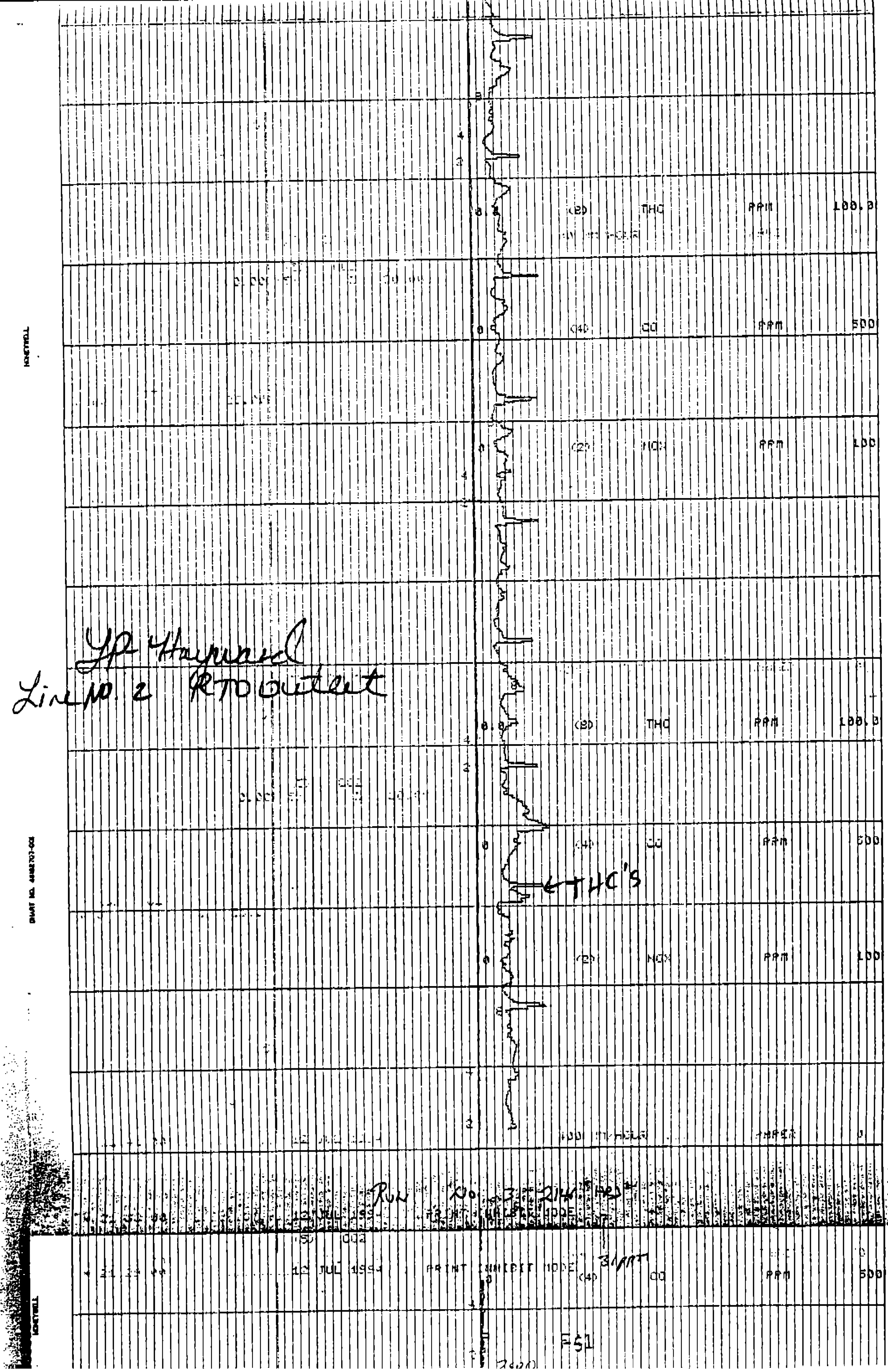
ZERO

SYSTEM DRAN No. 4

End Run 2

← THC's

LP-Hayumid
Line ERTO outlet



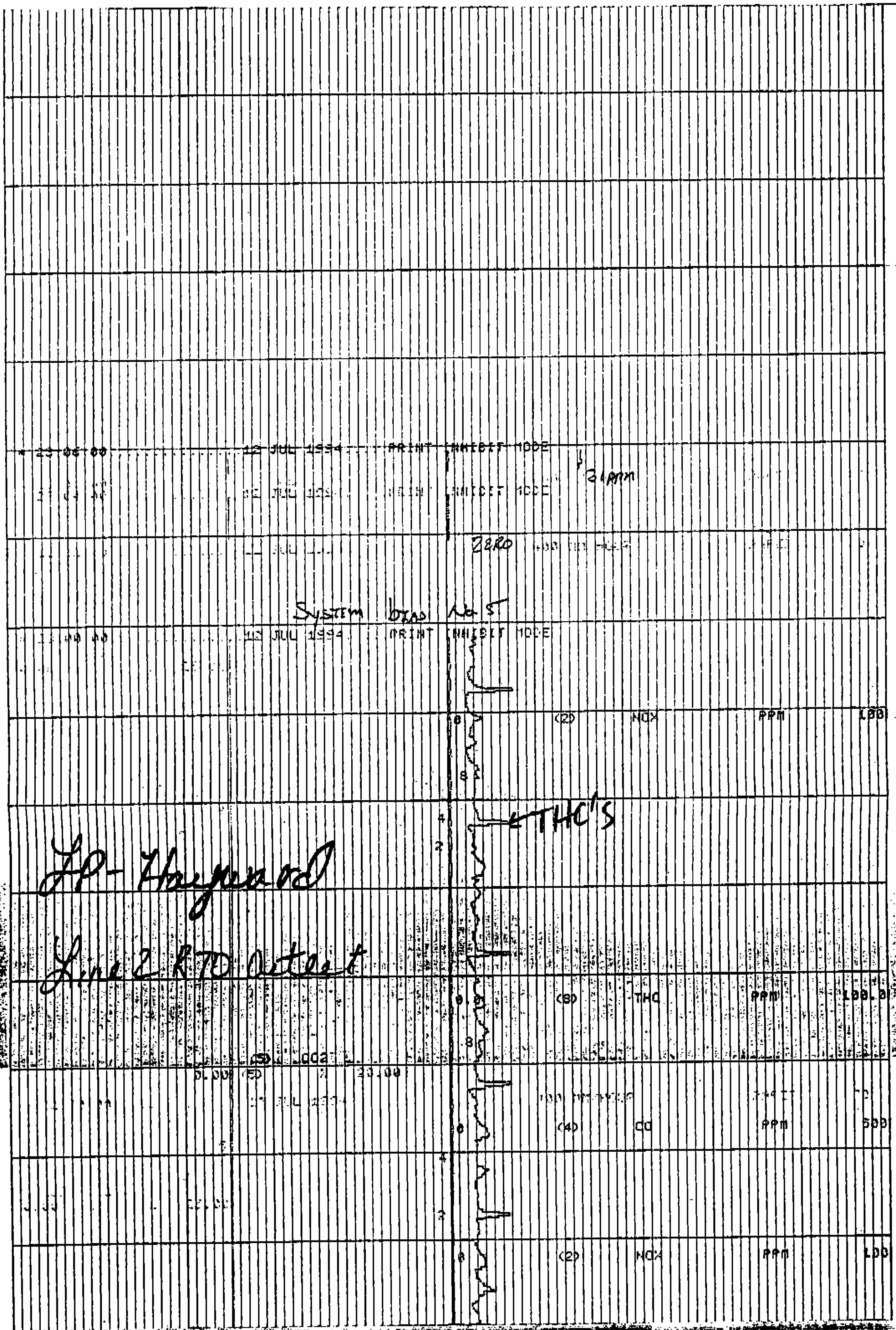
YP Haywood
Line No. 2 RTO Outlet

←THC's

Run No. 3 [illegible]

3/MT

F51



21ppm

ZERO

System bias No 5

THC'S

IP-Hayward

Line 2 RTO outlet

APPENDIX G

ANALYZER SPECIFICATIONS

Servomex

1420
Oxygen Analyser Instruction Manual

Ref : 01420/001A/0

Order as part No. 01420001A

was (7982-2842)

INTERPOLL LABORATORIES
4500 BALL ROAD N.E.
CIRCLE PINES, MN 55014-1819
(612) 786-6020

INTERPOLL LABORATORIES
4500 BALL ROAD N.E.
CIRCLE PINES, MN 55014-1819
(612) 786-6020

1.3 Sampling System

The sampling system of the analyser includes a combination filter/automatic flow control device, designed to keep a constant flow of sample gas through the measuring cell for varying input pressures and to prevent the entrance of particulate matter into the measuring cell. Excess flow is vented to the by-pass.

1.4 Specification

Performance Specification (typical)

Repeatability:	Better than +/-0.2% O2 under constant conditions.
Drift:	Less than 0.2% O2 per week under constant conditions. (Excluding variation due to barometric pressure changes; reading is proportional to barometric pressure.)

Outputs

Display:	3 1/2 digit LCD reading 0.0 to 100.0% oxygen with overrange capability.
Output:	0 to 1V (non-isolated) for 0 to 100% oxygen available on 'D' type connector located on the back panel of the instrument. Output impedance is less than 10 ohms.
Option:	4 - 20mA isolated, Max impedance 500 ohms.
Flow alarm output:	Change over relay contact rated at 3A/115V ac, 1A/240V ac or 1A/28V dc. 4 sets of single pole changeover contacts. Alarm becomes active when sample gas flow through the analyser fails.

Sample requirements

Condition:	Clean, dry gas with dew point 5 deg C below ambient temperature.
Inlet pressure:	0.5 to 3psig (3.5 to 21kPa). Inlet pressure changes within this range will change the reading by less than 0.1% O2. May be operated up to 10psig (70kPa) with degraded stability.
Flowrate:	1.5 to 6 litres/minute approximately depending on sample pressure.
Filtering:	0.6 micron replaceable filter integral to the automatic flow control device.

Response time:	Less than 15 secs. to 90% at an inlet pressure of 3psig (21kPa).
Inlet/vent connections:	1/4 inch OD tube (stainless steel) suitable for 6mm ID flexible tubing or 1/4 inch OD compression fittings.
Materials exposed to the sample:	Stainless steel, Pyrex glass, brass, platinum, epoxy resin, Viton, polypropylene and glass fibre filter.

Physical Characteristics

Case:	Steel and aluminium finished in epoxy powder paint.
Case classification:	IP 20 (IEC 529) when fitted into the Servomex 1400 series 19 inch case.
Dimensions:	See Figure 2.1.
Weight:	10Kg (22lb) approximately.

Electrical

AC Supply:	110 to 120V AC or 220 to 240V AC, +/-10%, 48 to 62Hz. Voltage selected by a voltage selector integral to the IEC supply plug.
Power required:	15VA maximum.

Environmental Limits

Operating ambient temperature:	0 to +40 deg C (32 to 104 deg F)
Storage temp. range:	-20 to +70 deg C (-4 to 158 deg F)
Relative humidity:	0-85%, non-condensing.

SPECIFICATIONS FOR ACS MODEL 3300 CO_2 NDIR

Measuring principle	NDIR single beam method
Measurable gas components and measuring range	0 - 20%
Reproducibility	±0.5% of full scale
Stability	Zero drift; ±% of full scale/24H Span drift; ±% of full scale/24H
Noise	0.5% of full scale
Ambient temperature	-5 to 45°C
Ambient humidity	Less than 90% RH
Response time (90% of final reading)	Electrical system; 2 sec, 3 sec, 5 sec (selectable with connector) Response of actual gas; Within 15 sec (depending on cell length)
Indicator	100 linear division
Output signal	OUTPUT 1; DC 0 - 1 V OUTPUT 2; DC 0 - 10 mV or DC 0 - 100 mV or DC 0 - 1 V or DC 4 - 20 mA (Allowable load resistance 500Ω max.)
Linearity	Better than ±2% of full scale (when linearizer is used)
Power supply	AC 115 V ± 10%, 60 Hz

Power consumption	Approx. 30 VA
Materials of gas-contacting parts	Measuring cell; SUS304 Window; CaF2 Piping; Polyethylene
Sample gas flow rate	1ℓ/min ± 0.5ℓ/min
Sample gas temperature	0 to 55°C
Purging gas flow rate	1ℓ/min (to be flowed as occasion demands)
Warmup time	Approx. 2 hours
External dimensions	200 x 250 x 541 (H x W x D) mm
Weight	Approx. 11 kg
Finish Color	MUNSELL N1.5

Remarks: For combinations of measuring ranges for the dualcomponent analyzer, inquiry should be made to the manufacturer.

SPECIFICATIONS FOR MODEL 10A
ROCK MOUNTED CHEMILUMINESCENT
NO-NO_x GAS ANALYZER

Sensitivity	Each instrument is equipped with the following ranges: 0 - 2.5 ppm 0 - 10 ppm 0 - 25 ppm 0 - 100 ppm 0 - 250 ppm 0 - 1000 ppm 0 - 2500 ppm 0 - 10000 ppm
Accuracy	Derived from the NO or NO_2 calibration gas, ±1% of fullscale
Response time (0-90%) Typical	1.5 seconds - NO Mode 1.7 seconds - NO_x Mode
Output	0 - 10mV and 0 - 10V
Zero Drift	Negligible after 1/2-hour warm-up
Linearity	±1% of full scale
Input Power Requirements	115v/50Hz; 115v/60Hz

Ratfisch
INSTRUMENTE

TOTAL HYDROCARBON ANALYZER (FLAME IONIZATIO
Model RS 55

TECHNICAL DATES

MAINS : 115V/60H
RECORDER OUTPUT : 0 - 5 V / 4-20mA

MODEL: X Manual switching
__ Solenoid valves
HOUSING: __ Case, __ 19"-Rack
MEASURING RANGES: 1 = 0 – 10 C_1-
2 = 0 – 100 C_1
3 = 0 – 1,000 C_1
4 = 0 – 10,000 C_1

SPECIAL OPTIONS:

Flame out alarm ....
1 Alarm ....
Sample line ....
....

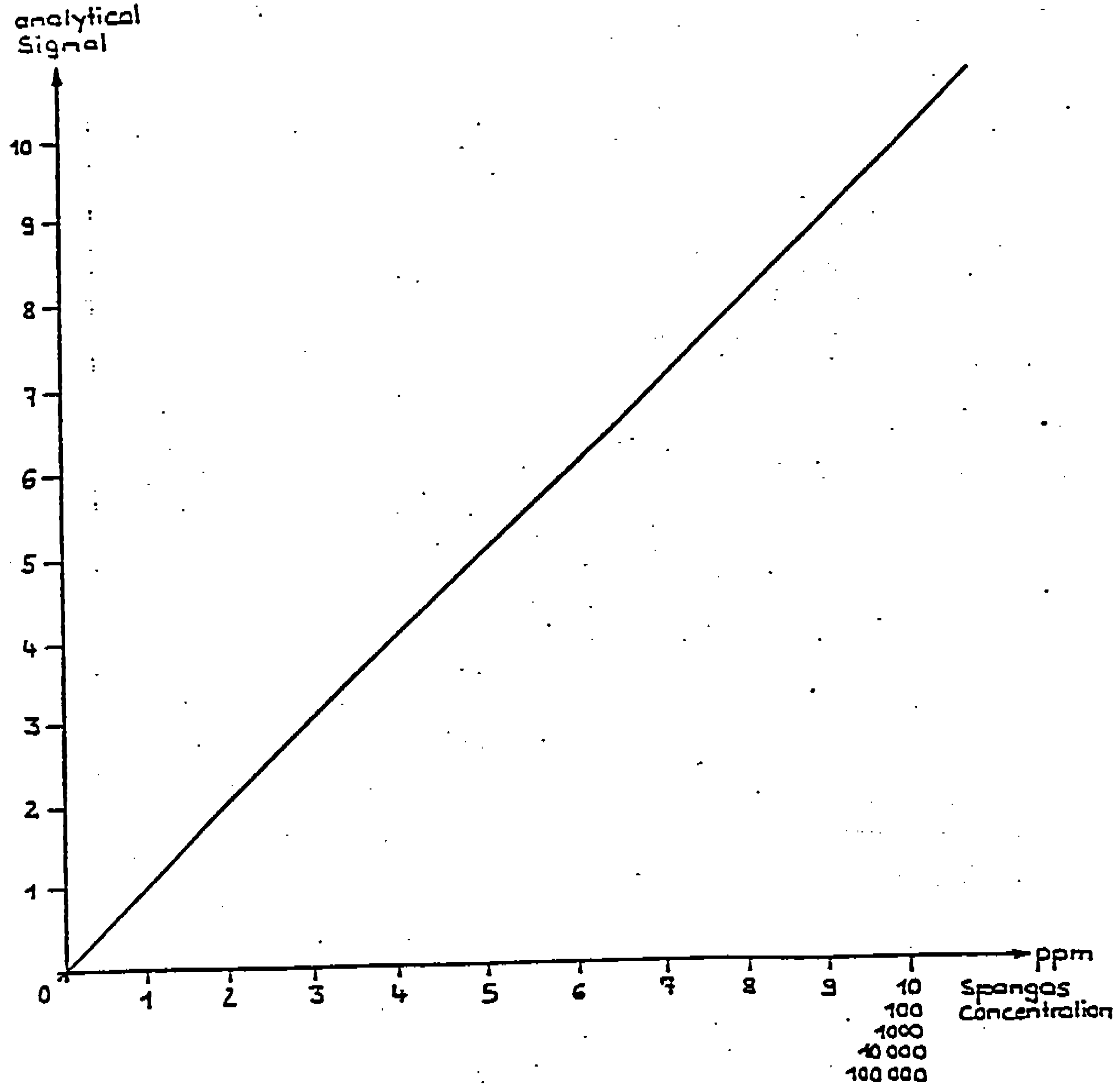
ANALYZER CONDITIONS:

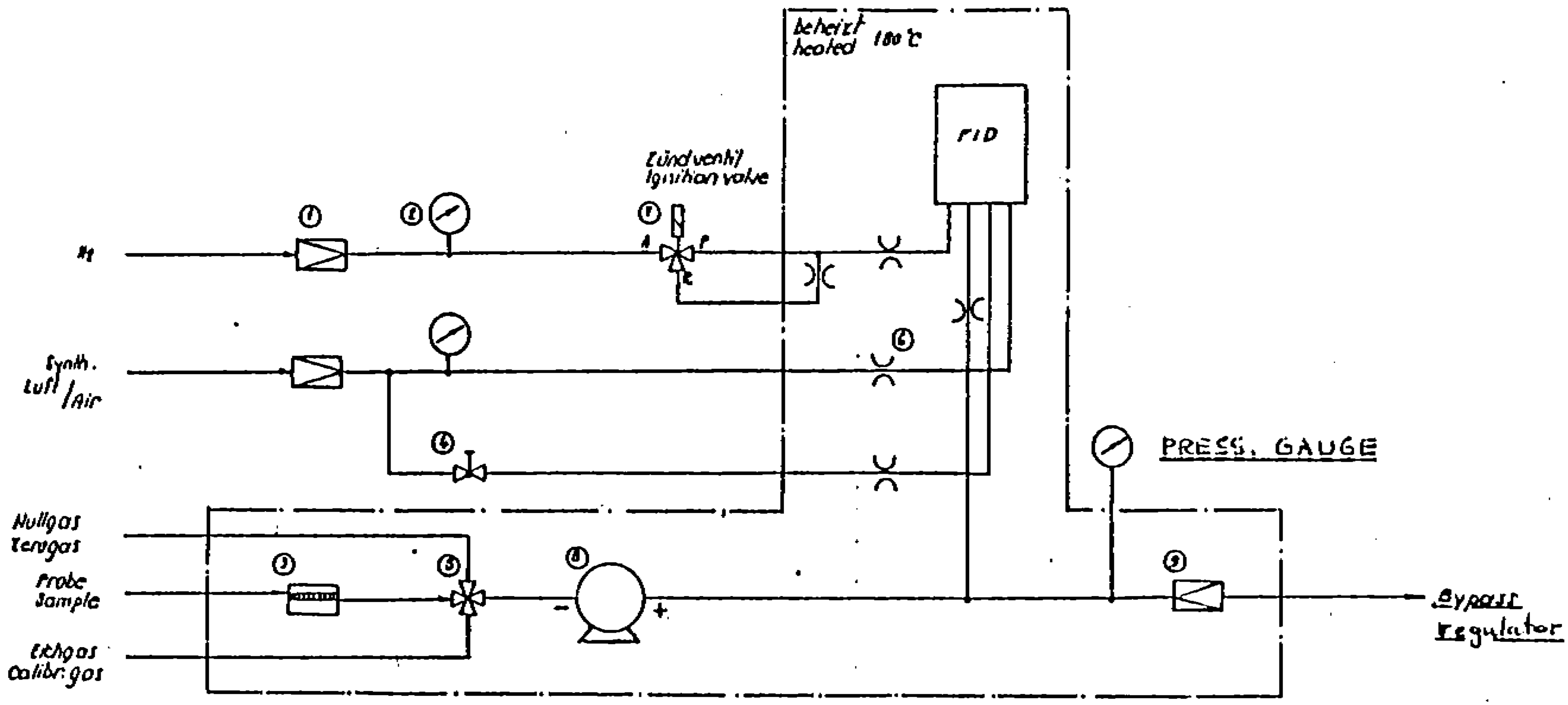
Temperature : ..160.°C

Zero Point : .3,90...
Gain : ....7,70...
Pressure Setting: Sample/Spangas/Zerogas: 200 mbar
Fuel: Hydrogen : .. ..0,35 bar
Combustion Air : ....0,80 bar

Span Gases : ..300. ppm C_1
24.000. ppm C_1

CALIBRATION DIAGRAMM





1	Druckregler Pressure regulator
2	Manometer Gauge
3	Filter
4	Nadelventil Needle valve
5	3 Wege Ventil 3 way valve
6	Kapillare capillary
7	Magnetventil solenoid valve
8	Pumpe pump
9	Rückdruckregler Back pressure regulator

Zündventil
Ignition valve

P-A	angezogen energised
R-A	stromlos at rest

Handumschaltung
Manuel switching

Ratfisch
INSTRUMENTE

FLAMMEN IONISATIONS DETEKTOR
Flame Ionisation Detector

Fließplan
Flowdiagram

RS 55

13.04.88

APPENDIX H

MEASUREMENT SYSTEMS PERFORMANCE SPECIFICATIONS

INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 2 Field Data Sheet

Job LP/HAYWARD
Source LINE No. 2 DRYER RTO OUTLET
Test 1 Run__ Date 7-12-94
Stack Dimen. ______ IN.
Dry Bulb ______ °F Wet bulb ______ °F
Manometer ☐ Reg. ☐ Exp ☐ Elec.
Barometric Pressure 28.70 IN.HG
Static Pressure ______ IN.WC
Operators Ron Rosenthal
Pitot No. ______ C_p .840

Drawing of Test Site

Cross-section View	Elevation View

Traverse Point No.	Fraction of Diameter	Distance From Stack Wall (IN.)	Distance From End of Port (IN.)	Velocity	Temp. of Gas (°F)
▨		Port Length:	IN.	Time Start:	HRS
1	.4m				
2	1.2m				
3	2.0m				
Temp. Meas. Device & S/N:				Time End:	HRS

R or nothing → reg. manometer; S = expanded; E = electronic

INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 2 Field Data Sheet

Job LP/HAYWARD 3366
Source LINE No. 2 DRYER RTO OUTLET
Test 4 Run ___ Date 7-12-94
Stack Dimen. ________ IN.
Dry Bulb ________ °F Wet bulb ________ °F
Manometer ☐ Reg. ☐ Exp ☐ Elec.
Barometric Pressure ________ IN.HG
Static Pressure ________ IN.WC
Operators ________
Pitot No. ________ C_p ________

Drawing of Test Site

Cross-section View	Elevation View

Traverse Point No.	Fraction of Diameter	Distance From Stack Wall (IN.)	Distance From End of Port (IN.)	Velocity	Temp. of Gas (°F)
▨		Port Length:	IN.	Time Start:	HRS
1	.4m				
2	1.2m				
3	2.0m				
Temp. Meas. Device & S/N:				Time End:	HRS

R or nothing = reg. manometer; S = expanded; E = electronic

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INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 2 Field Data Sheet

Job LP/HAYWARD 3366
Source LINE No. 2 SURFACE DRYER OUTLET
Test 5 Run ___ Date 7-12-94
Stack Dimen. 42 IN.
Dry Bulb ______ °F Wet bulb ______ °F
Manometer ☐ Reg. ☐ Exp ☐ Elec.
Barometric Pressure ______ IN.HG
Static Pressure ______ IN.WC
Operators ______
Pitot No. ______ C_p ______

Drawing of Test Site

Cross-section View	Elevation View

VIG Channel No. 1

Traverse Point No.	Fraction of Diameter	Distance From Stack Wall (IN.)	Distance From End of Port (IN.)	Velocity	Temp. of Gas (°F)
▨		Port Length: 4 IN.		Time Start:	HRS
1	1/6	7.00	11.00		
2	3/6	21.00	25.00		
3	5/6	35.00	39.00		
Temp. Meas. Device & S/N:				Time End:	HRS

R or nothing = reg. manometer; S = expanded; E = electronic

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INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 2 Field Data Sheet

Job LP / HAYWARD 3366
Source LINE No. 2 CORE DRYER OUTLET
Test 6 Run ___ Date 7-12-94
Stack Dimen. 42 IN.
Dry Bulb ___ °F Wet bulb ___ °F
Manometer ☐ Reg. ☐ Exp ☐ Elec.
Barometric Pressure ___ IN.HG
Static Pressure ___ IN.WC
Operators ___
Pitot No. ___ C_p ___

Drawing of Test Site

Cross-section View	Elevation View

Traverse Point No.	Fraction of Diameter	Distance From Stack Wall (IN.)	Distance From End of Port (IN.)	Velocity	Temp. of Gas (°F)
▨		Port Length: 4 IN.		Time Start: HRS	
1	1/6	7.00	11.00		
2	3/6	21.00	25.00		
3	5/6	35.00	39.00		
Temp. Meas. Device & S/N:				Time End: HRS	

R or nothing = reg. manometer; S = expanded; E = electronic

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INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 2 Field Data Sheet

Job LP/HAYWARD 3366
Source LINE No. 1 DRYER RTO OUTLET
Test 14 Run __ Date 7-14-94
Stack Dimen. 81.5 IN.
Dry Bulb ____ °F Wet bulb ____ °F
Manometer ☐ Reg. ☐ Exp ☐ Elec.
Barometric Pressure ____ IN.HG
Static Pressure ____ IN.WC
Operators R.R.
Pitot No. ____ C_p ____

Drawing of Test Site

Cross-section View	Elevation View

Traverse Point No.	Fraction of Diameter	Distance From Stack Wall (IN.)	Distance From End of Port (IN.)	Velocity	Temp. of Gas (°F)
▨		Port Length: 6.25	IN.	Time Start:	HRS
1	1/6	13.58	19.83		
2	3/6	40.75	47.00		
3	5/6	67.92	74.17		
Temp. Meas. Device & S/N:				Time End:	HRS

R or nothing = reg. manometer; S = expanded; E = electronic

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INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 2 Field Data Sheet

Job LP/ HAYWARD 3366
Source LINE No. 1 DRYER RTO OUTLET
Test 17 Run __ Date 1-15-94
Stack Dimen. 81.5 IN.
Dry Bulb ____ °F Wet bulb ____ °F
Manometer ☐ Reg. ☐ Exp ☐ Elec.
Barometric Pressure ____ IN.HG
Static Pressure ____ IN.WC
Operators ____
Pitot No. ____ C_p ____

Drawing of Test Site

Cross-section View	Elevation View

Traverse Point No.	Fraction of Diameter	Distance From Stack Wall (IN.)	Distance From End of Port (IN.)	Velocity	Temp. of Gas (°F)
		Port Length: 6.25	IN.	Time Start:	HRS
1	1/6	13.58	19.83		
2	3/6	40.75	47.00		
3	5/6	67.92	74.17		
Temp. Meas. Device & S/N:				Time End:	HRS

R or nothing = reg. manometer; S = expanded; E = electronic

INTERPOLL LABORATORIES

Calibration Error Check

Job LP/HAYWARD 3366

Test 1 Run ____ Date 7-12-94

Operator R.Ro

CO

SO_2 Calibration: Time(HRS) 730

***	Cylinder Value (ppm)	Analyzer Response (ppm)	Difference (ppm)	Span Value (ppm)	Percent of Span
Zero gas	0	1	1	500	.2
Mid level	150.5	151	1	500	.2
High level	300.8	303	3	500	.6

NO_x Calibration: Time(HRS) 730

***	Cylinder Value (ppm)	Analyzer Response (ppm)	Difference (ppm)	Span Value (ppm)	Percent of Span
Zero gas	0	0	0	250	0
Mid level	50.5	52	1.5	250	.45
High level	140.5	140	1.5	250	.45

23163

O_2 Calibration: Time(HRS) 730

***	Cylinder Value (ppm)	Analyzer Response (ppm)	Difference (ppm)	Span Value (ppm)	Percent of Span
Zero gas	0	0	0	25	.0
Mid level	13.5	13.5	0	25	0
High level	21.0	21.0	0	25	0

CO_2 Calibration: Time(HRS) 730

***	Cylinder Value (ppm)	Analyzer Response (ppm)	Difference (ppm)	Span Value (ppm)	Percent of Span
Zero gas	0	.1	.1	20	.5
Mid level	11.1	10.95	.2	20	1.0
High level	17.0	16.8	.2	20	1.0

Must be within 2% of the span for each calibration gas

INTERPOLL LABORATORIES, INC
(612) 786-6020

CO System Bias Check

3366

Job CP/HAYWARD
Source LINE No. 2 DRYER RTO
Test 1 Run ______ Date 7-12-94
Site OUTLET
Operator R.R.

Run	Time (HRS)	***	Cylinder Value (PPM)	Analyzer Resp (PPM)		Diff. CE-SB (PPM)	Span Val. (PPM)	% of Span	RUN TIME
				Cal. Err.	Sys. Bias				
1		Zero Gas	0	1	2	1	500	.2	
		Upscale	150.5	151	150	1	500	.2	
2	910	Zero Gas	0	1	1	0	500	0	1000
		Upscale	150.5	151	149	2	500	.4	1214
3	1215	Zero Gas	0	1	1	0	500	0	1305
		Upscale	150.5	151	148	3	500	.6	1412
4	1415	Zero Gas	0	1	2	1	500	.2	
		Upscale	150.5	151	149	2	500	.4	
5	1615	Zero Gas	0	1	1	0	500	0	
		Upscale	150.5	151	149	2	500	.2	
6		Zero Gas	0						
		Upscale							
7	I.G.S PRETEST	Zero Gas	0		1				
		Upscale			154				
8	I.G.S POSTEST	Zero Gas	0		1				
		Upscale			152				
9		Zero Gas	0						
		Upscale							
10		Zero Gas	0						
		Upscale							
11		Zero Gas	0						
		Upscale							
12		Zero Gas	0						
		Upscale							

Must be within 5% of the span for the zero or upscale cal. gas.

INTERPOLL LABORATORIES, INC
(612) 786-6020

NOx System Bias Check

3366

Job LP/HAYWARD
Source LINE No. 2
Test 1 Run Date 7-12-94
Site OUTLET
Operator R.R.

Run	Time (HRS)	***	Cylinder Value (PPM)	Analyzer Resp (PPM)		Diff. CE-SB (PPM)	Span Val. (PPM)	% of Span
				Cal. Err.	Sys. Bias			
1		Zero Gas	0	0	1	1	100	1
		Upscale	50.5	52	51	1	100	1
2	910	Zero Gas	0	0	0	0	100	0
		Upscale	50.5	52	51	1	100	1
3	1215	Zero Gas	0	0	2	2	100	2
		Upscale	50.5	52	54	2	100	2
4	145	Zero Gas	0	0	2	2	100	2
		Upscale	50.5	52	52	0	100	0
5	1615	Zero Gas	0	0	0	0	100	0
		Upscale	50.5	52	52	0	100	0
6		Zero Gas	0					
		Upscale						
7		Zero Gas	0					
		Upscale						
8		Zero Gas	0					
		Upscale						
9		Zero Gas	0					
		Upscale						
10		Zero Gas	0					
		Upscale						
11		Zero Gas	0					
		Upscale						
12		Zero Gas	0					
		Upscale						

Must be within 5% of the span for the zero or upscale cal. gas.

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INTERPOLL LABORATORIES, INC
(612) 786-6020

O_2 System Bias Check 3366

Job LP/HAYWARD
Source LINE No. 2 DRYER R
Test 1 Run ______ Date 7-12-94
Site OUTLET
Operator R.R.

Run	Time (HRS)	***	Cylinder Value (PPM)	Analyzer Resp (PPM)		Diff. CE-SB (PPM)	Span Val. (PPM)	% of Span
				Cal. Err.	Sys. Bias			
1		Zero Gas	0	0	.1	.1	25	.4
		Upscale	13.5	13.5	13.4	.1	25	.4
2	910	Zero Gas	0	0	.1	.1	25	.4
		Upscale	13.5	13.5	13.4	.1	25	.4
3	1215	Zero Gas	0	0	.1	.1	25	.4
		Upscale	13.5	13.5	13.4	.1	25	.4
4	1415	Zero Gas	0	0	.1	.1	25	.4
		Upscale	13.5	13.5	13.4	.1	25	.4
5	1615	Zero Gas	0	0	.1	.1	25	.4
		Upscale	13.5	13.5	13.5	0	25	0
6		Zero Gas	0					
		Upscale						
7	I.G.S PRETEST	Zero Gas	0		.1			
		Upscale			13.5			
8	I.G.S POSTEST	Zero Gas	0		.1			
		Upscale			13.5			
9		Zero Gas	0					
		Upscale						
10		Zero Gas	0					
		Upscale						
11		Zero Gas	0					
		Upscale						
12		Zero Gas	0					
		Upscale						

Must be within 5% of the span for the zero or upscale cal. gas.

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INTERPOLL LABORATORIES, INC
(612) 786-6020

CO2 System Bias Check 3366

Job LP/ HAYWARD
Source LINE No.2 DRYER RTO
Test 1 Run ______ Date 7-12-94
Site OUTLET
Operator K.R.

Run	Time (HRS)	***	Cylinder Value (PPM)	Analyzer Resp (PPM)		Diff. CE-SB (PPM)	Span Val. (PPM)	% of Span
				Cal. Err.	Sys. Bias			
1		Zero Gas	0	.1	.1	0	20	0
		Upscale	11.1	10.9	10.9	0	20	0
2	910	Zero Gas	0	.1	0	.1	20	.5
		Upscale	11.1	10.9	10.9	0	20	0
3	1215	Zero Gas	0	.1	0.1	0	20	0
		Upscale	11.1	10.9	10.9	0	20	0
4	1415	Zero Gas	0	.1	.1	0	20	0
		Upscale	11.1	10.9	10.9	0	20	0
5	1615	Zero Gas	0	.1	.1	0	20	0
		Upscale	11.1	10.9	10.9	0	20	0
6		Zero Gas	0					
		Upscale						
7	I.G.S. PreTest	Zero Gas	0		0			
		Upscale			10.9			
8	I.G.S. PostTest	Zero Gas	0		.1			
		Upscale			11.0			
9		Zero Gas	0					
		Upscale						
10		Zero Gas	0					
		Upscale						
11		Zero Gas	0					
		Upscale						
12		Zero Gas	0					
		Upscale						

Must be within 5% of the span for the zero or upscale cal. gas.

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INTERPOLL LABORATORIES
(612) 785-6020

Test 3

CO System Bias Check

Job LP/HAYWARD
Source Core Dryer Line 2
Test ______ Run ____ Date 3-12-90
Site Inlet
Operator

Run	Time (HRS)	***	Cylinder Value (ppm)	Analyzer Resp (ppm)		Diff. CE-SB (ppm)	Span Val (PPM)	% of span
				Cal Err	Sys Bias			
1	0845	Zero gas	0	0	0	0	1000	0
		Upscale	594	596	594	2	1000	.2
2	1248	Zero gas	0	0	0	0	1000	0
		Upscale	594	596	594	2	1000	.2
3	1415	Zero gas	0	0	1	1	1000	.1
		Upscale	594	596	592	4	1000	.4
4	1625	Zero gas	0	0	0	0	1000	0
		Upscale	594	596	594	2	1000	.2
5		Zero gas	0					
		Upscale						
6		Zero gas	0					
		Upscale						
7		Zero gas	0					
		Upscale						
8		Zero gas	0					
		Upscale						
9		Zero gas	0					
		Upscale						
10		Zero gas	0					
		Upscale						
11		Zero gas	0					
		Upscale						
12		Zero gas	0					
		Upscale						

Must be within 5% of the span for the zero or upscale cal. gas.

S420-11R

INTERPOLL LABORATORIES
(612) 785-6020

NOX System Bias Check

Job LP/Dungannon
Source Core Dryer
Test ______ Run 3 Date 7-12-94
Site Inlet
Operator

Run	Time (HRS)	***	Cylinder Value (ppm)	Analyzer Resp (ppm)		Diff. CE-SB (ppm)	Span Val (PPM)	% of span
				Cal Err	Sys Bias			
1	0838	Zero gas	0	0	0	0	500	0
		Upscale	239	238	235	3	500	.6
2	1255	Zero gas	0	0	0	0	500	0
		Upscale	75	78	76	2	500	.4
3	1415	Zero gas	0	0	1	1	500	.2
		Upscale	78	76	77	1	500	.2
4	1625	Zero gas	0	0	0	0	100	0
		Upscale	78	78	75	3	100	.6
5		Zero gas	0					
		Upscale						
6		Zero gas	0					
		Upscale						
7		Zero gas	0					
		Upscale						
8		Zero gas	0					
		Upscale						
9		Zero gas	0					
		Upscale						
10		Zero gas	0					
		Upscale						
11		Zero gas	0					
		Upscale						
12		Zero gas	0					
		Upscale						

Must be within 5% of the span for the zero or upscale cal. gas.

S420-11R

INTERPOLL LABORATORIES
(612) 785-6020

O_2 System Bias Check

Job LP/HAYWARD
Test ____ Run ____ Date 7-12-94
Operator
Source LINE 2 CORE DRYER
Site INLET

Run	Time (HRS)	***	Cylinder Value (ppm)	Analyzer Resp (ppm)		Diff. CE-SB (ppm)	Span Val (PPM)	% of span
				Cal Err	Sys Bias			
1	0832	Zero gas	0	0	0	0	25	0
		Upscale	13.5	13.5	13.5	0	25	0
2	1235	Zero gas	0	0	0	0	25	0
		Upscale	13.5	13.5	13.5	0	25	0
3	1415	Zero gas	0	0	0	0	25	0
		Upscale	13.5	13.5	13.5	0	25	0
4	1625	Zero gas	0	0	0	0	25	0
		Upscale	13.5	13.5	13.5	0	25	0
5		Zero gas	0					
		Upscale						
6		Zero gas	0					
		Upscale						
7		Zero gas	0					
		Upscale						
8		Zero gas	0					
		Upscale						
9		Zero gas	0					
		Upscale						
10		Zero gas	0					
		Upscale						
11		Zero gas	0					
		Upscale						
12		Zero gas	0					
		Upscale						

Must be within 5% of the span for the zero or upscale cal. gas.

S420-11R

INTERPOLL LABORATORIES
(612) 786-6020

CO2 System Bias Check

Job LP/HAYWARD Source Hall 2 Core Dryer
Test ______ Run ______ Date 7-12-90 Site Inlet
Operator ____________

Run	Time (HRS)	***	Cylinder Value (ppm)	Analyzer Resp (ppm) Cal Err	Analyzer Resp (ppm) Sys Bias	Diff. CE-SB (ppm)	Span Val (PPM)	% of span
1	1632	Zero gas	0	0	0	0	20	0
		Upscale	11.1	11.1	11.1	0	20	0
2	1235	Zero gas	0	0	0	0	20	0
		Upscale	11.1	11.1	11.1	0	20	0
3	1415	Zero gas	0	0	0	0	20	0
		Upscale	11.1	11.1	11.0	.1	20	.5
4	1625	Zero gas	0	0	.1	.1	20	.5
		Upscale	11.1	11.1	11.1	0	20	0
5		Zero gas	0					
		Upscale						
6		Zero gas	0					
		Upscale						
7		Zero gas	0					
		Upscale						
8		Zero gas	0					
		Upscale						
9		Zero gas	0					
		Upscale						
10		Zero gas	0					
		Upscale						
11		Zero gas	0					
		Upscale						
12		Zero gas	0					
		Upscale						

Must be within 5% of the span for the zero or upscale cal. gas.

S420-11R

INTERPOLL LABORATORIES, INC
(612) 786-6020

THC System Bias Check

Job LP/HAYWARD 3366 Source 1ZNE No. 2 DRYER RTO
Test 4 Run ______ Date 7-12-94 Site OUTLET
Operator R.R.

Run	Time (HRS)	***	Cylinder Value (PPM)	Analyzer Resp (PPM)		Diff. CE-SB (PPM)	Span Val. (PPM)	% of Span	Run Time
				Cal. Err.	Sys. Bias				
1		Zero Gas	0	1.1	.5	.5	100	.5	
		Upscale	31.2	31.2	31	0	100	0	
2	1815	Zero Gas	0	1.1	.5	.5	100	.5	1830
		Upscale	31.2	31.2	31.5	0	100	0	1935
3	1950	Zero Gas	0	1.1	1.2	0	100	0	2015
		Upscale	31.2	31.2	31.7	.5	100	.5	2125
4	2130	Zero Gas	0	1.1	-.3	1.5	100	1.5	2155
		Upscale	31.2	31.2	30.7	.5	100	.5	2300
5	2305	Zero Gas	0	1.1	.3	.5	100	.5	
		Upscale	31.2	31.2	30.2	1.0	100	1.0	
6		Zero Gas	0						
		Upscale							
7		Zero Gas	0						
		Upscale							
8		Zero Gas	0						
		Upscale							
9		Zero Gas	0						
		Upscale							
10		Zero Gas	0						
		Upscale							
11		Zero Gas	0						
		Upscale							
12		Zero Gas	0						
		Upscale							

Must be within 5% of the span for the zero or upscale cal. gas.

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Dscfm

Y29

INTERPOLL LABORATORIES, INC
(612) 786-6020

THC System Bias Check

Job LP/HAYWARD
Source LINE No. 2 SURFACE DRYER
Test 5 Run ____ Date 7-12-94
Site OUTLET
Operator R.R.
CHANNEL No. 1

Run	Time (HRS)	***	Cylinder Value (PPM)	Analyzer Resp (PPM)		Diff. CE-SB (PPM)	Span Val. (PPM)	% of Span
				Cal. Err.	Sys. Bias			
1	1710	Zero Gas	0	1	1	0	1000	0
		Upscale	301	306	301	5	1000	.50
2		Zero Gas	0	1	2	1	1000	.10
		Upscale	301	306	302	4	1000	,40
3	1950	Zero Gas	0	1	2	1	1000	,10
		Upscale	301	306	301	5	1000	.50
4	2130	Zero Gas	0	1	1	0	1000	0
		Upscale	361	306	306	0	1000	0
5	2213	Zero Gas	0	1	3	2	1000	,02
		Upscale	301	306	307	1	1000	,01
6		Zero Gas	0					
		Upscale						
7		Zero Gas	0					
		Upscale						
8		Zero Gas	0					
		Upscale						
9		Zero Gas	0					
		Upscale						
10		Zero Gas	0					
		Upscale						
11		Zero Gas	0					
		Upscale						
12		Zero Gas	0					
		Upscale						

Must be within 5% of the span for the zero or upscale cal. gas.

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RAT

INTERPOLL LABORATORIES, INC
(612) 786-6020

THC System Bias Check CORE

Job LP/HAYWARD 3366 Source LINE No.2 CORE DRYER
Test 6 Run ____ Date 7-12-94 Site OUTLET
Operator R.R

Run	Time (HRS)	***	Cylinder Value (PPM)	Analyzer Resp (PPM)		Diff. CE-SB (PPM)	Span Val. (PPM)	% of Span
				Cal. Err.	Sys. Bias			
1	1655	Zero Gas	0	0	1	1	1000	.01
		Upscale	301	304	305	1	1000	.01
2		Zero Gas	0	0	2	2	1000	.02
		Upscale	301	304	301	3	1000	.03
3	1945	Zero Gas	0	0	2	2	1000	.02
		Upscale	301	304	306	4	1000	.04
4		Zero Gas	0	0	2	2	1000	.02
		Upscale	301	304	305	1	1000	.01
5	2206	Zero Gas	0	0	4	4	1000	.04
		Upscale	301	304	305	1	1000	.01
6		Zero Gas	0					
		Upscale						
7		Zero Gas	0					
		Upscale						
8		Zero Gas	0					
		Upscale						
9		Zero Gas	0					
		Upscale						
10		Zero Gas	0					
		Upscale						
11		Zero Gas	0					
		Upscale						
12		Zero Gas	0					
		Upscale						

Must be within 5% of the span for the zero or upscale cal. gas.

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INTERPOLL LABORATORIES, INC
(612) 786-6020

CO System Bias Check

Job LP/HAYWARD 3366 Source LINE No. 1 DRYER R70
Test 14 Run ______ Date 7-14-94 Site OUTLET
Operator R.R.

Run	Time (HRS)	***	Cylinder Value (PPM)	Analyzer Resp (PPM)		Diff. CE-SB (PPM)	Span Val. (PPM)	% of Span	RUN TIME
				Cal. Err.	Sys. Bias				
1	1445	Zero Gas	0	1	1	0	500	0	1625
		Upscale	150.5	151	151	0	500	0	1840
2	1846	Zero Gas	0	1	2	1	500	.2	
		Upscale	150.5	151	150	1	500	.2	
3	2200	Zero Gas	0	1	-0	1	500	.2	
		Upscale	150.5	151	146	5	500	1.0	
4	019	Zero Gas	0	1	2	1	500	.2	
		Upscale	150.5	151	152	1	500	.2	
5	200	Zero Gas	0	1	0	1	500	.2	
		Upscale	150.5	151	151	0	500	0	
6		Zero Gas	0						
		Upscale							
7		Zero Gas	0						
		Upscale							
8		Zero Gas	0						
		Upscale							
9		Zero Gas	0						
		Upscale							
10		Zero Gas	0						
		Upscale							
11	I.G.S PRETEST	Zero Gas	0		2				
		Upscale			152				
12	I.G.S POST TEST	Zero Gas	0		2				
		Upscale			153				

Must be within 5% of the span for the zero or upscale cal. gas.

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INTERPOLL LABORATORIES, INC
(612) 786-6020

NOx System Bias Check

Job LP/HAYWARD 3366
Source LINE NO. 1 DRYER RTO
Test 14 Run Date 7-14-94
Site OUTLET
Operator R.R.

Run	Time (HRS)	***	Cylinder Value (PPM)	Analyzer Resp (PPM)		Diff. CE-SB (PPM)	Span Val. (PPM)	% of Span
				Cal. Err.	Sys. Bias			
1	1445	Zero Gas	0	0	0	0	100	0
		Upscale	50.5	52	50	2	100	2
2	1846	Zero Gas	0	0	1	1	100	1
		Upscale	50.5	52	54	2	100	2
3	2200	Zero Gas	0	0	0	0	100	0
		Upscale	50.5	52	53	1	100	1
4	019	Zero Gas	0	0	0	0	100	0
		Upscale	50.5	52	54	2	100	2
5	200	Zero Gas	0	0	0	0	100	0
		Upscale	50.5	52	54	2	100	2
6		Zero Gas	0					
		Upscale						
7		Zero Gas	0					
		Upscale						
8		Zero Gas	0					
		Upscale						
9		Zero Gas	0					
		Upscale						
10		Zero Gas	0					
		Upscale						
11		Zero Gas	0					
		Upscale						
12		Zero Gas	0					
		Upscale						

Must be within 5% of the span for the zero or upscale cal. gas.

INTERPOLL LABORATORIES, INC
(612) 786-6020

O_2 System Bias Check

Job LP/HAYWARD 3366 Source LINE No. 1 DRYER RTO
Test 14 Run ______ Date 7-14-94 Site OUTLET
Operator R.R.

Run	Time (HRS)	***	Cylinder Value (PPM)	Analyzer Resp (PPM)		Diff. CE-SB (PPM)	Span Val. (PPM)	% of Span
				Cal. Err.	Sys. Bias			
1	1445	Zero Gas	0	0	.1	.1	25	.4
		Upscale	13.5	13.5	13.4	.1	25	.4
2	1846	Zero Gas	0	0	.1	.1	25	.4
		Upscale	13.5	13.5	13.5	0	25	0
3	2200	Zero Gas	0	0	.1	.1	25	.4
		Upscale	13.5	13.5	13.4	.1	25	.4
4	019	Zero Gas	0	0	.1	.1	25	.4
		Upscale	13.5	13.5	13.5	0	25	0
5	200	Zero Gas	0	0	0	0	25	0
		Upscale	13.5	13.5	13.4	.1	25	.4
6		Zero Gas	0					
		Upscale						
7		Zero Gas	0					
		Upscale						
8		Zero Gas	0					
		Upscale						
9		Zero Gas	0					
		Upscale						
10		Zero Gas	0					
		Upscale						
11	I.G.S PRETEST	Zero Gas	0		0			
		Upscale			13.4			
12	I.G.S POSTEST	Zero Gas	0		.1			
		Upscale			13.4			

Must be within 5% of the span for the zero or upscale cal. gas.

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INTERPOLL LABORATORIES, INC
(612) 786-6020

CO2 System Bias Check

Job LP/HAYWARD 3366 Source LINE NO. 2 DRYER RTO
Test 14 Run ____ Date 7-14-94 Site OUTLET
Operator R.R.

Run	Time (HRS)	***	Cylinder Value (PPM)	Analyzer Resp (PPM) Cal. Err.	Analyzer Resp (PPM) Sys. Bias	Diff. CE-SB (PPM)	Span Val. (PPM)	% of Span
1	1445	Zero Gas	0	.1	0	.1	20	.5
		Upscale	11.1	10.9	10.9	0	20	0
2	1846	Zero Gas	0	.1	.2	.1	20	.5
		Upscale	11.1	10.9	11.0	.1	20	.5
3	2200	Zero Gas	0	.1	.2	.1	20	.5
		Upscale	11.1	10.9	10.9	0	20	0
4	019	Zero Gas	0	.1	0.	.1	20	.5
		Upscale	11.1	10.9	10.9	0	20	0
5	200	Zero Gas	0	.1	0	.1	20	.5
		Upscale	11.1	10.9	10.9	0	20	0
6		Zero Gas	0					
		Upscale						
7		Zero Gas	0					
		Upscale						
8		Zero Gas	0					
		Upscale						
9		Zero Gas	0					
		Upscale						
10		Zero Gas	0					
		Upscale						
11	I.G.S. PRETEST	Zero Gas	0		0			
		Upscale			11.0			
12	I.G.S POSTEST	Zero Gas	0		.1			
		Upscale			10.9			

Must be within 5% of the span for the zero or upscale cal. gas.

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INTERPOLL LABORATORIES, INC
(612) 786-6020

_______ System Bias Check

Job LP/HAYWARD 3366 Source ________

Test ________ Run ________ Date 7-15-94 Site ________

Operator ________

	Run	Time (HRS)	***	Cylinder Value (PPM)	Analyzer Resp (PPM)		Diff. CE-SB (PPM)	Span Val. (PPM)	% of Span
					Cal. Err.	Sys. Bias			
CO	1	I.G.S PRETEST	Zero Gas	0		2			
			Upscale			153			
O2	2	I.G.S. PRETEST	Zero Gas	0		.1			
			Upscale			13.5			
NOx	3	I.G.S PRETEST	Zero Gas	0		0			
			Upscale			10.9			
CO	4	I.G.S POSTEST	Zero Gas	0		2			
			Upscale			149			
	5	I.G.S POSTEST	Zero Gas	0		.1			
			Upscale			13.4			
NOx	6	I.G.S POSTEST	Zero Gas	0		.1			
			Upscale			10.9			
	7		Zero Gas	0					
			Upscale						
	8		Zero Gas	0					
			Upscale						
	9		Zero Gas	0					
			Upscale						
	10		Zero Gas	0					
			Upscale						
	11		Zero Gas	0					
			Upscale						
	12		Zero Gas	0					
			Upscale						

Must be within 5% of the span for the zero or upscale cal. gas.

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INTERPOLL LABORATORIES, INC
(612) 786-6020
CO System Bias Check

Job LP/Hayward
Test 15 ~~Run#~~ Date 7-14-94
Operator
Source Line 1 Coke Dryer
Site Inlet

Run	Time (HRS)	***	Cylinder Value (ppm)	Analyzer Resp (ppm)		Diff. CE-SB (ppm)	Span Val (ppm)	% of Span
				Cal Err	Sys Bias			
1	1800	Zero Gas	0	0	0	0	1000	0
		Upscale	594	596	594	2	1000	.2
2	1445	Zero Gas	0	0	1	1	1000	.1
		Upscale	594	596	595	1	1000	.1
3	1845	Zero Gas	0	0	1	1	1000	.1
		Upscale	594	596	595	1	1000	.1
4	2142	Zero Gas	0	0	1	1	1000	.1
		Upscale	594	596	593	3	1000	.3
5	0006	Zero Gas	0	0	2	2	1000	.2
		Upscale	594	596	596	0	1000	0
6	0157	Zero Gas	0	0	3	3	1000	.3
		Upscale	594	596	594	2	1000	.2
7		Zero Gas	0					
		Upscale						
8		Zero Gas	0					
		Upscale						
9		Zero Gas	0					
		Upscale						
10		Zero Gas	0					
		Upscale						
11		Zero Gas	0					
		Upscale						
12		Zero Gas	0					
		Upscale						

Must be within 5% of the span for the zero or upscale cal. gas.

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INTERPOLL LABORATORIES, INC
(612) 786-6020

NOX System Bias Check

Job LP/HAYWARD
Source LINE 1 CORE DRYER
Test 15 Run - Date 7-14-94
Site INLET
Operator

Run	Time (HRS)	***	Cylinder Value (ppm)	Analyzer Resp (ppm)		Diff. CE-SB (ppm)	Span Val (ppm)	% of Span
				Cal Err	Sys Bias			
1	0800	Zero Gas	0	0	0	0	100	0
		Upscale	78	78	77	1	100	1
2	1445	Zero Gas	0	0	.6	.6	100	.6
		Upscale	78	78	78	78	100	0
3	1845	Zero Gas	0	0	.2	.2	100	.2
		Upscale	78	78	78	0	100	0
4	2142	Zero Gas	0	0	0	0	100	0
		Upscale	78	78	78	0	100	0
5	0006	Zero Gas	0	0	0	0	100	0
		Upscale	78	78	77	1	100	1
6	0151	Zero Gas	0	0	0	0	100	0
		Upscale	78	78	77	1	100	1
7		Zero Gas	0					
		Upscale						
8		Zero Gas	0					
		Upscale						
9		Zero Gas	0					
		Upscale						
10		Zero Gas	0					
		Upscale						
11		Zero Gas	0					
		Upscale						
12		Zero Gas	0					
		Upscale						

Must be within 5% of the span for the zero or upscale cal. gas.

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INTERPOLL LABORATORIES, INC
(612) 786-6020

O2 System Bias Check

Job LP/HAYWARD Source LINE 1 CORE DRYER
Test 15 Run ____ Date 2-14-94 Site INLET
Operator ____

Run	Time (HRS)	***	Cylinder Value (ppm)	Analyzer Resp (ppm)		Diff. CE-SB (ppm)	Span Val (ppm)	% of Span
				Cal Err	Sys Bias			
1	0900	Zero Gas	0	0	0	0	25	0
		Upscale	13.5	13.5	13.5	0	25	0
2	1445	Zero Gas	0	0	0	0	25	0
		Upscale	13.5	13.5	13.5	0	25	0
3	1845	Zero Gas	0	0	0	0	25	0
		Upscale	13.5	13.5	13.4	.1	25	.4
4	2142	Zero Gas	0	0	0	0	25	0
		Upscale	13.5	13.5	13.6	.1	25	.4
5	0006	Zero Gas	0	0	0	0	25	0
		Upscale	13.5	13.5	13.5	0	25	0
6	0157	Zero Gas	0	0	.1	.1	25	.4
		Upscale	13.5	13.5	13.5	0	25	0
7		Zero Gas	0					
		Upscale						
8		Zero Gas	0					
		Upscale						
9		Zero Gas	0					
		Upscale						
10		Zero Gas	0					
		Upscale						
11		Zero Gas	0					
		Upscale						
12		Zero Gas	0					
		Upscale						

Must be within 5% of the span for the zero or upscale cal. gas.

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INTERPOLL LABORATORIES, INC
(612) 786-6020

CO2 System Bias Check

Job LP / Hayward
Test 15 Run ______ Date 7-14-94
Operator

Source Line 1 Core Dryer
Site INLET

Run	Time (HRS)	***	Cylinder Value (ppm)	Analyzer Resp (ppm)		Diff. CE-SB (ppm)	Span Val (ppm)	% of Span
				Cal Err	Sys Bias			
1	0800	Zero Gas	0	0	0	0	20	0
		Upscale	11.1	11.1	11.1	0	20	0
2	1445	Zero Gas	0	0	0	0	20	0
		Upscale	11.1	11.1	11.1	0	20	0
3	1845	Zero Gas	0	0	0	0	20	0
		Upscale	11.1	11.1	11.1	0	20	0
4	2142	Zero Gas	0	0	0	0	20	0
		Upscale	11.1	11.1	11.1	0	20	0
5	0006	Zero Gas	0	0	0	0	20	0
		Upscale	11.1	11.1	11.1	0	20	0
6	0151	Zero Gas	0	0	0	0	20	0
		Upscale	11.1	11.1	11.0	.1	20	.5
7		Zero Gas	0					
		Upscale						
8		Zero Gas	0					
		Upscale						
9		Zero Gas	0					
		Upscale						
10		Zero Gas	0					
		Upscale						
11		Zero Gas	0					
		Upscale						
12		Zero Gas	0					
		Upscale						

Must be within 5% of the span for the zero or upscale cal. gas.

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INTERPOLL LABORATORIES, INC
(612) 786-6020

Core

THC System Bias Check

Job LP/HAYWARD
Source Line 1 Core Dryer
Test 16+17 Run 1-3 Date 7-15-96
Site RTO INLET
Operator BOB

Run	Time (HRS)	***	Cylinder Value (PPM)	Analyzer Resp (PPM)		Diff. CE-SB (PPM)	Span Val. (PPM)	% of Span
				Cal. Err.	Sys. Bias			
1		Zero Gas	0	0	3	3	1000	.3
		Upscale	301	304	302	2	1000	.2
2	1100	Zero Gas	0	0	3	3	1000	.3
		Upscale	301	304	304	0	1000	0
3	1256	Zero Gas	0	0	2	2	1000	.2
		Upscale	301	304	301	3	1000	.3
4	1437	Zero Gas	0	0	4	4	1000	.4
		Upscale	301	304	306	2	1000	.2
5	1554	Zero Gas	0	0	3	3	1000	.3
		Upscale	301	304	300	4	1000	.4
6		Zero Gas	0					
		Upscale						
7		Zero Gas	0					
		Upscale						
8		Zero Gas	0					
		Upscale						
9		Zero Gas	0					
		Upscale						
10		Zero Gas	0					
		Upscale						
11		Zero Gas	0					
		Upscale						
12		Zero Gas	0					
		Upscale						

Must be within 5% of the span for the zero or upscale cal. gas.

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SURFACE

INTERPOLL LABORATORIES, INC
(612) 786-6020

THC System Bias Check

Job CP/HAYWARD
Source CPAE / Surfacelayer
Test ______ Run 1 - Date 7-15-96
Site RTO Duct
Operator SCB

Run	Time (HRS)	***	Cylinder Value (PPM)	Analyzer Resp (PPM)		Diff. CE-SB (PPM)	Span Val. (PPM)	% of Span
				Cal. Err.	Sys. Bias			
1		Zero Gas	0	1	2	1	1000	.1
		Upscale	301	306	301	5	1000	.5
2	1100	Zero Gas	0	1	2	1	1000	.1
		Upscale	301	306	298	8	1000	.8
3	1300	Zero Gas	0	1	2	1	1000	.1
		Upscale	301	306	305	1	1000	.1
4	1425	Zero Gas	0	1	2	1	1000	.1
		Upscale	301	306	302	4	1000	.4
5	1600	Zero Gas	0	1	3	2	1000	.2
		Upscale	301	306	300	6	1000	.6
6		Zero Gas	0					
		Upscale						
7		Zero Gas	0					
		Upscale						
8		Zero Gas	0					
		Upscale						
9		Zero Gas	0					
		Upscale						
10		Zero Gas	0					
		Upscale						
11		Zero Gas	0					
		Upscale						
12		Zero Gas	0					
		Upscale						

Must be within 5% of the span for the zero or upscale cal. gas.

INTERPOLL LABORATORIES, INC
(612) 786-6020

CO System Bias Check

Job LP/HAYWARD 3366 Source LINE No. 1 DRYER R70
Test 17 Run Date 7-15-94 Site OUTLET
Operator R.R.

Run	Time (HRS)	***	Cylinder Value (PPM)	Analyzer Resp (PPM)		Diff. CE-SB (PPM)	Span Val. (PPM)	% of Span
				Cal. Err.	Sys. Bias			
1	815	Zero Gas	0	1	2	1	500	.2
		Upscale	150.5	151	149	2	500	.4
2	1105	Zero Gas	0	1	3	2	500	.4
		Upscale	150.5	151	149	2	500	.4
3	1255	Zero Gas	0	1	2	1	500	.2
		Upscale	150.5	151	149	2	500	.4
4	1425	Zero Gas	0	1	2	1	500	.2
		Upscale	150.5	151	149	2	500	.4
5	1600	Zero Gas	0	1	1	0	500	0
		Upscale	150.5	151	148	3	500	.6
6		Zero Gas	0					
		Upscale						
7		Zero Gas	0					
		Upscale						
8		Zero Gas	0					
		Upscale						
9		Zero Gas	0					
		Upscale						
10		Zero Gas	0					
		Upscale						
11		Zero Gas	0					
		Upscale						
12		Zero Gas	0					
		Upscale						

Must be within 5% of the span for the zero or upscale cal. gas.

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INTERPOLL LABORATORIES, INC
(612) 786-6020

NOx System Bias Check

ob LP/HAYWARD 3366 Source LINE No-1 DRYER RTO
Test 17 Run Date 7-15-94 Site OUTLET
Operator R.R.

Run	Time (HRS)	***	Cylinder Value (PPM)	Analyzer Resp (PPM)		Diff. CE-SB (PPM)	Span Val. (PPM)	% of Span
				Cal. Err.	Sys. Bias			
1	815	Zero Gas	0	0	0	0	100	0
		Upscale	50.5	52	52	0	100	0
2	1105	Zero Gas	0	0	0	0	100	0
		Upscale	50.5	52	51	1	100	1
3	1255	Zero Gas	0	0	1	1	100	1
		Upscale	50.5	52	51	1	100	1
4	1425	Zero Gas	0	0	1	1	100	1
		Upscale	50.5	52	53	1	100	1
5	1600	Zero Gas	0	0	2	2	100	2
		Upscale	50.5	52	53	1	100	1
6		Zero Gas	0					
		Upscale						
7		Zero Gas	0					
		Upscale						
8		Zero Gas	0					
		Upscale						
9		Zero Gas	0					
		Upscale						
10		Zero Gas	0					
		Upscale						
11		Zero Gas	0					
		Upscale						
12		Zero Gas	0					
		Upscale						

Must be within 5% of the span for the zero or upscale cal. gas.

033194-G:\STACK\WP\FORMS\S-420-11

INTERPOLL LABORATORIES, INC
(612) 786-6020

O2 System Bias Check

Job LP/HAYWARD 3366 Source LINE No. 1 DRYER RTO
Test 17 Run ____ Date 2-15-94 Site OUTLET
Operator R.R.

Run	Time (HRS)	***	Cylinder Value (PPM)	Analyzer Resp (PPM)		Diff. CE-SB (PPM)	Span Val. (PPM)	% of Span
				Cal. Err.	Sys. Bias			
1	815	Zero Gas	0	0	0	0	25	0
		Upscale	13.5	13.5	13.4	.1	25	.4
2	1105	Zero Gas	0	0	0	0	25	0
		Upscale	13.5	13.5	13.4	.1	25	.4
3	1255	Zero Gas	0	0	.1	.1	25	.4
		Upscale	13.5	13.5	13.5	0	25	0
4	1425	Zero Gas	0	0	0	0	25	0
		Upscale	13.5	13.5	13.4	.1	25	.4
5	1600	Zero Gas	0	0	.2	.2	25	.8
		Upscale	13.5	13.5	13.6	.1	25	.4
6		Zero Gas	0					
		Upscale						
7		Zero Gas	0					
		Upscale						
8		Zero Gas	0					
		Upscale						
9		Zero Gas	0					
		Upscale						
10		Zero Gas	0					
		Upscale						
11		Zero Gas	0					
		Upscale						
12		Zero Gas	0					
		Upscale						

Must be within 5% of the span for the zero or upscale cal. gas.

INTERPOLL LABORATORIES, INC
(612) 736-6020

Co2 System Bias Check

Job LP/HAYWARD 3366 Source 1 ZNE No. 1 DRYER RTO
Test 17 Run ____ Date 7-15-94 Site OUTLET
Operator R. R.

Run	Time (HRS)	***	Cylinder Value (PPM)	Analyzer Resp (PPM)		Diff. CE-SB (PPM)	Span Val. (PPM)	% of Span
				Cal. Err.	Sys. Bias			
1	815	Zero Gas	0	.1	0	.1	20	.5
		Upscale	11.1	10.9	10.9	0	20	0
2	1105	Zero Gas	0	.1	0	.1	20	.5
		Upscale	11.1	10.9	10.9	0	20	0
3	1255	Zero Gas	0	.1	0	.1	20	.5
		Upscale	11.1	10.9	10.9	0	20	0
4	1425	Zero Gas	0	.1	.2	.1	20	.5
		Upscale	11.1	10.9	10.9	0	20	0
5	1600	Zero Gas	0	.1	0	.1	20	.5
		Upscale	11.1	10.9	10.9	0	20	0
6		Zero Gas	0					
		Upscale						
7		Zero Gas	0					
		Upscale						
8		Zero Gas	0					
		Upscale						
9		Zero Gas	0					
		Upscale						
10		Zero Gas	0					
		Upscale						
11		Zero Gas	0					
		Upscale						
12		Zero Gas	0					
		Upscale						

Must be within 5% of the span for the zero or upscale cal. gas.

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INTERPOLL LABORATORIES, INC
(612) 786-6020

THC System Bias Check

Job CP/HAYWARD 3366 Source LINE No. 1 DRYER RTO
Test 17 Run ______ Date 7-15-94 Site OUTLET
Operator R.R.

Run	Time (HRS)	***	Cylinder Value (PPM)	Analyzer Resp (PPM)		Diff. CE-SB (PPM)	Span Val. (PPM)	% of Span	
				Cal. Err.	Sys. Bias				
1	815	Zero Gas	0	1.1	.5	.6	100	.6	850
		Upscale	31.2	31.2	31.1	.1	100	.1	1110
2	1105	Zero Gas	0	1.1	.6	.5	100	.5	
		Upscale	31.2	31.2	30.9	.3	100	.3	
3	1255	Zero Gas	0	1.1	.8	.3	100	.3	1315
		Upscale	31.2	31.2	31.1	.1	100	.1	1420
4	1430	Zero Gas	0	1.1	.4	.7	100	.7	1445
		Upscale	31.2	31.2	31.2	0	100	0	1553
5	1600	Zero Gas	0	1.1	.9	.2	100	.2	
		Upscale	31.2	31.2	31.7	.5	100	.5	
6		Zero Gas	0						
		Upscale							
7		Zero Gas	0						
		Upscale							
8		Zero Gas	0						
		Upscale							
9		Zero Gas	0						
		Upscale							
10		Zero Gas	0						
		Upscale							
11		Zero Gas	0						
		Upscale							
12		Zero Gas	0						
		Upscale							

Must be within 5% of the span for the zero or upscale cal. gas.

033194-G:\STACK\WP\FORMS\S-420-11

INTERPOLL LABORATORIES

Calibration Error Check

Job LP/HAYWARD

Test ____ Run ____ Date 7-12-94

Operator ____

CO ~~SO_2~~ Calibration: Time(HRS) 0815

***	Cylinder Value (ppm)	Analyzer Response (ppm)	Difference (ppm)	Span Value (ppm)	Percent of Span
Zero gas	0	0	0	1000	0
Mid level	249	249	0	1000	0
High level	594	596	2	1000	.2

NO_x Calibration: Time(HRS) 0745

***	Cylinder Value (ppm)	Analyzer Response (ppm)	Difference (ppm)	Span Value (ppm)	Percent of Span
Zero gas	0	0	0	500	0
Mid level	239	238	1	500	.2
High level	476	476	0	500	0

O_2 Calibration: Time(HRS) 0730

***	Cylinder Value (ppm)	Analyzer Response (ppm)	Difference (ppm)	Span Value (ppm)	Percent of Span
Zero gas	0	0	0	25	0
Mid level	13.5	13.5	0	25	0
High level	21.1	21.0	.1	25	.4

CO_2 Calibration: Time(HRS) 0730

***	Cylinder Value (ppm)	Analyzer Response (ppm)	Difference (ppm)	Span Value (ppm)	Percent of Span
Zero gas	0	0	0	20	0
Mid level	11.1	11.1	0	20	0
High level	17.0	17.0	0	20	0

Must be within 2% of the span for each calibration gas

S-420-10

INTERPOLL LABORATORIES

Calibration Error Check

Job LP/ HAYWARD

Test ____ Run ____ Date 7-12-94

Operator R. R.

~~SO₂~~ Calibration: Time (HRS) 1400

***	Cylinder Value (ppm)	Analyzer Response (ppm)	Difference (ppm)	Span Value (ppm)	Percent of Span
Zero gas	0	1.1		100	
Mid level	31.2	31.2		100	
High level	303	308		1000	
	3038	3040		1000	

NO_x Calibration: Time (HRS) ____

***	Cylinder Value (ppm)	Analyzer Response (ppm)	Difference (ppm)	Span Value (ppm)	Percent of Span
Zero gas	0				
Mid level					
High level					

O_2 Calibration: Time (HRS) ____

***	Cylinder Value (ppm)	Analyzer Response (ppm)	Difference (ppm)	Span Value (ppm)	Percent of Span
Zero gas	0				
Mid level					
High level					

CO_2 Calibration: Time (HRS) ____

***	Cylinder Value (ppm)	Analyzer Response (ppm)	Difference (ppm)	Span Value (ppm)	Percent of Span
Zero gas	0				
Mid level					
High level					

Must be within 2% of the span for each calibration gas

S-420-10

INTERPOLL LABORATORIES

Calibration Error Check

Job IP Hayward

Test 5 Run ______ Date ______________

Operator ______________

THC ~~SO2~~ Calibration: Time (HRS) 1500

***	Cylinder Value (ppm)	Analyzer Response (ppm)	Difference (ppm)	Span Value (ppm)	Percent of Span
Zero gas	0	1		100	
Low ~~Mid~~ level	27.9	28		100	
MID ~~High~~ level	301	306		1000	
High level	3038	3030		1000	

NO_x Calibration: Time (HRS) ______

***	Cylinder Value (ppm)	Analyzer Response (ppm)	Difference (ppm)	Span Value (ppm)	Percent of Span
Zero gas	0				
Mid level					
High level					

O_2 Calibration: Time (HRS) ______

***	Cylinder Value (ppm)	Analyzer Response (ppm)	Difference (ppm)	Span Value (ppm)	Percent of Span
Zero gas	0				
Mid level					
High level					

CO_2 Calibration: Time (HRS) ______

***	Cylinder Value (ppm)	Analyzer Response (ppm)	Difference (ppm)	Span Value (ppm)	Percent of Span
Zero gas	0				
Mid level					
High level					

Must be within 2% of the span for each calibration gas

S-420-10

APPENDIX J

PROCESS RATE INFORMATION

Hayward Dryer testing July 12-15, 1994

CONTENTS page

LINE 1 DRYER TESTING JULY 13, 1994

Formaldehyde

LINE 1 DRYER TESTING JULY 14, 1994

PM, CO, NOx

LINE 1 DRYER TESTING JULY 15, 1994

VOC, PHENOL, POM

LINE 2 DRYER TESTING JULY 12, 1994

VOC, Formaldehyde, PM, CO, NOx

LINE 2 DRYER TESTING JULY 13, 1994

PHENOL, POM

Hayward Dryer testing July 12-15, 1994

Test schedule

Line 1 Dryer testing

	POLLUTANT	RUN #1	RUN #2	RUN #3
7-13	HCHO	1200-1307	1427-1533	1612-1720
7-14	PM, CO, NOX	1625-1631 1642-1736 1827-1840	2030-2138	2230-2334 2332-2338 2350-2358
7-15	VOC	0847-1032	1315-1418	1445-1550
7-15	PHENOL + Benzene	0922-1025	1257-1357	1408-1508
7-15	POM	0800-1015	1258-1509	1545-1754

Note Run # 2 for PM, CO, NOx, not used due to suspected leak

Line 2 Dryer testing

DATE	POLLUTANT	RUN #1	RUN #2	RUN #3
7-12	PM	1000-1210	1305-1410	1500-1611
7-12	CO	1000-1210	1305-1410	1500-1611
7-12	NOX	1000-1210	1305-1410	1500-1611
7-12	VOC	1824-1932	2005-2120	2141-2300
7-12	HCHO	1830-1940	2015-2121	2155-2305
7-13	PHENOL + Benzene	0856-0956	1120-1220	1300-1401
7-13	POM	0848-1058	1150-1402	1505-1717

Hayward Dryer testing July 12-15, 1994
Line 1 process data summary

LINE 1 DRYER TESTING JULY 13, 1994 FORMALDEHYDE

19.93 =PressProduction rate in Tons per hour
46,733 = Production rate of both dryers in pounds per hour
2.21 =Surface fuel burned in tons per hour
1.23 =Core fuel burned in tons per hour
3.43 =Total fuel (both dryers) burned in tons per hour
48.0% =average incoming moisture percent (both dryers)
5.5% =average dry moisture percent (both dryers)
1444 =average inlet temperature (both dryers)

LINE 1 DRYER TESTING JULY 14, 1994 PM, CO, NOx

19.56 =PressProduction rate in Tons per hour
45,438 = Production rate of both dryers in pounds per hour
1.69 =Surface fuel burned in tons per hour
1.47 =Core fuel burned in tons per hour 1311° Surf
3.16 =Total fuel (both dryers) burned in tons per hour
46.4% =average incoming moisture percent (both dryers) 1375° Core
5.3% =average dry moisture percent (both dryers)
1343 =average inlet temperature (both dryers)

LINE 1 DRYER TESTING JULY 15, 1994 VOC and PHENOL + Benzene

19.82 =PressProduction rate in Tons per hour
47,952 = Production rate of both dryers in pounds per hour
2.22 =Surface fuel burned in tons per hour
1.93 =Core fuel burned in tons per hour
4.15 =Total fuel (both dryers) burned in tons per hour
48.4% =average incoming moisture percent (both dryers)
4.2% =average dry moisture percent (both dryers)
1406 =average inlet temperature (both dryers)

LINE 1 DRYER TESTING JULY 15, 1994 POM

19.83 =PressProduction rate in Tons per hour
47,920 = Production rate of both dryers in pounds per hour
2.18 =Surface fuel burned in tons per hour
1.94 =Core fuel burned in tons per hour
4.13 =Total fuel (both dryers) burned in tons per hour
48.0% =average incoming moisture percent (both dryers)
4.5% =average dry moisture percent (both dryers)
1391 =average inlet temperature (both dryers)

Hayward Dryer testing July 12-15, 1994
Line 2 process data summary

LINE 2 DRYER TESTING JULY 12, 1994 PM, CO, NOx

18.90 =PressProduction rate in Tons per hour
45,630 = Production rate of both dryers in pounds per hour
1.83 =Surface fuel burned in tons per hour
2.09 =Core fuel burned in tons per hour
3.92 =Total fuel (both dryers) burned in tons per hour
46.1% =average incoming moisture percent (both dryers)
5.0% =average dry moisture percent (both dryers)
1203 =average inlet temperature (both dryers) 1090 Face 1317 ~~[illegible]~~ core

LINE 2 DRYER TESTING JULY 12, 1994 VOC, Formaldehyde

18.83 =PressProduction rate in Tons per hour
44,992 = Production rate of both dryers in pounds per hour
1.76 =Surface fuel burned in tons per hour
1.91 =Core fuel burned in tons per hour
3.67 =Total fuel (both dryers) burned in tons per hour
47.6% =average incoming moisture percent (both dryers)
5.2% =average dry moisture percent (both dryers)
1192 =average inlet temperature (both dryers)

LINE 2 DRYER TESTING JULY 13, 1994 PHENOL + Benzene

17.83 =PressProduction rate in Tons per hour
43,149 = Production rate of both dryers in pounds per hour
1.91 =Surface fuel burned in tons per hour
1.84 =Core fuel burned in tons per hour
3.74 =Total fuel (both dryers) burned in tons per hour
46.9% =average incoming moisture percent (both dryers)
6.0% =average dry moisture percent (both dryers)
1117 =average inlet temperature (both dryers)

LINE 2 DRYER TESTING JULY 13, 1994 POM

17.90 =PressProduction rate in Tons per hour
43460 = Production rate of both dryers in pounds per hour
1.89 =Surface fuel burned in tons per hour
1.94 =Core fuel burned in tons per hour
3.83 =Total fuel (both dryers) burned in tons per hour
46.9% =average incoming moisture percent (both dryers)
5.5% =average dry moisture percent (both dryers)
1137 =average inlet temperature (both dryers)

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LINE 1 DRYER TESTING JULY 13, 1994 FORMALDEHYDE
DATA TIME: START= 12:00 END= 17:30 HOURS= 5.50

BOARD WEIGHTS - LBS

weights of approximately every 25th untrimmed board (from press tapes)
7/16

189	189	191	192	191	191.2	lb=average
193	192	192	190	188		untrimmed
192	185	191	190	191		mat weight
198	188	190	192	190		
200	189	192	191	192	179.2	lb=average
196	188	195	196	191		finished board
191	190	191	190	189		weight
196	189	195	191	189		(untrimmed mat
189	189	197	187	188		weight-weight
189	193	193	190	190		of trim)
					6.3%	=trim %

PLANT PRODUCTION RATE

5.50 =hours during testing
102 =pressloads
1224 =no. of 8'x16' boards produced (pressloads x 12 boards per load)
219,280 =lbs of finished product (boards produced x weight of finished board)
39869 =lbs of finished product per hour (lbs of finshed product / hours)
19.93 =tons of finished product per hour (lbs of finshed product per hour / 2000 lb)

FUEL BURNING RATE ESTIMATED BY DRY FUEL INPUT

SURFACE

10 =SURFACE fuel calibration in pounds per count
2426 =SURFACE counts during testing hours
24260 =SURFACE lbs of fuel burned during testing
5.50 =hours during testing
4411 =lbs of dry fuel burned per hour during testing (pounds of dry fuel / testing hours)
2.21 =tons of dry fuel burned per hour during testing (pounds of dry fuel / 2000 lbs)
8600 =estimated BTU content per pound of dry fuel,
37.9 =estimated mmbtu input per hour (lbs of dry fuel per hour x btu content)
1446 =average inlet temperature
48.0% =average incoming moisture percent
5.1% =average dry moisture percent

CORE

10 =CORE fuel calibration in pounds per count
1349 =CORE counts during testing hours
13490 =CORE lbs of fuel burned during testing
5.50 =hours during testing
2453 =lbs of dry fuel burned per hour during testing (pounds of dry fuel / testing hours)
1.23 =tons of dry fuel burned per hour during testing (pounds of dry fuel / 2000 lbs)
8600 =estimated BTU content per pound of dry fuel,
21.1 =estimated mmbtu input per hour (lbs of dry fuel per hour x btu content)
1442 =average inlet temperature
48.0% =average incoming moisture percent
5.9% =average dry moisture percent

DRYER THROUGHPUT RATE

6864 =Total pounds of fuel burned per hour in Core and Surface Dryer
39869 =lbs of finished product per hour (lbs of finshed product / hours)
46733 =Pounds of material produced by the dryer per hour (dry basis, assumming fuel balances)
2681 = weight of trim per hour at 6.3% of finished product
4183 =weight of screened fines per hour (total fuel - trim)
8.95% =resulting loss to fines as percentage of dryer throughput

LOUISIANA-PACIFIC CORPORATION
HAYWARD, WI

PRESS REPORT - LINE 1

OPERATOR Fitch SHIFT Am CREW A DATE 7-3-

THICKNESS: 15/32

OVERALL TIMER: 148

PRESS TEMP: 210

PRESS LOADS 19 15/32 39 1/4 Ts 9

DECOMPRESSION TIME 12

TOTAL REJECTS: —

LOG COUNT: 7511

F.C.O.S. END RADIATOR 805 Am

Cleaned Blender Shrouds & Tracks 900 A

Cleaned Deckle Chains 129 PM

Press Blow Down 700 Am

Headers Cleaned YES [✓ NO]

How Many —

Former End Radiator 124 PM Ti

LINE SPEED	FROM	TO
42	700	825
60	825	1035
40	1035	1100
60	1100	700

DOWNTIME		DOWNTIME (Mins)			KEY	REASONS FOR DOWNTIME
FROM	TO	M	E	O		
928	933	5				Jam up saws
1033	1034	1				Saws
	[illegible]		-			
121	122		1			False gap (West End)
521	524	3				#5 Drop #8

Downtime Code: M - Mechanical E - Electrical O - Operator

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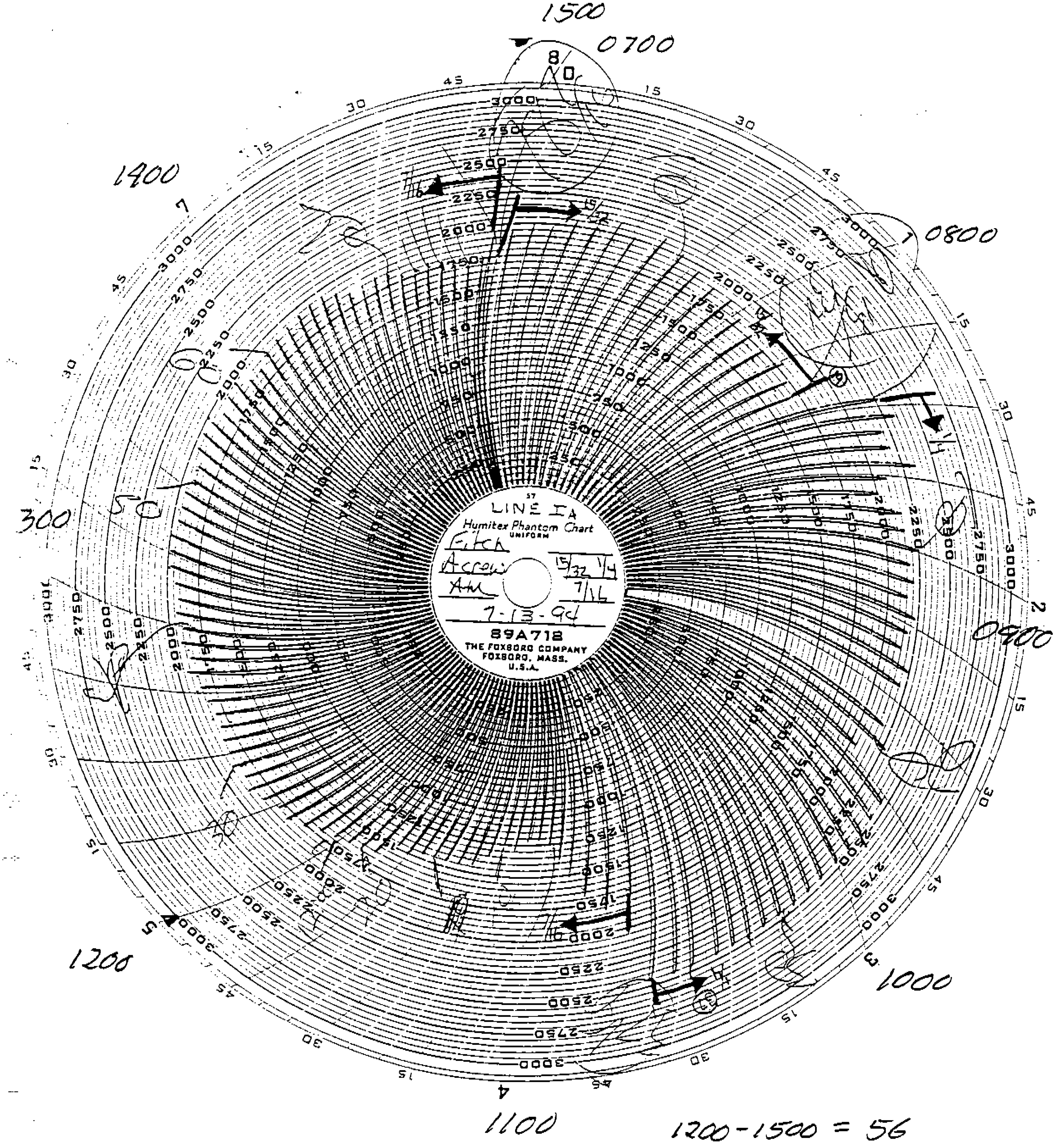
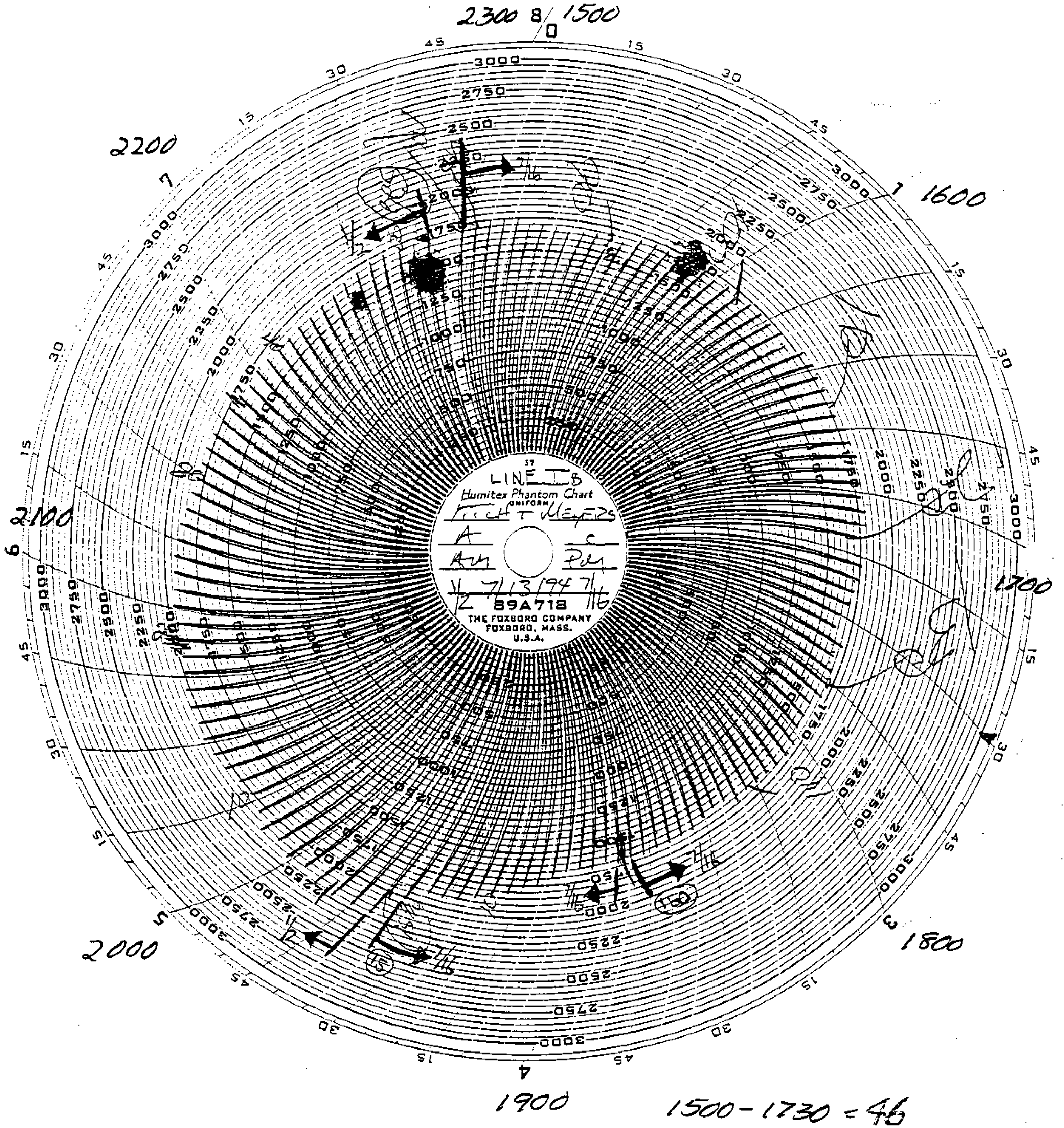
LINE I
PRESS CHART
7-13-94
0700 - 1500



1200-1500 = 56

7

LINE 1
PRESS CHART
7-13-94
1500 - 2300



1500-1730 = 46

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J-9

Hayward Dryer Testing LINE I

DATE JULY 13, 1994
BY
PAGE 1 OF 2

FUEL CALIBRATION: face=____lb./count core=____lb./count

TIME	FACE OUT. SET POINT	FACE FEED RATE	FACE INLET TEMP	FACE OUTLET TEMP	FACE FUEL COUNT	FACE WET BIN LEVEL	CORE OUT. SET POINT	CORE FEED RATE	CORE INLET TEMP	CORE OUTLET TEMP	CORE FUEL COUNT	CORE WET BIN LEVEL	DRY BIN LEVEL FACE	DRY BIN LEVEL CORE	EVERY HOUR FLAKE MOISTURE IN	EVERY HOUR FLAKE MOISTURE FACE OUT	EVERY HOUR FLAKE MOISTURE CORE OUT
11:20	285	42	1270	252	1056	75	270	36	1206	200	1512	70	60	60			
11:30	280	42	1463	279	1128	75	270	36	1694	214	1554	70	60	65			
11:40	280	43	1396	280	1182	65	270	36	1496	261	1610	65	60	65			
11:50	280	42	1361	279	1247	65	270	36	1527	269	1672	65	60	65			
12:00	280	42	1429	277	1318	65	268	36	1502	269	1732	60	65	70			
12:10	280	42	1404	280	1381	70	268	37	1508	265	1787	65	65	70			
12:20	280	42	1447	281	1453	65	267	36	1475	267	1851	65	65	70			
12:30	280	42	1435	282	1521	65	267	37	1475	265	1904	60	70	70			
12:40	280	42	1465	278	1614	65	267	37	1474	266	1975	60	75	70			
12:50	280	42	1455	278	1671	65	267	37	1377	266	2612	60	75	70			
1:00	280	42	1465	274	1751	65	267	37	1341	266	2059	60	75	70			
1:10	280	42	1475	279	1812	60	267	36	1350	264	2091	65	75	70			
1:20	278	44	1425	275	1887	65	267	42	1356	269	2135	70	75	70			
1:30	278	45	1508	275	1972	65	267	42	1462	264	2183	70	75	65			
1:40	278	44	1510	276	2048	65	267	42	1485	265	2232	70	75	65			
1:50	278	44	1515	273	2122	65	267	42	1529	264	2277	75	80	65			
2:00	278	45	1549	276	2202	65	267	42	1536	266	2319	80	80	70			
2:10	278	43	1464	269	2268	60	267	42	1576	265	2360	80	85	70			
2:20	278	43	1469	282	2336	65	267	42	1501	251	2404	80	85	70			
2:30	278	43	1486	272	2411	70	267	42	1479	256	2443	80	85	70			
2:40	278	42	1597	278	2493	75	267	42	1351	252	2479	80	85	70			
2:50	278	42	1495	277	2565	75	268	42	1268	252	2515	85	85	70			
3:00	278	42	1328	277	2623	75	268	41	1413	255	2549	85	85	70			
3:10	278	38	1392	274	2703	80	268	41	1532	266	2597	80	80	70			
3:20	278	38	1400	278	2774	80	268	40	1521	269	2639	80	80	70			
3:30	278	39	1385	276	2839	80	268	41	1565	270	2669	85	80	70			
3:40	278	39	1380	277	2913	75	268	40	1456	266	2697	80	80	75			
3:50	278	38	1335	276	2981	75	268	40	1476	268	2732	80	80	75			
4:00	278	39	1348	276	3046	75	268	41	1451	266	2769	75	80	75			
4:10	278	39	1362	278	3114	75	268	41	1397	269	2812	75	80	75			

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Hayward Dryer Testing LINE I

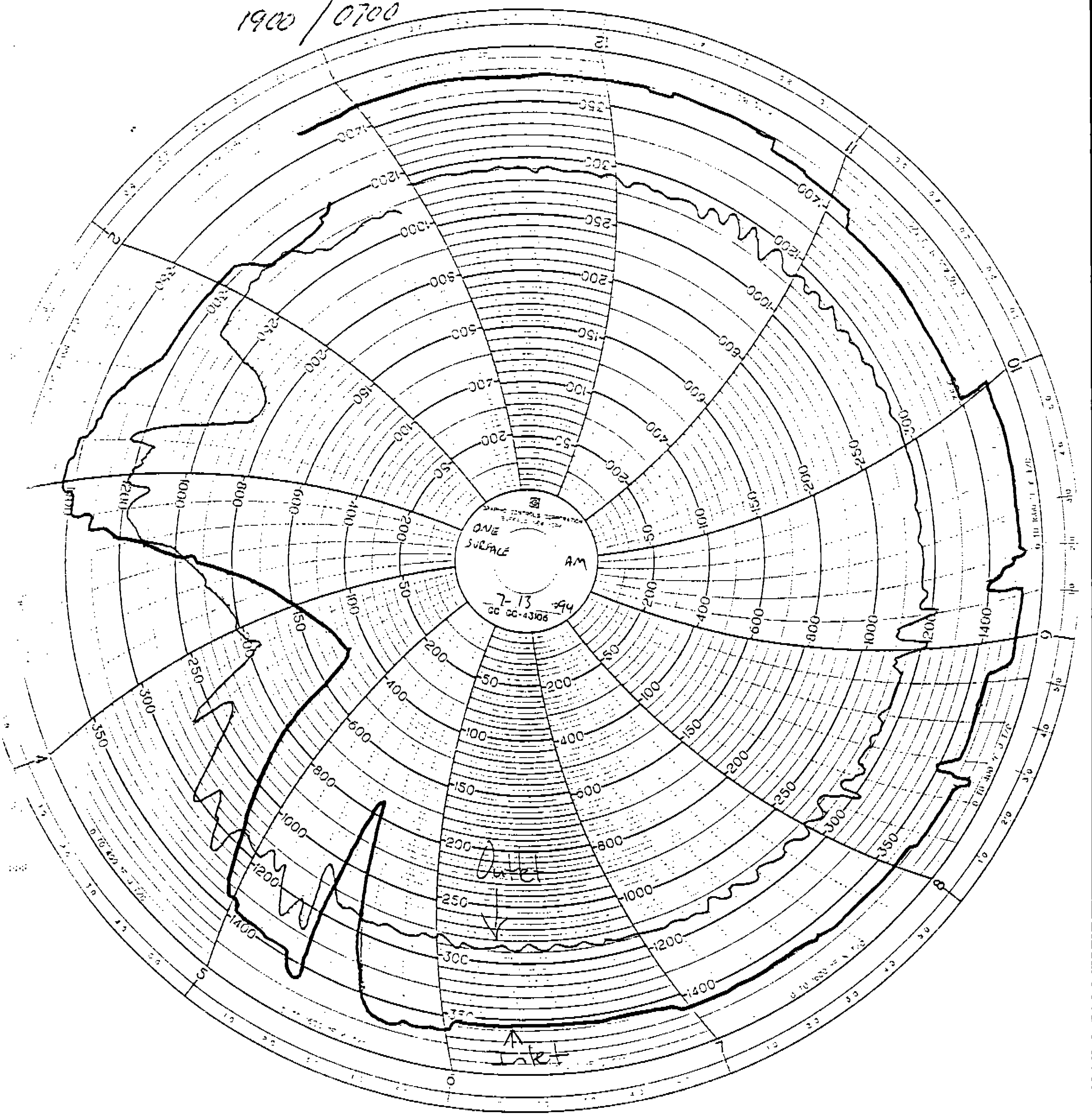
FUEL CALIBRATION: face=_____lb/count core=_____lb/count

DATE 7/13
BY Hayward Line I
PAGE 2 OF 2

TIME	FACE OUT. SET POINT	FACE FEED RATE	FACE INLET TEMP	FACE OUTLET TEMP	FACE FUEL COUNT	FACE WET BIN LEVEL	CORE OUT. SET POINT	CORE FEED RATE	CORE INLET TEMP	CORE OUTLET TEMP	CORE FUEL COUNT	CORE WET BIN LEVEL	DRY BIN LEVEL		EVERY HOUR FLAKE MOISTURE		
													FACE	CORE	IN	FACE OUT	CORE OUT
4:20	278	40	1408	278	3191		268	41	1430	269	2857		80	75			
4:30	278	40	1401	277	3269	80	268	41	1418	269	2899	75	80	75			
4:40	278	40	1463	281	3348	75	268	41	1401	268	2941	70	80	75			
4:50	278	40	1425	277	3410	75	268	41	1410	266	2968	70	80	75			
5:00	278	40	1456	273	3486	85+	268	41	1362	262	2996	70	80	75			
5:10	278	40	1463	271	3568	90	268	40	1388	269	3022	75	80	75			
5:20	278	40	1541	287	3654	90	268	41	1369	270	3049	80	80	75			
5:30	278	40	1490	272	3744	90	268	41	1457	270	3081	80	80	75			
5:40																	

10

SURFACE DRYER CHART
7-13-94
0700 - 1900



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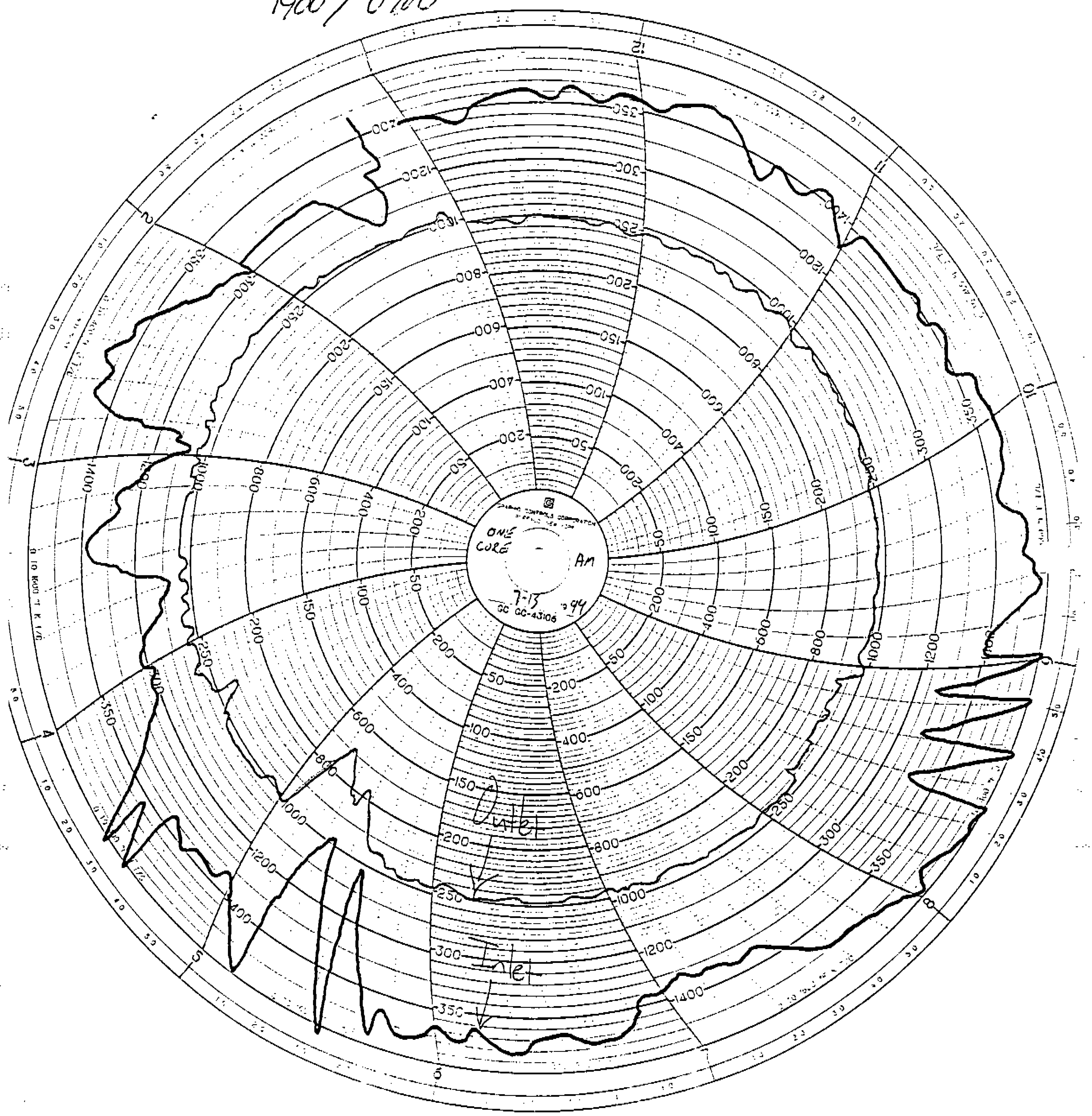
HAYWARD DRYERS
L I JULY 13-14-15

LINE L
CORE DRYER CHART
7-13-94
0700-1900

1900 / 0700



EFB READINGS

DATE JULY 13, 1994

BY

PLANT: HAYWARD LINE I

TIME	"A" SIDE				"B" SIDE				Core / Surface	
	BED VOLT	BED CURR.	ION VOLT	ION CURR.	BED VOLT	BED CURR.	ION VOLT	ION CURR.	EFB PRESS.	BAG H. PRESS.
11:20	9.5	.05	34.2	2.7	3	.05	25	1.9	5/2.8	4.2
11:30	11.5	.03	37.5	1.7	4.5	.04	25	2.2	5.1/2.2	4.4
11:40	10.5	.04	36.0	1.4	4.5	.04	25	2.1	5.0/2.4	4.2
11:50	10.4	.03	37.0	1.4	6.9	.05	23.9	1.9	5.0/2.5	4.2
12:00	10.4	.03	38.5	1.9	9.9	.06	25	2.2	4.9/2.4	4.3
12:10	10.5	.03	38	1.7	9.5	.075	25	2.0	4.7/2.8	4.2
12:20	11.2	.03	39	1.8	10.5	.06	25	1.9	4.9/2.7	4.2
12:30	12	.025	39	1.6	10	.07	25	1.9	4.79/2.7	4.3
12:40	12	.03	39	1.7	9.5	.08	25	1.8	4.8/2.8	4.7
12:50	12.5	.03	39	1.8	9.5	.08	25	1.8	4.95/2.7	[illegible]
1:00	11.4	03	39	1.7	10.25	.075	25	1.9	5.1/2.7	turned off
1:10	11	.025	38.5	1.6	10.25	.06	25	1.8	5.0/2.8	3.6
1:20	11.5	.025	39	1.8	9.5	.1	25	1.6	5.0/2.4	3.7
1:30	11	.025	39	1.6	9.5	.1	25	1.6	4.9/2.5	3.6
1:40	11	.025	39	1.6	9.5	.1	25	1.6	4.7/2.4	3.8
1:50	10.5	.04	38.5	1.5	9	.1	25.5	1.4	4.6/2.6	3.6
2:00	11	.03	39	1.7	10.5	.1	26	1.6	4.5/2.5	Turned off
2:10	10	.02	39	1.6	11	.06	25	1.8	4.5/2.4	3.6
2:20	12	.01	Down	Down	10	.12	25.5	1.5	4.6/2.7	3.7
2:30	10	.03	39	1.7	10	.13	26	1.4	4.5/2.6	3.7
2:40	10.5	.02	33	1	10	.12	25.5	1.6	4.5/2.4	3.8
2:50	10.5	.02	33	.9	9	.14	26	1.4	4.6/2.5	3.8
3:00	10	.03	33	1	10	.12	23	1	4.5/2.6	3.8
3:10	10.5	.02	34	1	9	.14	25	1	4.7/2.7	3.7
3:20	10.5	.02	34	1	10	.1	23	1.1	4.4/2.8	3.8
3:30	10.5	.02	34	.8	10.5	.1	23	1	4.3/2.5	3.8
3:40	10.5	.02	34	.8	11	.09	23	1	4.2/2.6	3.9
3:50	10	.02	34	.8	10.5	.1	24	1	4.3/2.5	4.0
4:00	10	.02	35	1	10.5	.1	25	1	4.3/2.4	3.8
4:10	11	.02	37	1.1	10.5	.1	25	1.3	4.2/2.4	4.0

EFB READINGS

DATE 7/13

BY

PLANT: Hayward Line I

TIME	"A" SIDE				"B" SIDE					
	BED VOLT	BED CURR.	ION VOLT	ION CURR.	BED VOLT	BED CURR.	ION VOLT	ION CURR.	EFB PRESS.	BAG H. PRESS.
4:20	10.5	.02	37	1	10.5	.10	25	1.3	4.2 / 2.6	3.9
4:30	10.5	.02	39	1.5	10.5	.11	25	1.4	4.2 / 2.7	3.8
4:40	10.5	.02	39.5	1.6	10.5	.11	25.5	1.3	4.2 / 2.4	4.0
4:50	10.5	.02	40	1.6	10	.12	25	1.2	4.2 / 2.6	4.0
5:00	10.5	.02	39	1.6	10	.13	26	1.2	4.1 / 2.5	4.0
5:10	11	.02	39	1.6	10	.13	26	1.1	4.0 / 2.6	3.9
5:20	11	.01	39	1.8	10.5	.10	26	1.2	4.2 / 2.4	4.0
5:30	11	.02	40	1.6	9.0	.15	27	1.0	4.1 / 2.6	4.0
5:40										

14

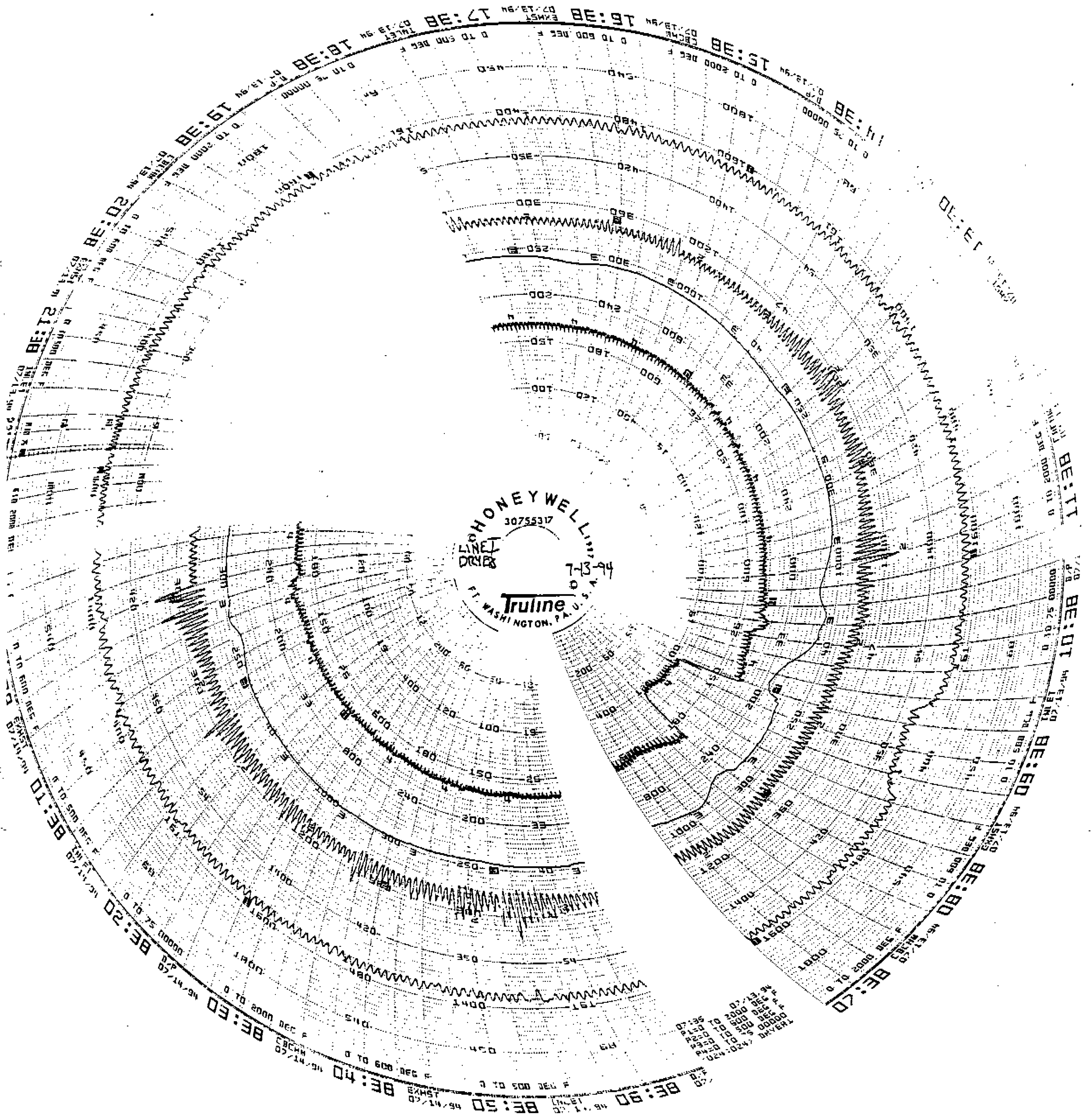
HAYWARD LINE I RTO
EVERY 15 MINUTES

JULY 13, 199

	#1	#2	#3	#4	#5	INLET PRESS.	BURNERS B #1	BURNERS B #2	INLET TEMP.	COMBUST. CHAMBER TEMP.	EXHAUST TEMP.	Δ ~~AMP.~~	GAS
11^{15}	469	470	461	476	469	3.8	1549	1552	237	1577	321	27.1	28410
11^{30}	461	477	476	470	496	6.1	1532	1527	236	1576	330	25.5	28412
11^{45}	462	468	485	464	499	3.6	1500	1543	229	1557	338	25.9	28414
12^{00}	444	473	492	450	510	4.3	1645	1551	234	1583	325	25.7	28416
12^{15}	409	486	532	415	515	5.8	1615	1538	239	1567	325	25.2	28418
12^{30}	427	479	514	424	530	4.8	1540	1561	241	1579	329	25.4	28420
12^{45}	439	480	507	434	524	5.5	1530	1637	243	1572	332	24.8	28421
1^{00}	453	476	502	445	512	4.8	1513	1541	243	1557	340	25.2	28423
1^{15}	432	484	530	431	557	6.1	1641	1538	242	1569	328	25.3	28424
1^{30}	438	482	521	432	539	5.9	1517	1540	241	1565	333	25.4	28426
1^{45}	456	471	513	439	520	4.5	1528	1554	239	1568	348	25.2	28428
2^{00}	426	454	540	423	569	5.6	1541	1535	239	1585	325	24.4	28430
2^{15}	427	478	535	418	554	3.7	1515	1554	238	1568	344	24.9	28432
2^{30}	435	482	514	425	530	4.4	1557	1532	234	1588	327	25.1	28434
2^{45}	431	478	518	422	536	4.2	1547	1533	235	1590	327	24.3	28435
3^{00}	441	475	504	429	511	4.2	1549	1556	235	1584	331	25.2	28437
3^{15}	449	471	498	435	501	4.7	1536	1562	236	1577	332	25.1	28439
3^{30}	454	467	496	439	499	4.5	1520	1551	237	1564	335	25.5	28440
3^{45}	452	470	497	441	505	4.2	1514	1541	237	1561	335	25.2	28442
4^{00}	461	468	490	446	494	3.6	1522	1552	238	1564	336	25.7	28443
4^{15}	462	472	485	450	491	4.1	1550	1552	238	1583	330	25.0	28445
4^{30}	471	470	511	437	525	4.7	1536	1562	239	1572	342	24.9	28447
4^{45}	451	470	503	436	510	4.8	1533	1564	239	1574	339	25.4	28448
5^{00}	455	471	493	443	498	3.9	1554	1552	239	1570	328	24.7	28450
5^{15}	446	471	509	436	523	3.7	1511	1541	237	1560	336	25.5	28452
5^{30}	453	470	499	439	505	4.9	1534	1564	234	1575	337	25.4	28453

15

LINE I
DRYER RTO CHART
7-13-94



HAYWARD OSB
LINE I
JULY 13, 1994

FLAKE MOISTURE

	WET	DRY
10:00 AM	C 47.9 S 44.2	C 5.8 S 7.3
11:00 AM	C 44.9 S 47.5	C 6.1 S 9.0
12:00 PM	C 44.3 S 45.6	C 4.4 S 7.1
1:00 PM	C 48.7 S 47.0	C 5.0 S 4.1
2:00 PM	C 50.4 S 50.6	C 6.0 S 3.1
3:00 PM	C 48.2 S 50.4	C 6.2 S 4.6
4:00 PM	C 45.6 S 47.9	C 6.4 S 5.1
5:00 PM	C 50.2 S 47.2	C 7.6 S 6.5

```
196LB
194LB
197LB
196LB
197LB
199LB
199LB
199LB
201LB
197LB
200LB
198LB
196LB
201LB
196LB
196LB
195LB
200LB
200LB
195LB
200LB
195LB
```

2237 lb After Saw's

Line I

Pulled At
4:30 PM
7/14/94

```
              P
 196·00  +
 197·00  +
 199·00  +
 199·00  +
 199·00  +
 201·00  +
 197·00  +
 200·00  +
 198·00  +
 196·00  +
 201·00  +
 196·00  +
2,379·00  *
•••••••••••
```

Before Saws 2,379.00

Weight After
Saws - 2,237 lb

6.3%

142 lb
trim

18

LINE 1 DRYER TESTING JULY 14, 1994 PM, CO, NOx

DATA TIME:	START=	16:20	END=	17:30	HOURS=	1.17
	START=	18:30	END=	18:40	HOURS=	0.17
	START=	22:30	END=	02:00	HOURS=	3.50
						4.83

BOARD WEIGHTS - LBS

weights of approximately every 25th untrimmed board (from press tapes)

7/16

193	195	190	198
191	198	186	197
193	193	196	195
194	191	198	195
197	188	194	195
191	191	203	198
188	184	198	193
191	184	199	191
193	185	198	197
192	188	196	195

193.3 lb=average untrimmed mat weight

181.1 lb=average finished board weight (untrimmed mat weight-weight of trim)

6.3% =trim %

PLANT PRODUCTION RATE

4.83 =hours during testing
87 =pressloads
1044 =no. of 8'x16' boards produced (pressloads x 12 boards per load)
189,089 =lbs of finished product (boards produced x weight of finished board)
39122 =lbs of finished product per hour (lbs of finshed product / hours)
19.56 =tons of finished product per hour (lbs of finshed product per hour / 2000 lb)

FUEL BURNING RATE ESTIMATED BY DRY FUEL INPUT

SURFACE

10 =SURFACE fuel calibration in pounds per count
1632 =SURFACE counts during testing hours
16320 =SURFACE lbs of fuel burned during testing
4.83 =hours during testing
3377 =lbs of dry fuel burned per hour during testing (pounds of dry fuel / testing hours)
1.69 =tons of dry fuel burned per hour during testing (pounds of dry fuel / 2000 lbs)
8600 =estimated BTU content per pound of dry fuel,
29.0 =estimated mmbtu input per hour (lbs of dry fuel per hour x btu content)
1311 =average inlet temperature
46.4% =average incoming moisture percent
4.3% =average dry moisture percent

CORE

10 =CORE fuel calibration in pounds per count
1421 =CORE counts during testing hours
14210 =CORE lbs of fuel burned during testing
4.83 =hours during testing
2940 =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)
8600 =estimated BTU content per pound of dry fuel,
25.3 =estimated mmbtu input per hour (lbs of dry fuel per hour x btu content)
1375 =average inlet temperature
46.4% =average incoming moisture percent
6.2% =average dry moisture percent

DRYER THROUGHPUT RATE

6,317 =Total pounds of fuel burned per hour in Core and Surface Dryer
39,122 =lbs of finished product per hour (lbs of finshed product / hours)
45,438 =Pounds of material produced by the dryer per hour (dry basis, assumming fuel balances)
2,630 = weight of trim per hour at 6.3% of finished product
3,686 =weight of screened fines per hour (total fuel - trim)
8.11% =resulting loss to fines as percentage of dryer throughput

19

LINE 1 DRYER TESTING JULY 14, 1994 PM, CO, NOx

DATA TIME:	START=	16:20	END=	17:30	HOURS=	1.17
	START=	18:30	END=	18:40	HOURS=	0.17
	START=	22:30	END=	02:00	HOURS=	3.50
						4.83

BOARD WEIGHTS - LBS

weights of approximately every 25th untrimmed board (from press tapes)
7/16

193	195	190	198
191	198	186	197
193	193	196	195
194	191	198	195
197	188	194	195
191	191	203	198
188	184	198	193
191	184	199	191
193	185	198	197
192	188	196	195

193.3 lb=average untrimmed mat weight

181.1 lb=average finished board weight (untrimmed mat weight-weight of trim)

6.3% =trim %

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SURFACE

10 =SURFACE fuel calibration in pounds per count
1632 =SURFACE counts during testing hours
16320 =SURFACE lbs of fuel burned during testing
4.83 =hours during testing
3377 =lbs of dry fuel burned per hour during testing (pounds of dry fuel / testing hours)
1.69 =tons of dry fuel burned per hour during testing (pounds of dry fuel / 2000 lbs)
8600 =estimated BTU content per pound of dry fuel,
29.0 =estimated mmbtu input per hour (lbs of dry fuel per hour x btu content)
1311 =average inlet temperature
46.4% =average incoming moisture percent
4.3% =average dry moisture percent

CORE

10 =CORE fuel calibration in pounds per count
1421 =CORE counts during testing hours
14210 =CORE lbs of fuel burned during testing
4.83 =hours during testing
2940 =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)
8600 =estimated BTU content per pound of dry fuel,
25.3 =estimated mmbtu input per hour (lbs of dry fuel per hour x btu content)
1375 =average inlet temperature
46.4% =average incoming moisture percent
6.2% =average dry moisture percent

DRYER THROUGHPUT RATE

6,317 =Total pounds of fuel burned per hour in Core and Surface Dryer
39,122 =lbs of finished product per hour (lbs of finshed product / hours)
45,438 =Pounds of material produced by the dryer per hour (dry basis, assumming fuel balances)
2,630 = weight of trim per hour at 6.3% of finished product
3,686 =weight of screened fines per hour (total fuel - trim)
8.11% =resulting loss to fines as percentage of dryer throughput

LOUISIANA-PACIFIC CORPORATION
HAYWARD, WI

PRESS REPORT - LINE I

OPERATOR Fitch SHIFT Days CREW A DATE 2-14-9

THICKNESS: 1/2

PRESS LOADS 21⅝ 97 7/16

OVERALL TIMER: 245

DECOMPRESSION TIME 26

PRESS TEMP: 210°c

TOTAL REJECTS: —

LOG COUNT: 4286

F.C.O.S. HYD RADIATOR 145PM

Cleaned Blender Screens & Tracks 200PM

Cleaned Deckle Chains 230PM

Press Blow Down 100PM

Headbox Cleaned YES [✓ NO]

How Many —

Former Hyd Radiator 225PM Time

LINE SPEED	FROM	TO
40	7:00	110
46	110	300
55	300	512
60	512	525
65	525	~~625~~
60	625	700

DOWNTIME		DOWNTIME (Mins)			KEY	REASONS FOR DOWNTIME
FROM	TO	M	E	O		
724	1012	2h 48min				DEBHOUSE DOWN (SCHEDULED)
1032	1052	30				↑ SAME (SCHEDULED)
1056	1106	12	-			JAM IN SAWS
1108	1109		1			TIMING + LIMITS SAWS
1135	1235	60				BAGHOUSE DOWN AGAIN (SCHE
554	555		1			NO AUTO ADVANCE #6 CONV
645						

Downtime Code: M - Mechanical E - Electrical O - Operator

20

LOUISIANA-PACIFIC CORPORATION
HAYWARD, WI

PRESS REPORT - LINE 1

OPERATOR Meyers SHIFT Nights CREW C DATE 7-14-94

THICKNESS: 7/16

PRESS LOADS 212 7/16

OVERALL TIMER: 150

DECOMPRESSION TIME 15

PRESS TEMP: 210°C.

TOTAL REJECTS: —

LOG COUNT: 7,267

LINE SPEED	FROM	TO
60	7:00	7:52
64	7:52	7:00

F.C.O.S. END RADIATOR 4:30 TI

Cleaned Blender Shrouds & Tracks yes

Cleaned Deckle Chains yes

Press Blown Down yes

Headbox Cleaned YES/[✓ NO]

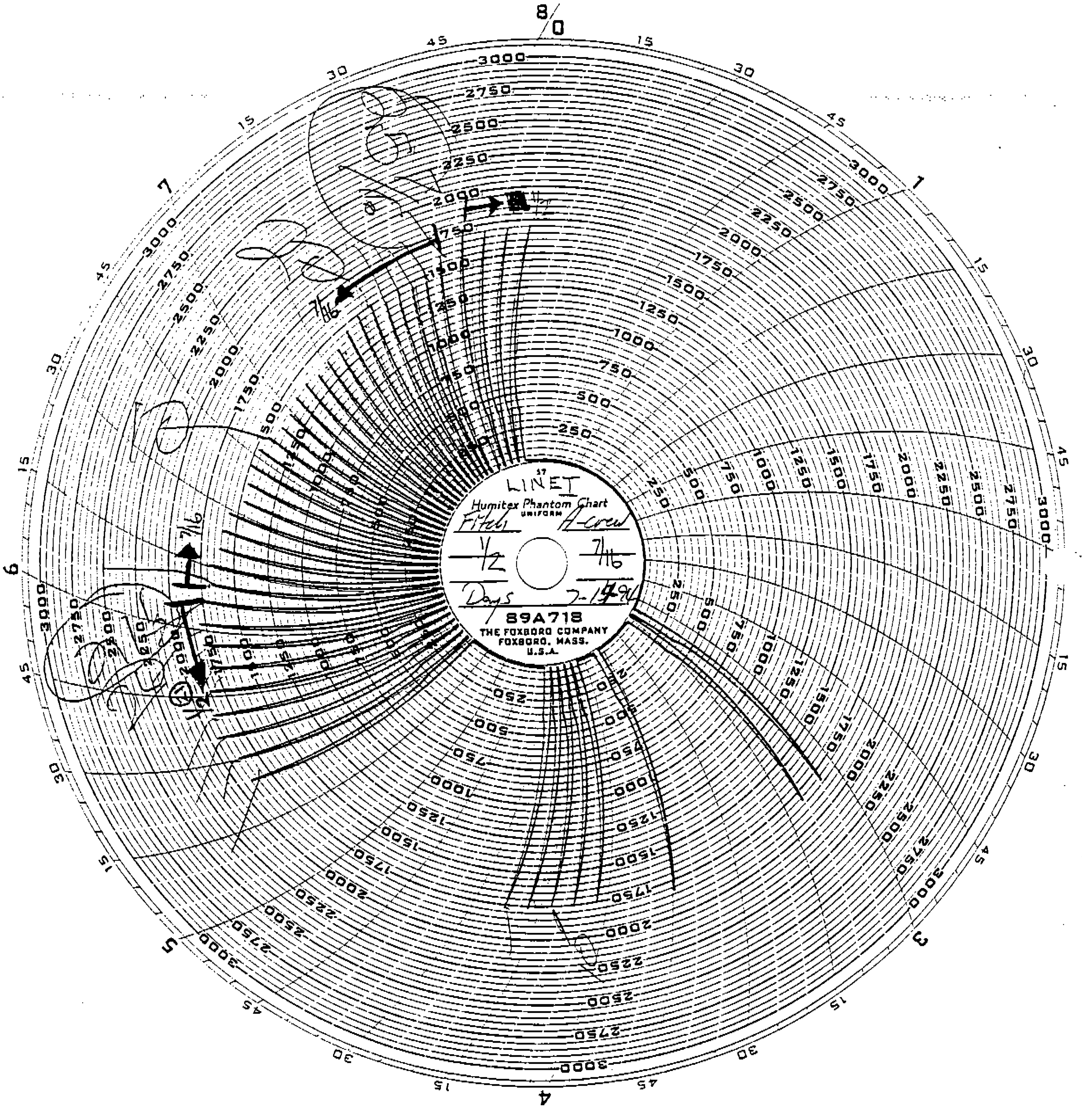
How Many —

Former End Radiator 2:30 Time

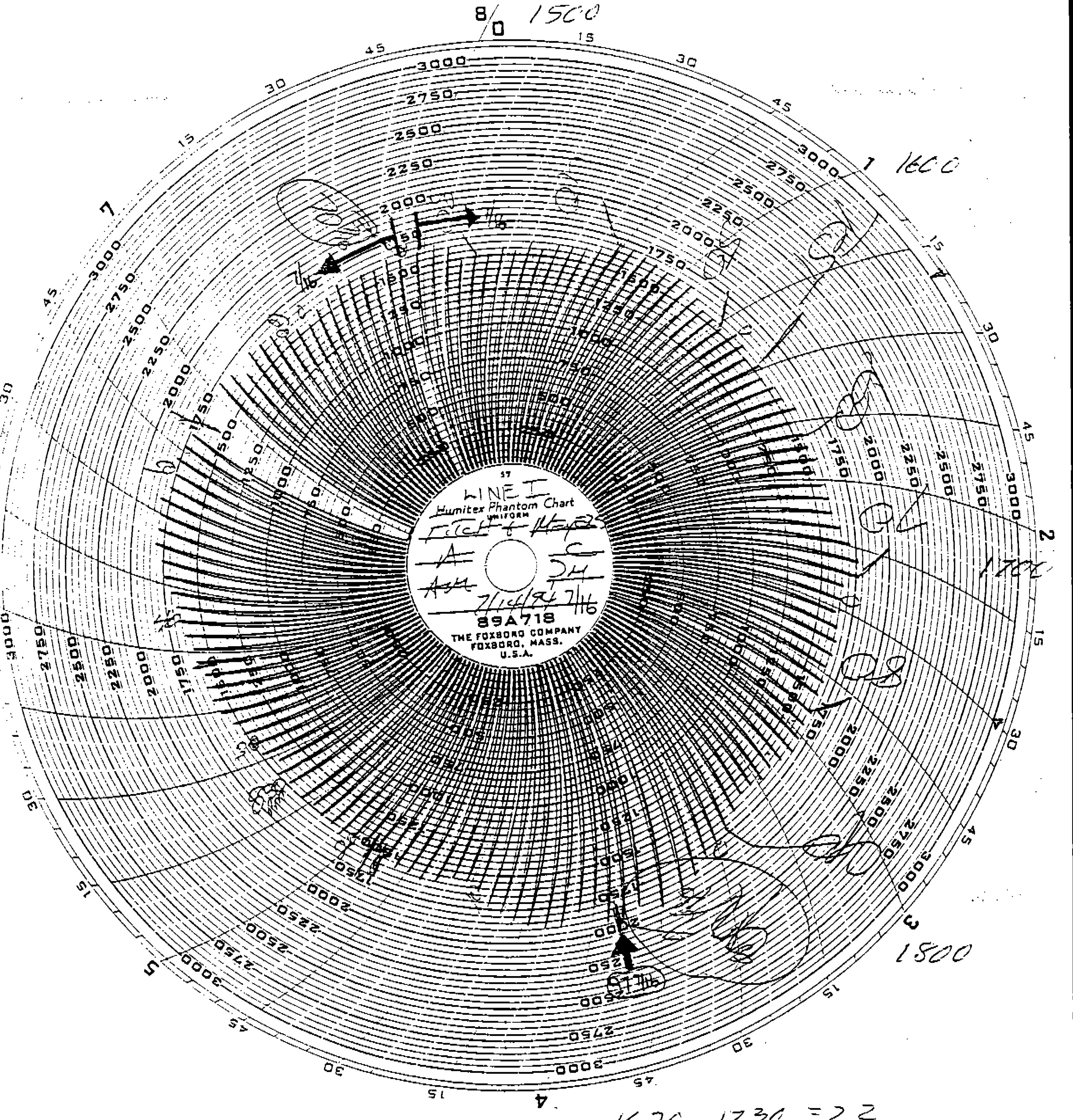
DOWNTIME FROM	DOWNTIME TO	DOWNTIME (Mins) M	DOWNTIME (Mins) E	DOWNTIME (Mins) O	KEY	REASONS FOR DOWNTIME
824	826	2				Checking vibration at gearbox & Motor
						for Second Saw Feedworks.
9:56	1005	9	-			Changed bad Coupler at 2nd Feed-
						works at saws. Also changed bad
						brake pad at #5 conv. brake.
1139	1145		6			Lost Tach. Feedback, reset
						drive for Loader Boom.
11:59	12:01	2				Screen balled up at #5 conv.
12:38	12:42	4				" " " "
						Replaced screen.
2:50	2:54	4				Bd. Stacker jam up.

Downtime Code: M - Mechanical E - Electrical O - Operator

LINE I
PRESS CHART
7-14-94
0700 - 1500



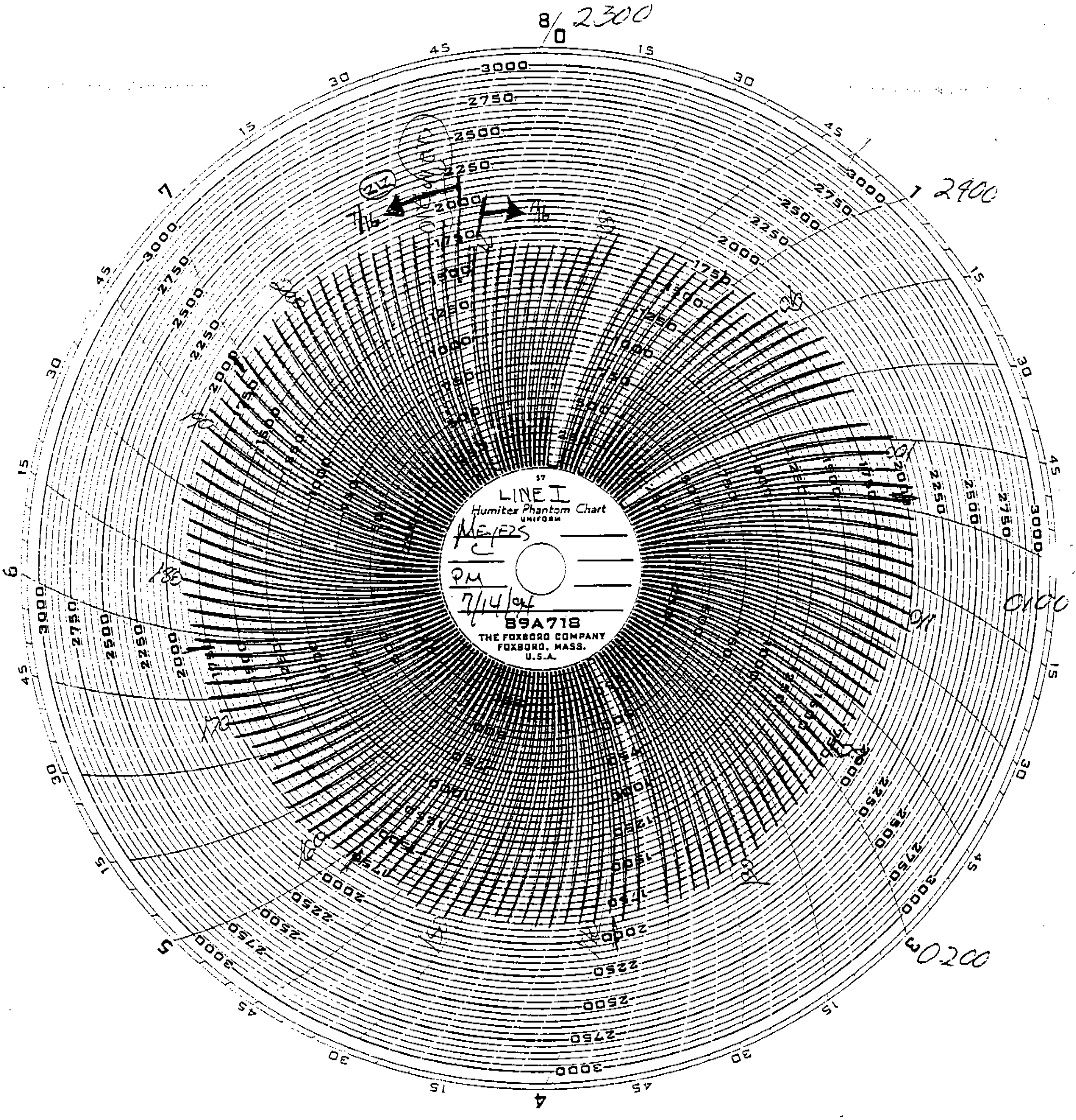
LINE L
PRESS CHART
7-14-94
1500 - 2300



1620 - 1730 = 22
1830 - 1840 = 4
2230 - 2300 = 9

23

LINE I
PRESS CHART
7-14-94
2300 - 0700



2300-0200 = 52

24

Hayward Dryer Testing LINE I

FUEL CALIBRATION: face=____ lb/count core=____ lb/count

DATE JULY 14, 1997
BY
PAGE 2 OF 3

TIME	FACE OUT. SET POINT	FACE FEED RATE	FACE INLET TEMP	FACE OUTLET TEMP	FACE FUEL COUNT	FACE WET BIN LEVEL	CORE OUT. SET POINT	CORE FEED RATE	CORE INLET TEMP	CORE OUTLET TEMP	CORE FUEL COUNT	CORE WET BIN LEVEL	DRY BIN LEVEL FACE	DRY BIN LEVEL CORE	EVERY HOUR FLAKE MOISTURE IN	EVERY HOUR FLAKE MOISTURE FACE OUT	EVERY HOUR FLAKE MOISTURE CORE OUT
8:15	285	33	1020	277	108	85	286	42	1348	279	438	85	65	90			
8:25	285	35	1171	285	167	85	280	42	1280	279	499	85	65	90			
8:35	288	35	1149	285	225	90	280	42	1214	278	538	90	65	85			
8:45	288	37	1161	287	288	90	280	42	1234	278	593	90	65	85			
8:55	288	37	1212	284	378	90	281	42	1341	284	670	90	65	85			
9:05	288	37	1167	287	426	85	281	42	1366	281	718	90	65	85			
9:15	290	37	1164	291	487	85	281	42	1363	283	776	90	65	85			
9:25	290	37	1127	288	559	85	281	42	1422	281	852	90	65	85			
9:35	290	36	1136	289	613	85	281	42	1471	278	910	85	65	80			
9:45	290	37	1151	288	675	85	281	42	1496	282	977	85	65	80			
9:55	290	37	1177	289	756	80	281	42	1452	278	1061	85	65	85			
10:05	290	35	1161	289	804	80	281	42	1512	283	1121	85	70	85			
10:15	290	35	1184	289	874	80	281	42	1507	279	1192	85	75	85			
10:25	290	36	1202	290	953	80	281	42	1537	279	1277	80	75	85			
10:35	290	36	1223	290	1011	75	281	42	1545	283	1337	70	75	80			
10:45	290	36	1253	291	1075	70	281	42	1466	283	1397	70	80	80			
10:55	290	36	1254	289	1152	70	281	43	1483	285	1471	70	80	80			
11:05	290	36	1239	290	1204	65	281	42	1443	278	1524	65	80	80			
11:15	288	36	1236	287	1273	65	281	42	1459	280	1593	65	80	80			
11:25	288	35	1276	287	1363	65	281	42	1412	273	1672	65	85	85			
11:35	288	35	1270	286	1410	65	281	42	1472	283	1720	65	85	85			
11:45	288	35	1485	290	1486	60	281	42	1475	282	1792	65	90	90			
11:55	288	36	1315	291	1567	60	281	42	1458	285	1868	65	90	90			
12:05	288	35	1274	288	1616	60	281	43	1421	276	1914	60	↑	90↑		so full it	
12:15	288	35	1266	288	1703	60	281	42	1322	275	1991	60	90	90	↑ =	covered the	
12:25	288	35	1249	297	1773	60	281	42	1450	286	2065	60	90	90		window	
12:35	288	36	1254	298	1827	70	281	42	1437	277	2114	60	↑90	↑90			
12:45	288	33	1267	288	1904	70	281	39	1367	277	2182	60	90	90			
12:55	288	33	1220	287	1976	70	281	40	1329	279	2248	60	90	90			
1:05	288	33	1216	287	2029	75	281	40	1297	279	2296	60	↑90	↑90			

J-26

Hayward Dryer Testing Line I

FUEL CALIBRATION: face=____ lb./count core=____ lb./count

DATE July 14, 1994
BY
PAGE 1 OF 3

TIME	FACE OUT. SET POINT	FACE FEED RATE	FACE INLET TEMP	FACE OUTLET TEMP	FACE FUEL COUNT	FACE WET BIN LEVEL	CORE OUT. SET POINT	CORE FEED RATE	CORE INLET TEMP	CORE OUTLET TEMP	CORE FUEL COUNT	CORE WET BIN LEVEL	DRY BIN LEVEL FACE	DRY BIN LEVEL CORE	EVERY HOUR FLAKE MOISTURE IN	FACE OUT	CORE OUT
3:15	287	41	1342	284	649	85	280	41	1554	281	477	90	65	90			
3:25	287	41	1405	288	693	85	280	41	1425	283	519	90	65	90			
3:35	283	44	1407	283	779	80	280	40	1545	279	599	85	65	90			
3:45	277	38	1400	266	853	80	280	36	1482	274	681	85	65	90			
3:55	277	37	1308	276	917	80	280	36	1444	288	746	80	65	90			
4:05	277	37	1310	278	985	80	280	36	1363	273	805	80	70	85			
4:15	277	42	1405	281	1064	75	280	40	1357	274	871	80	70	85			
4:25	277	42	1409	278	1153	80	280	40	1432	282	946	85	70	85			
4:35	277	42	1391	277	1231	80	280	40	1422	280	1013	85	75	80			
4:45	277	42	1320	274	1310	75	280	40	1461	274	1078	85	75	80			
4:55	277	42	1371	278	1386	75	280	40	1311	276	1137	85	80	80			
5:05	277	42	1400	277	1465	75	280	40	1394	283	1204	85	85	80			
5:15	277	42	1413	275	1545	75	280	39	1366	278	1265	80	90↑	80	↑ = window covered		
5:25	277	42	1357	276	1632	75	280	40	1388	280	1335	80	90	80			
5:35	277	44	1482	277	1709	70	280	43	1399	275	1392	80	90↑	80			
5:45	277	44	1423	278	1799	65	280	42	1454	283	1470	75	90	80			
5:55	277	42	1362	277	1873	65	280	42	1463	275	1537	75	90↑	80			
6:05	277	42	1360	276	1946	65	280	[illegible]	[illegible]	[illegible]	[illegible]	75	90	80			
6:15	285	36	1282	285	2032	65	280	36	1319	268	1669	75	90↑	80			
6:25	285	38	1316	285	2087	65	280	42	1335	274	1653	75	90	80			
6:35	285	40	1293	284	2156	65	280	42	1498	280	1723	75	90	80			
6:45	285	40	1433	286	2244	70	280	42	1445	276	1798	70	90↑	80			
6:55	285	40	1389	284	2327	70	280	42	1457	279	1877	70	90	80			
7:05	285	32	1232	285	2413	65	280	42	1444	279	1968	65	90	80			
7:15	285	33	1201	286	36	70	280	42	1446	275	44	65	90↑	85	* 20 min layoff on testing		
7:25		Down				70	280	42	1524	283	129	65	90	90			
7:35			Down			70	280	42	1427	277	179	60	90↑	90			
7:45			Down			95	280	42	1450	281	245	60	85	90			
7:55			Down			95	280	42	1462	281	318	60	70	90			
8:05			Down			95	280	42	1399	280	383	75	65	90			

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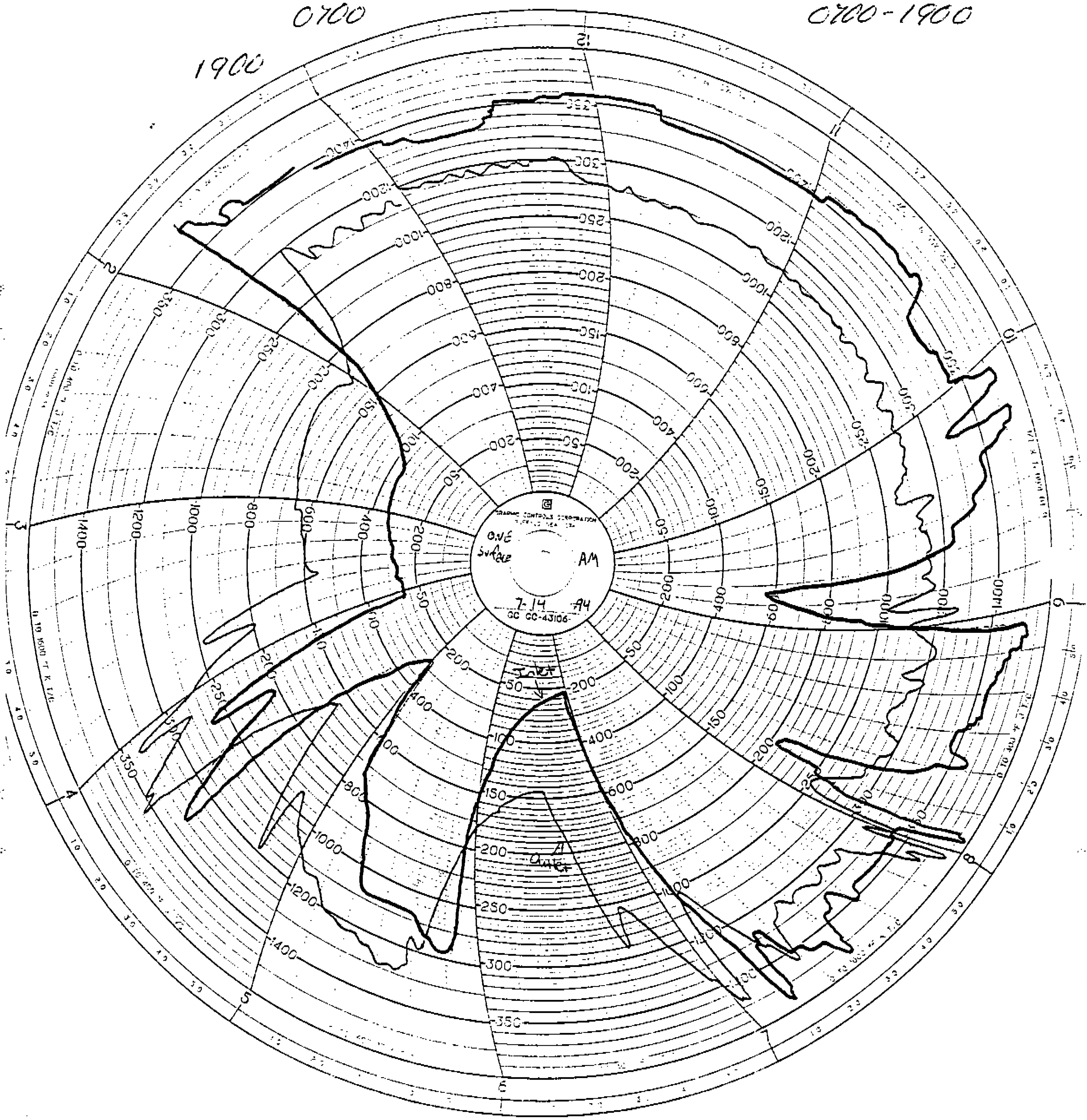
Hayward Dryer Testing Line I

DATE 7/14/94
BY
PAGE 3 OF 3

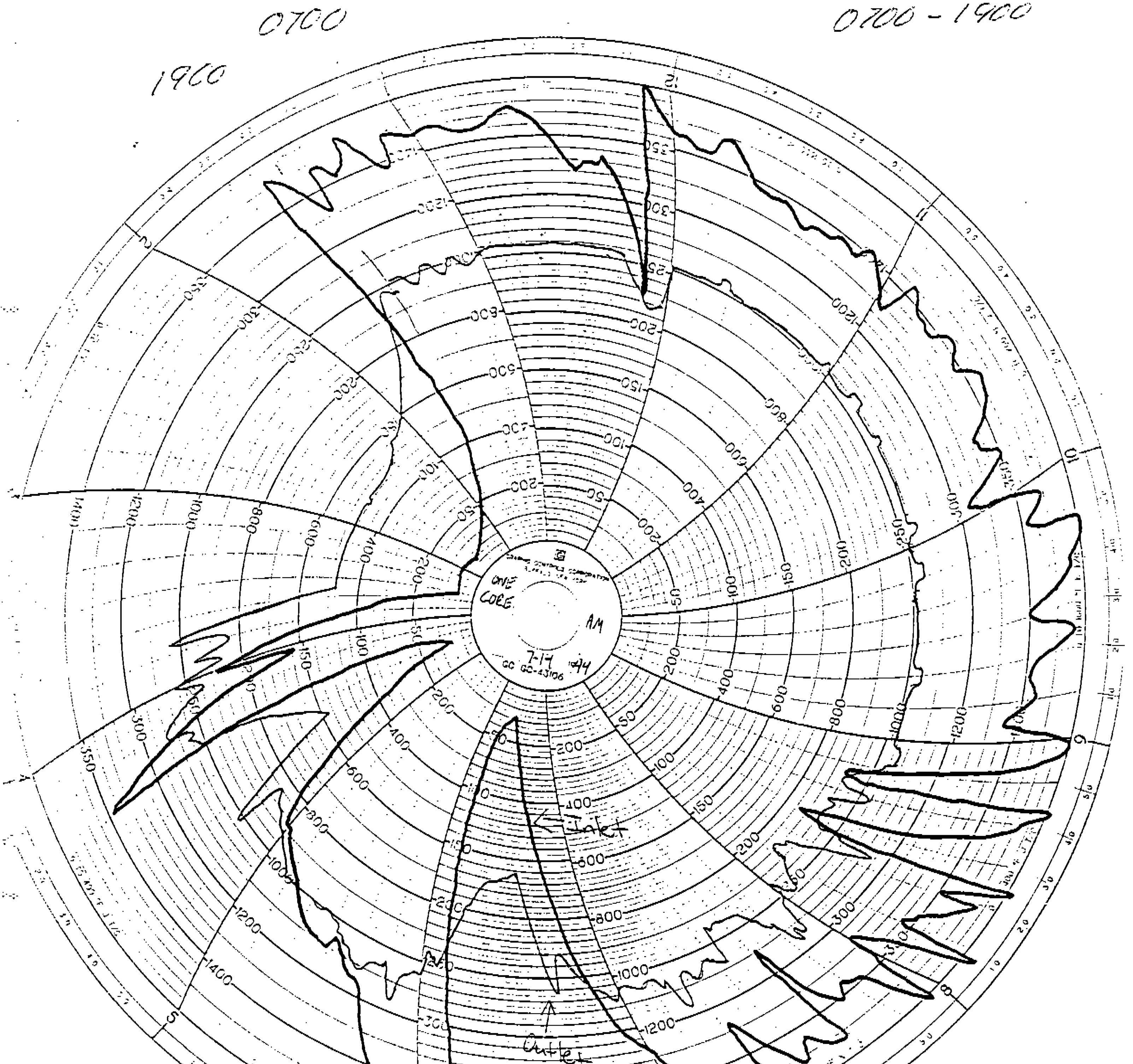
FUEL CALIBRATION: face=_____lb/count core=_____lb/count

TIME	FACE OUT. SET POINT	FACE FEED RATE	FACE INLET TEMP	FACE OUTLET TEMP	FACE FUEL COUNT	FACE WET BIN LEVEL	CORE OUT. SET POINT	CORE FEED RATE	CORE INLET TEMP	CORE OUTLET TEMP	CORE FUEL COUNT	CORE WET BIN LEVEL	DRY BIN LEVEL FACE	DRY BIN LEVEL CORE	EVERY HOUR FLAKE MOISTURE IN	EVERY HOUR FLAKE MOISTURE FACE OUT	EVERY HOUR FLAKE MOISTURE CORE OUT
1:15	288	33	1230	289	2095	70	281	39	1306	283	2354	60	90	90			
1:25	288	34	1264	290	2161	70	281	40	1251	281	2409	65	90	90		So full	
1:35	288	33	1225	288	2227	70	281	39	1165	277	2463	65	90	90	↑	= Covers	
1:45	288	33	1211	287	2291	75	281	39	1231	278	2520	70	90	90		Window	
1:55	288	34	1207	289	2351	75	281	39	1307	283	2572	70	90	90			

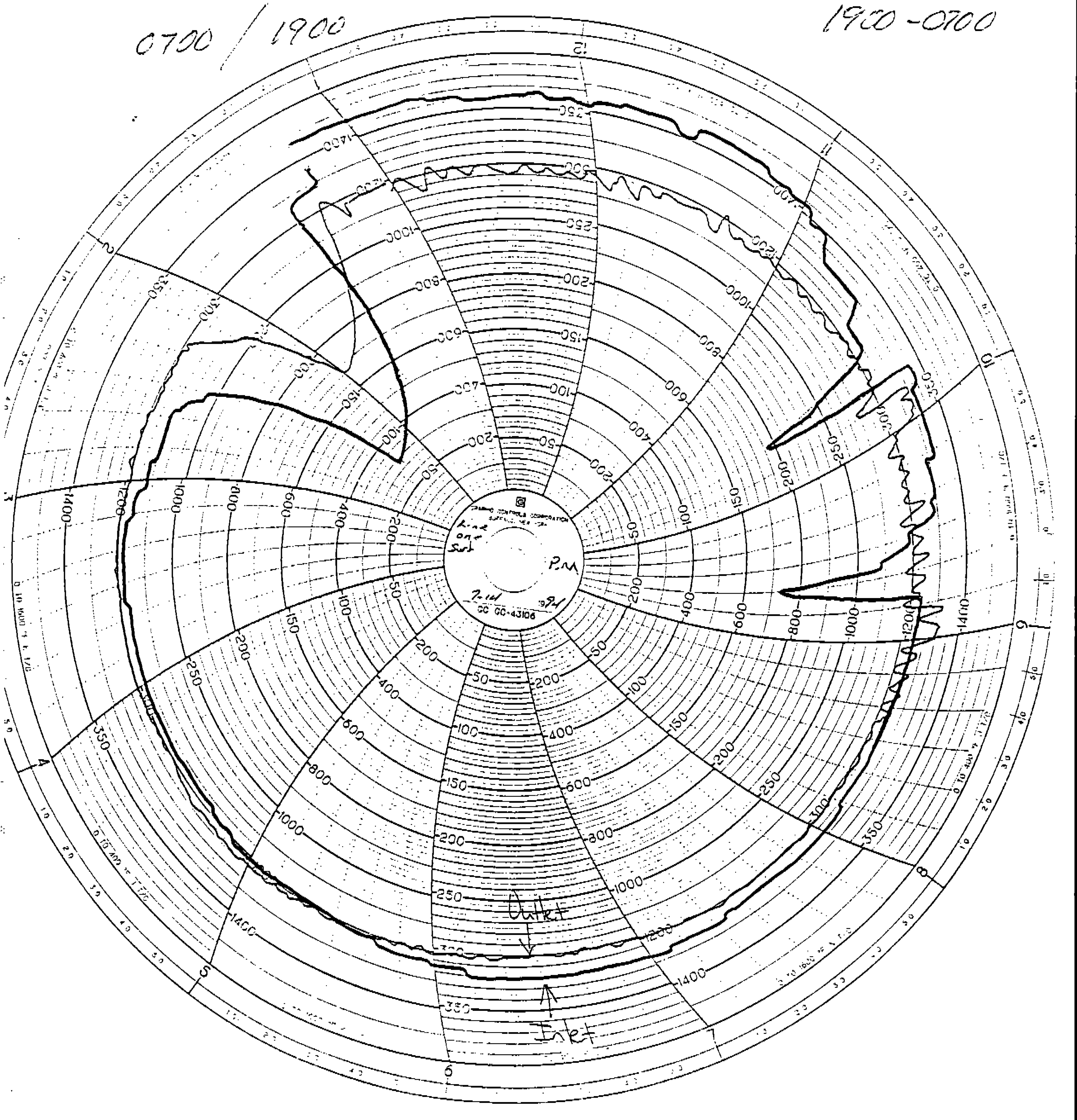
LINE I
SURFACE DRYER
CHART
7-14-94
0700-1900



LINE I
CORE DRYER
CHART
7-14-94
0700 - 1900



LINE I
SURFACE DRYER
CHART
7-14-94
1900-0700



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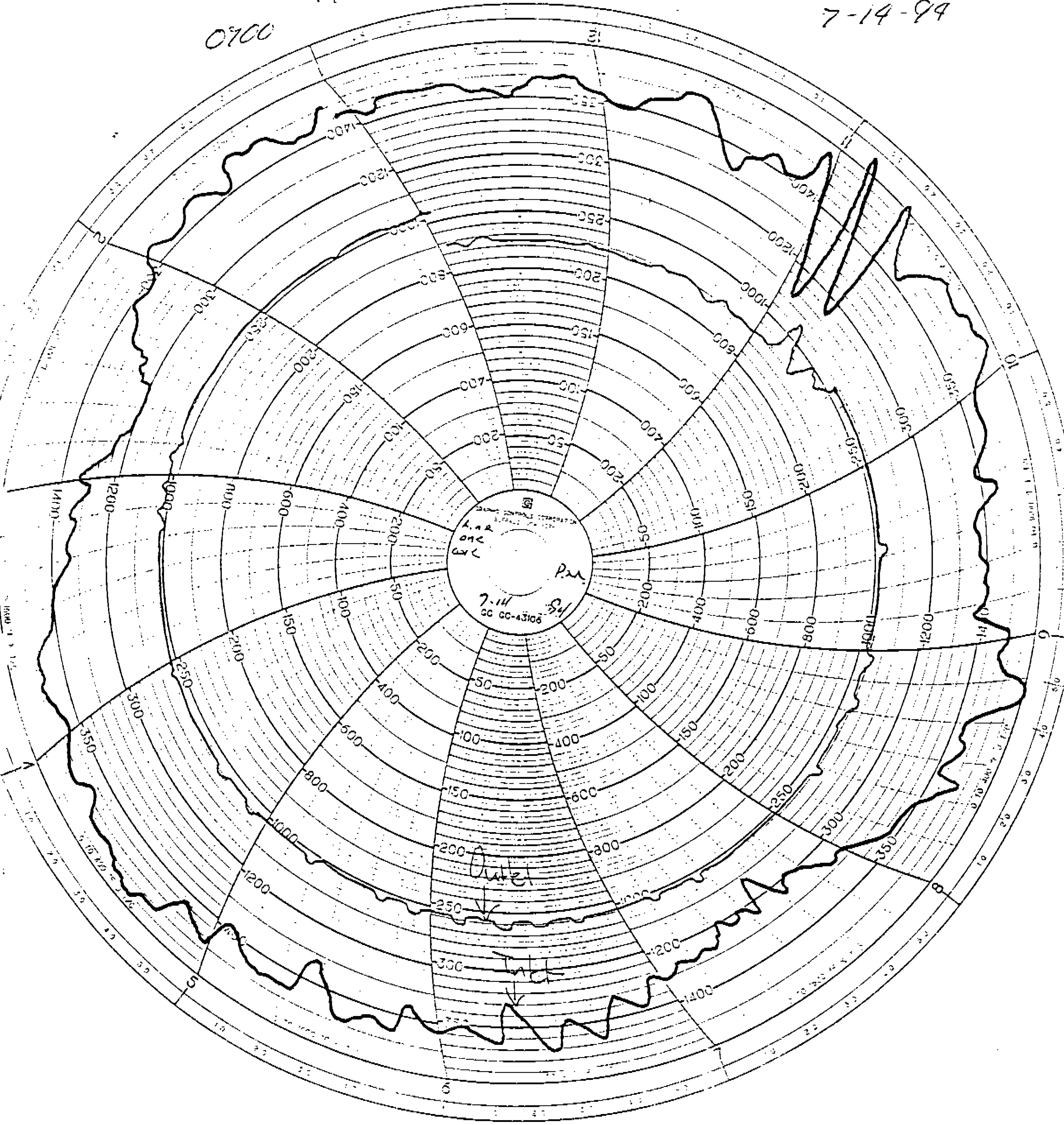
LINE 1
CORE DRYER
CHART
1900 - 0700
7-14-94

1900

0700



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EFB READINGS

DATE JULY 14, 1994

BY

PLANT: HAYWARD LINE I

1 OF 3

TIME	"A" SIDE				"B" SIDE				C/S	
	BED VOLT	BED CURR.	ION VOLT	ION CURR.	BED VOLT	BED CURR.	ION VOLT	ION CURR.	EFB PRESS.	BAG H. PRESS.
3:15	12	.04	25	1.6	11.5	.16	24.5	1.4	4.2/3.0	4.0
3:25	12.5	.03	25	1.6	11.5	.16	24	1.4	4.3/2.6	4.0
3:35	12.5	.04	27	1.6	12.5	.07	25	2.2	4.2/2.4	4.0
3:45	12.5	.03	27	1.7	11.5	.11	25	1.8	4.3/2.1	4.0
3:55	13	.02	27.5	2.2	11.5	.10	25	1.8	4.2/2.2	4.0
4:05	12.75	.03	27.5	1.8	12	.10	25	1.9	4.1/2.1	3.9
4:15	12.5	.03	27.5	1.7	11	.13	26	1.8	4.0/2.0	4.0
4:25	12.5	.02	27	1.6	11	.15	26	1.8	4.0/2.1	4.0
4:35	13	.02	28	1.6	11.5	.12	26	1.9	4.2/2.4	4.0
4:45	12.75	.03	28	1.6	11.5	.12	26.5	1.8	4.3/2.2	4.0
4:55	12	.02	26.5	1.4	10	.11	26	1.7	4.4/2.2	3.9
5:05	12.5	.02	28	1.4	11	.14	26.5	1.7	4.4/2.0	4.0
5:15	12	.03	28	1.6	11.5	.14	27	1.7	4.3/2.0	4.0
5:25	12.5	.02	28	1.4	11	.14	26	1.6	4.2/2.2	4.0
5:35	12.5	.03	30	1.8	10.5	.16	26.5	1.4	4.4/2.0	4.1
5:45	12.5	.03	31	1.5	11	.13	26	1.5	4.4/2.2	4.1
5:55	13.5	.01	28	2.4	11	.13	26	1.6	4.2/2.0	4.0
6:05	12.5	.01	27.5	2.2	11	.13	26	1.5	4.1/2.1	4.1
6:15	12.0	.01	27	2.4	11	.12	26	1.5	4.1/2.0	4.0
6:25	12.5	.03	31	1.7	11.5	.12	26	1.6	4.3/2.0	4.1
6:35	12.5	.03	30.5	1.6	11	.14	27	1.5	4.2/2.0	4.1
6:45	12.5	.03	31	1.7	11.5	.14	27	1.6	4.3/2.6	4.0
6:55	12.5	.03	31	1.8	11	.16	27	1.5	4.3/2.1	4.0
7:05	12.5	.03	30	1.7	12	.10	26	1.8	4.2/2.2	4.0
7:15	12.5	.03	31	1.8	—	RESET	—		4.2/2.2	4.2
7:25	11.5	.03	31	1.7	-	Down -			4.2/1.8	4.1
7:35	12.5	.03	31	1.6		Down			4.2/2.2	4.1
7:45	12.5	.02	31	1.6		Down			4.1/2.3	4.1
7:55	12.5	.02	31	1.4		Down			4.1/2.5	4.0
8:05	12.5	.02	31	1.6		Down			3.9/3.2	4.1

EFB READINGS

DATE JULY 14, 1994

BY

PLANT: HAYWARD LINE I

2 OF 3

	"A" SIDE				"B" SIDE				0/3	
TIME	BED VOLT	BED CURR.	ION VOLT	ION CURR.	BED VOLT	BED CURR.	ION VOLT	ION CURR.	EFB PRESS.	BAG H. PRESS.
8:15	13	.02	31	1.6	9.5	.26	21.5	1.4	3.8/2.6	4.1
8:25	13	.02	31	1.6	10.5	.36	24	1.6	4.1/2.2	4.0
8:35	13	.02	31	1.4	12.5	.18	24	1.6	4.1/2.5	3.9
8:45	13	.02	32	1.4	12.5	.14	24	1.4	4.3/2.4	4.1
8:55	13	.02	32	1.6	12.5	.14	24	1.4	4.2/2.0	4.1
9:05	13	.02	32	1.6	13.5	.10	24	1.4	4.2/2.1	4.0
9:15	13	.02	32	1.6	13	.12	24	1.3	4.1/2.0	4.0
9:25	13	.02	32	1.3	13.5	.11	24	1.4	4.1/2.3	4.0
9:35	12.5	.03	32.5	1.4	12	.10	25	1.3	4.0/2.2	4.0
9:45	12.5	.02	32	1.5	12	.11	25	1.7	4.0/2.0	4.0
9:55	13	.02	33	1.5	12	.10	25	1.4	4.0/2.1	4.1
10:05	12.5	.02	32.5	1.2	12	.10	25	1.3	4.0/1.8	4.0
10:15	12.5	.03	33	1.2	12.5	.09	25	1.3	4.0/1.9	4.1
10:25	13	.03	33	1.4	12.5	.11	25	1.2	3.9/2.2	4.1
10:35	13	.02	34	1.2	12.5	.11	25	1.4	4.0/2.2	4.0
10:45	13	.02	33	1.4	12.5	.10	25	1.4	4.0/2.3	4.1
10:55	13	.02	33	1.4	12.5	.11	25	1.3	4.1/2.2	4.1
11:05	13	.02	33	1.4	12.5	.11	25	1.3	4.1/2.2	4.1
11:15	13	.02	33.5	1.4	12	.12	25	1.2	3.9/2.4	4.2
11:25	13	.02	33	1.4	12.5	.12	25	1.2	4.0/2.2	4.1
11:35	13	.02	33	1.4	12.5	.10	25	1.3	4.0/2.2	4.0
11:45	13	.02	33	1.4	12	.10	25	1.2	4.0/2.2	4.0
11:55	13	.02	33.5	1.2	12.5	.11	25	1.2	4.0/2.1	4.2
12:05	13	.02	34	1.4	12.5	.10	25	1.2	3.9/2.4	4.2
12:15	13	.02	33	1.4	12.5	.10	25	1.3	4.0/2.5	4.2
12:25	13	.01	33	1.4	12	.10	25	1.2	4.2/2.2	4.1
12:35	13	.02	33	1.2	12	.10	25	1.2	4.2/2.2	4.1
12:45	13	.02	33	1.4	12.5	.09	25	1.2	4.3/2.2	4.1
12:55	13	.01	32	1.6	13	.09	25	1.2	4.1/2.2	4.1
1:05	13.5	.01	33	1.7	12.5	.10	25	1.2	4.1/2.2	4.2

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EFB READINGS

DATE JULY 14, 1994

BY

PLANT: HAYWARD LINE I

3 OF 3

TIME	"A" SIDE				"B" SIDE					
	BED VOLT	BED CURR.	ION VOLT	ION CURR.	BED VOLT	BED CURR.	ION VOLT	ION CURR.	EFB PRESS.	BAG H. PRESS.
1:15	13.5	.01	32	1.6	12.5	.09	25	1.3	4.2 / 2.2	4.2
1:25	13.5	.01	33	1.4	12.5	.09	25	1.5	4.1 / 2.2	4.1
1:35	13.5	.02	33	1.4	12.5	.09	25	1.6	4.2 / 2.1	4.1
1:45	13.5	.01	33	1.4	12.5	.09	25	1.5	4.2 / 2.0	4.1
1:55	13.5	.01	32	1.6	13	.08	25	1.5	4.2 / 2.1	4.1

HAYWARD LINE I RTO

JULY 14, 1994
1 OF 2

TIME EVERY 15 MINUTES

	#1	#2	#3	#4	#5	INLET PRESS.	BURNERS B #1	BURNERS B #2	INLET TEMP.	COMBUST. CHAMBER TEMP.	EXHAUST TEMP.	Δ AMP.	GAS
3^{00}	457	456	486	436	482	6.1	1525	1562	228	1567	324	18.4	28606
3^{15}	462	458	479	442	478	3.9	1513	1541	226	1554	328	26.4	28607
3^{30}	459	462	464	447	482	3.5	1515	1545	230	1555	330	25.9	28609
3^{45}	464	459	464	452	474	2.7	1515	1548	236	1556	331	26.5	28611
4^{00}	468	461	461	457	467	4.1	1539	1562	235	1568	323	26.1	28613
4^{15}	466	461	473	453	488	4.0	1506	1541	236	1557	330	26.4	28614
4^{30}	459	462	478	446	490	4.1	1528	1561	237	1564	333	26.2	28616
4^{45}	464	463	472	450	480	4.1	1537	1565	237	1569	328	25.9	28618
5^{00}	466	468	471	453	482	5.2	1541	1534	238	1569	335	25.7	28620
5^{15}	471	465	471	456	480	4.1	1522	1537	239	1557	338	26.3	28621
5^{30}	479	461	470	461	470	4.2	1533	1567	239	1569	330	26.1	28623
5^{45}	478	464	469	463	470	3.5	1542	1551	239	1571	326	25.2	28625
6^{00}	478	468	468	465	473	3.9	1555	1530	240	1577	335	25.8	28627
6^{15}	481	461	474	463	476	2.5	1517	1559	239	1557	335	26.7	28629
6^{30}	483	461	470	466	470	4.5	1531	1561	239	1565	332	26.0	28630
6^{45}	449	473	497	443	523	5.1	1542	1535	240	1568	331	25.8	28632
7^{00}	458	468	492	443	507	2.9	1510	1541	242	1554	339	25.7	28634
7^{15}	468	467	484	452	489	3.6	1536	1565	244	1567	334	26.3	28636
7^{30}	465	475	487	452	500	3.1	1590	1530	244	1582	332	26.8	28637
7^{45}	468	475	486	455	497	4.6	1545	1533	241	1567	336	27.3	28639
8^{00}	477	466	484	457	490	1.7	1554	1540	225	1566	334	28.2	28641
8^{15}	477	462	471	460	471	3.1	1550	1551	210	1571	317	27.2	28643
8^{30}	471	459	462	458	469	5.9	1550	1530	213	1571	322	26.4	28645
8^{45}	472	454	461	459	468	4.2	1528	1535	228	1556	330	26.7	28647
9^{00}	480	458	463	463	466	3.0	1518	1551	238	1557	330	26.1	28648
9^{15}	486	455	462	469	461	3.5	1541	1562	242	1568	327	25.9	28650

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HAYWARD LINE I RTO

JULY 14, 1994
2 OF 2

EVERY 15 MINUTES

TIME	#1	#2	#3	#4	#5	INLET PRESS.	BURNERS B #1	BURNERS B #2	INLET TEMP.	COMBUST. CHAMBER TEMP.	EXHAUST TEMP.	Δ ~~AMP.~~	GAS
930	472	464	478	461	487	3.8	1558	1530	245	1578	334	26.0	28652
945	473	459	488	459	494	4.5	1523	1557	246	1566	337	26.0	28654
1000	478	462	486	462	488	4.0	1538	1567	248	1572	335	26.0	28656
1015	477	468	487	463	495	4.3	1534	1535	249	1565	342	25.9	28657
1030	485	464	488	467	488	3.4	1572	1541	248	1575	341	25.4	28659
1045	491	465	480	474	477	4.6	1544	1561	248	1569	332	25.6	28660
1100	493	466	483	477	482	4.3	1549	1537	250	1566	343	25.4	28662
1115	496	470	481	480	491	5.0	1518	1536	250	1558	345	25.5	28664
1130	495	470	482	481	481	3.7	1541	1561	250	1575	336	25.6	28666
1145	493	474	480	482	483	4.0	1554	1541	250	1578	336	25.6	28667
1200	499	466	483	482	481	4.5	1524	1552	250	1565	344	26.0	28669
1215	470	478	502	464	516	3.9	1555	1538	249	1579	336	25.7	28671
1230	476	478	494	468	503	4.3	1558	1529	249	1579	341	25.2	28672
1245	480	473	499	469	509	3.3	1514	1543	249	1555	345	25.6	28674
100	483	472	492	471	495	4.5	1531	1566	249	1568	~~304~~ 310	25.4	28676
115	484	475	490	473	493	3.6	1549	1559	248	1579	337	25.5	28678
130	487	471	492	472	492	5.2	1526	1561	249	1563	341	25.8	28679
145	493	472	485	477	481	4.3	1535	1567	248	1567	336	25.7	28681
200	494	478	480	480	478	3.3	1598	1530	249	1582	338	25.8	28683
215													
230													
245													
3													
315													
330													
345													

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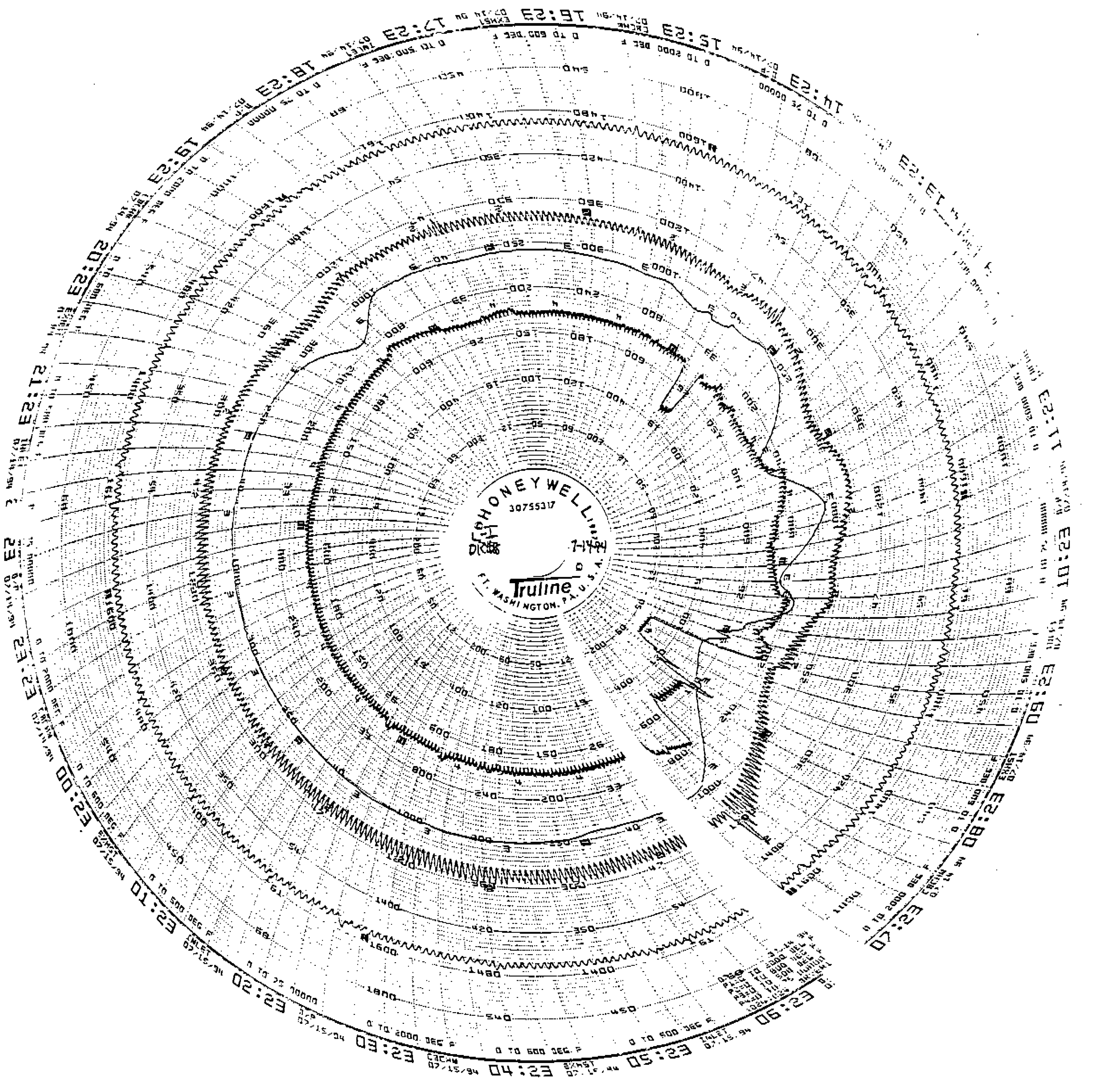
LINE I
DRYER RTC CHART
7-14-94



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HAYWARD OSB
LINE II
JULY 14, 1994

FLAKE MOISTURE

	WET	DRY
8:00 AM	C 47.2 S 45.7	C 6.0 S 5.8
9:00 AM	C 46.2 S 44.0	C 5.2 S 6.1
10:00 AM	C 47.6 S 46.1	C 5.2 S 4.1
11:00 AM	C 47.2 S 45.4	C 5.6 S 3.9
12:00 PM	C 48.6 S 49.0	C 5.0 S 6.8
1:00 PM	C 52.8 S 45.6	C 5.9 S 5.2
2:00 PM	C 46.2 S 46.0	C 5.8 S 7.4
3:00 PM	C 46.4 S 45.7	C 4.0 S 6.0

LINE 1 DRYER TESTING JULY 15, 1994 VOC and PHENOL

DATA TIME: START= 08:40 END= 10:40 HOURS= 2.00
START= 12:50 END= 15:50 HOURS= 3.00

5.00

BOARD WEIGHTS - LBS

weights of approximately every 25th untrimmed board (from press tapes)
7/16

192	193	193	190	195
192	200	189	194	195
191	198	192	194	
192	198	191	196	
190	199	189	196	
189	196	191	201	
196	192	199	193	
194	193	188	196	
192	196	189	193	
198	196	188	198	

193.74 lb=average untrimmed mat weight

181.5 lb=average finished board weight (untrimmed mat weight-weight of trim)

6.3% =trim %

PLANT PRODUCTION RATE

5.00 =hours during testing
91 =pressloads
1092 =no. of 8'x16' boards produced (pressloads x 12 boards per load)
198,231 =lbs of finished product (boards produced x weight of finished board)
39646 =lbs of finished product per hour (lbs of finshed product / hours)
19.82 =tons of finished product per hour (lbs of finshed product per hour / 2000 lb)

FUEL BURNING RATE ESTIMATED BY DRY FUEL INPUT

SURFACE

10 =SURFACE fuel calibration in pounds per count
2223 =SURFACE counts during testing hours
22230 =SURFACE lbs of fuel burned during testing
5.00 =hours during testing
4446 =lbs of dry fuel burned per hour during testing (pounds of dry fuel / testing hours)
2.22 =tons of dry fuel burned per hour during testing (pounds of dry fuel / 2000 lbs)
8600 =estimated BTU content per pound of dry fuel,
38.2 =estimated mmbtu input per hour (lbs of dry fuel per hour x btu content)
1384 =average inlet temperature
48.4% =average incoming moisture percent
4.2% =average dry moisture percent

CORE

10 =CORE fuel calibration in pounds per count
1930 =CORE counts during testing hours
19300 =CORE lbs of fuel burned during testing
5.00 =hours during testing
3860 =lbs of dry fuel burned per hour during testing (pounds of dry fuel / testing hours)
1.93 =tons of dry fuel burned per hour during testing (pounds of dry fuel / 2000 lbs)
8600 =estimated BTU content per pound of dry fuel,
33.2 =estimated mmbtu input per hour (lbs of dry fuel per hour x btu content)
1427 =average inlet temperature
48.4% =average incoming moisture percent
4.2% =average dry moisture percent

DRYER THROUGHPUT RATE

8,306 =Total pounds of fuel burned per hour in Core and Surface Dryer
39,646 =lbs of finished product per hour (lbs of finshed product / hours)
47,952 =Pounds of material produced by the dryer per hour (dry basis, assumming fuel balances)
2,666 = weight of trim per hour at 6.3% of finished product
5,640 =weight of screened fines per hour (total fuel - trim)
11.76% =resulting loss to fines as percentage of dryer throughput

LINE 1 DRYER TESTING JULY 15, 1994 POM

DATA TIME:	START=	08:40	END=	10:40	HOURS=	2.00
	START=	12:50	END=	18:00	HOURS=	5.17
						7.17

BOARD WEIGHTS - LBS

weights of approximately every 25th untrimmed board (from press tapes)

7/16

192	193	193	190	195	193	192.98	lb=average
192	200	189	194	195	183		untrimmed
191	198	192	194	198	187		mat weight
192	198	191	196	195	186		
190	199	189	196	195	192	180.8	lb=average
189	196	191	201	196	187		finished board
196	192	199	193	194	192		weight
194	193	188	196	194	186		(untrimmed mat
192	196	189	193	189			weight-weight
198	196	188	198	189			of trim)
						6.3%	=trim %

PLANT PRODUCTION RATE

7.17 =hours during testing
131 =pressloads 62.88
1572 =no. of 8'x16' boards produced (pressloads x 12 boards per load)
284,249 =lbs of finished product (boards produced x weight of finished board)
39663 =lbs of finished product per hour (lbs of finshed product / hours)
19.83 =tons of finished product per hour (lbs of finshed product per hour / 2000 lb)

FUEL BURNING RATE ESTIMATED BY DRY FUEL INPUT

SURFACE

10 =SURFACE fuel calibration in pounds per count
3131 =SURFACE counts during testing hours
31310 =SURFACE lbs of fuel burned during testing
7.17 =hours during testing
4369 =lbs of dry fuel burned per hour during testing (pounds of dry fuel / testing hours)
2.18 =tons of dry fuel burned per hour during testing (pounds of dry fuel / 2000 lbs)
8600 =estimated BTU content per pound of dry fuel,
37.6 =estimated mmbtu input per hour (lbs of dry fuel per hour x btu content)
1356 =average inlet temperature
48.0% =average incoming moisture percent
4.2% =average dry moisture percent

CORE

10 =CORE fuel calibration in pounds per count
2787 =CORE counts during testing hours
27870 =CORE lbs of fuel burned during testing
7.17 =hours during testing
3889 =lbs of dry fuel burned per hour during testing (pounds of dry fuel / testing hours)
1.94 =tons of dry fuel burned per hour during testing (pounds of dry fuel / 2000 lbs)
8600 =estimated BTU content per pound of dry fuel,
33.4 =estimated mmbtu input per hour (lbs of dry fuel per hour x btu content)
1426 =average inlet temperature
48.0% =average incoming moisture percent
4.8% =average dry moisture percent

DRYER THROUGHPUT RATE

8,258 =Total pounds of fuel burned per hour in Core and Surface Dryer
39,663 =lbs of finished product per hour (lbs of finshed product / hours)
47,920 =Pounds of material produced by the dryer per hour (dry basis, assumming fuel balances)
2,667 = weight of trim per hour at 6.3% of finished product
5,591 =weight of screened fines per hour (total fuel - trim)
11.67% =resulting loss to fines as percentage of dryer throughput

LOUISIANA-PACIFIC CORPORATION
HAYWARD, WI

PRESS REPORT - LINE 1

OPERATOR Fitch SHIFT Days CREW A DATE 7-15-94

THICKNESS: 7/16

PRESS LOADS 211 4/c

OVERALL TIMER: 143

DECOMPRESSION TIME 15

PRESS TEMP: 210°c

TOTAL REJECTS:

LOG COUNT: 7337

LINE SPEED	FROM	TO
64	7:00	1045
50	1045	120
64+	120	700

F.C.O.S. HYD RADIATOR 8:00 AM Ti

Cleaned Blender Shrouds & Tracks 9:00 AM

Cleaned Deckle Chains 1:25 PM

Press Blow Down 745 AM

Headers Cleaned YES/[✓ NO]

How Many —

Former Hyd Radiator 1:20 PM Time

DOWNTIME		DOWNTIME (Mins)			KEY	REASONS FOR DOWNTIME
FROM	TO	M	E	O		
1248	1254	6				COOLER FEED DRIVE
528	529		1			LOADER BOOM TRIP

Downtime Code: M - Mechanical E - Electrical O - Operator

EMMETS

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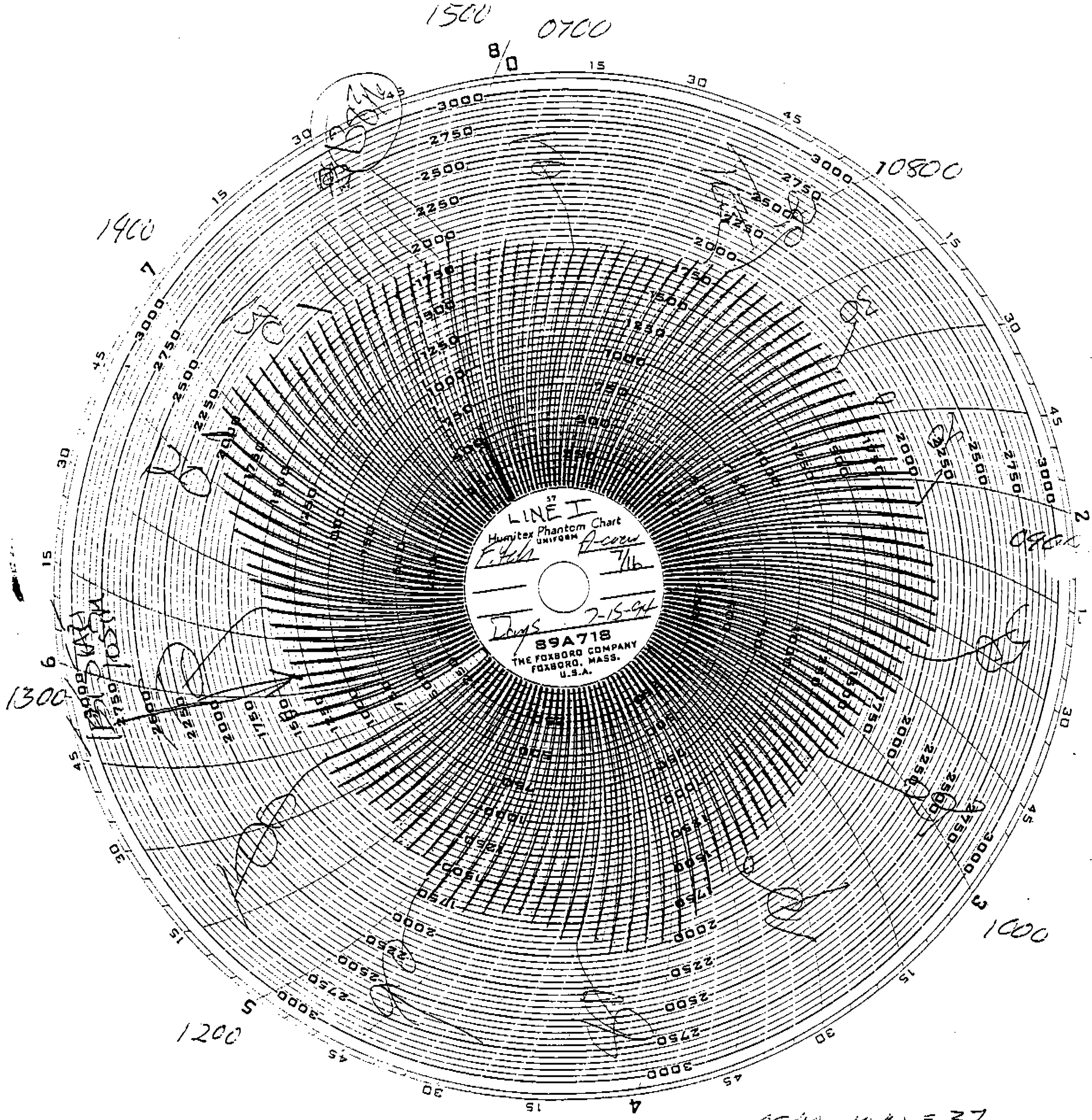
LINE I
PRESS CHART
7-15-94
0700 - 1500



1100 - 0840 - 1040 = 37
1250 - 1500 = 38

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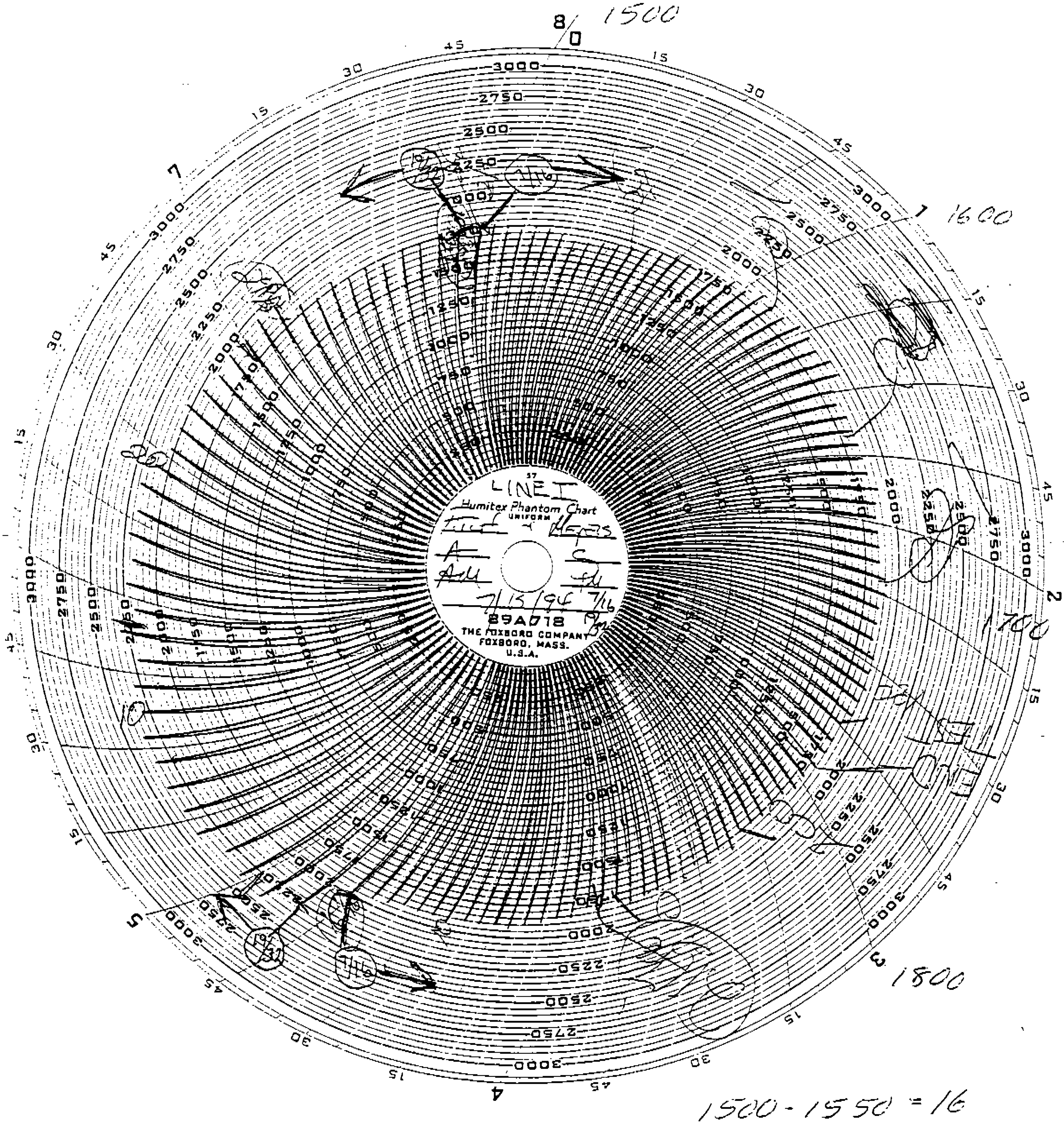
LINE +
PRESS CHART
7-15-94
1500-2300



1500-1550 = 16
1500-1800 = 56

Hayward Dryer Testing Line I

DATE 1/15
BY
PAGE 1 OF 2

FUEL CALIBRATION: face=_____lb./count core=_____ lb./count

TIME	FACE	FACE	FACE	FACE	FACE	FACE	CORE	CORE	CORE	CORE	CORE	CORE	DRY BIN LEVEL		EVERY HOUR FLAKE MOISTURE		
	OUT. SET POINT	FEED RATE	INLET TEMP	OUTLET TEMP	FUEL COUNT	WET BIN LEVEL	OUT. SET POINT	FEED RATE	INLET TEMP	OUTLET TEMP	FUEL COUNT	WET BIN LEVEL	FACE	CORE	IN	FACE OUT	CORE OUT
8:05	284	42	1335	283	465	60	247	36	1393	246	390	65	80	65			
8:15	284	42	1294	284	532	60	247	42	1356	242	448	65	80	65			
8:25	284	42	1274	284	597	60	247	42	1535	251	518	60	80	65			
8:35	284	42	1229	281	670	60	247	41	1518	246	593	60	75	65			
8:45	284	42	1267	283	745	60	247	42	1466	244	665	65	75	65			
8:55	284	44	1332	281	811	60	247	42	1558	249	729	65	75	65			
9:05	281	49	1426	276	890	60	247	42	1548	242	796	65	70	60			
9:15	274	44	1589	258	1004	70	247	42	1551	237	874	70	70	60			
9:25	274	44	1194	288	1042	70	247	41	1050	232	890	70	70	60			
9:35	274	45	1453	269	1149	65	257	36	1396	248	975	70	70	60			
9:45	274	48	1455	269	1217	65	265	41	1388	260	1030	70	70	60			
9:55	274	47	1465	271	1287	70	265	42	1519	264	1103	70	65	60			
10:05	274	47	1469	274	1367	70	265	46	1420	264	1167	70	65	60			
10:15	274	48	1436	275	1439	70	265	47	1481	264	1233	70	65	60			
10:25	274	47	1405	275	1526	70	265	47	1421	265	1307	70	65	60			
10:35	279	48	1467	272	1618	65	270	50	1375	267	1379	65	65	60			
10:45	279	48	1479	280	1691	65	270	54	1510	268	1446	65	65	60			
10:55	279	48	1490	281	1764	65	270	49	1484	273	1510	70	70	65			
11:05	279	47	1493	277	1855	66	275	46	1454	269	1688	70	70	65			
11:15	277	48	1572	282	1926	65	280	48	1452	280	1653	70	70	70			
11:25	[illegible]					65	280	48	1585	278	1730	70	70	70	*Surface down		
11:35	286	44	1432	281	2008	60	280	48	1439	275	1795	60	60	70			
11:45						60	280	49	1521	284	1875	60	55	75	*Surface down		
11:55	286	42	1171	272	2110	60	280	48	1415	280	1943	60	55	75			
12:05	286	41	1296	272	2168	60	280	48	1311	277	1989	60	55	80			
12:15	287	48	1363	284	2246	60	280	50	1338	281	2057	60	55	86			
12:25	285	52	1514	289	2334	60	280	50	1471	281	2127	65	65	80			
12:35	285	49	1506	284	2413	60	280	47	1562	275	2198	65	70	80			
12:45	285	49	1480	285	2493	55	279	43	1497	266	2266	65	75	80			
12:55	285	49	1386	286	2565	55	279	41	1496	263	2327	70	80	85			

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Hayward Dryer Testing Line I

DATE 7/15/94
BY
PAGE 2 OF 2

FUEL CALIBRATION: face=____ lb./count core=____ lb./count

TIME	FACE OUT. SET POINT	FACE FEED RATE	FACE INLET TEMP	FACE OUTLET TEMP	FACE FUEL COUNT	FACE WET BIN LEVEL	CORE OUT. SET POINT	CORE FEED RATE	CORE INLET TEMP	CORE OUTLET TEMP	CORE FUEL COUNT	CORE WET BIN LEVEL	DRY BIN LEVEL FACE	DRY BIN LEVEL CORE	EVERY HOUR FLAKE MOISTURE IN	FLAKE MOISTURE FACE OUT	FLAKE MOISTURE CORE OUT
1:05	285	50	1307	282	2645	55	279	42	1357	277	2395	70	80	90		So full	that
1:15	285	48	1341	285	2710	55	285	42	1370	278	2450	70	90	90	↑	Wood chips	
1:25	285	48	1385	284	2792	60	285	42	1490	287	2525	70	90	90	=	Covered	window
1:35	285	46	1542	286	2878	60	285	42	1450	283	2590	65	90	90			
1:45	285	46	1517	286	2962	60	285	43	1420	284	2658	65	90	90			
1:55	285	46	1482	287	3032	65	285	42	1477	286	2722	65	90	90			
2:05	285	44	1468	282	3115	65	285	40	1418	284	2790	65	90	90			
2:15	285	44	1448	287	3184	65	285	40	1452	285	2849	70	90	90			
2:25	285	44	1434	285	3263	65	285	41	1365	282	2909	70	90	90			
2:35	285	43	1429	285	3343	75	285	41	1377	282	2972	80	90	90			
2:45	285	38	1360	284	3406	75	285	40	1398	286	3029	80	90	90			
2:55	285	33	1264	285	3464	75	285	39	1414	285	3090	80	90	90			
3:05	288	32	1215	288	3535	75	285	39	1380	284	3167	80	90	90			
3:15	288	34	1215	287	3588	75	285	39	1424	284	3224	80	90	90			
3:25	291	36	1238	288	3649	75	285	39	1401	284	3285	70	95	95			
3:35	290	36	1272	290	3710	76	285	39	1406	285	3347	70	95	95			
3:45	290	36	1288	290	3777	75	285	39	1429	286	3413	70	95	95			
3:55	290	37	1273	290	3842	75	285	39	1429	283	3476	70	95	95			
4:05	290	38	1272	290	3911	75	285	39	1505	284	3550	70	95	95			
4:10	290	37	1265	290	3948	70	285	37	1430	286	3592	70	95	95			
4:20	290	37	1276	288	4001	72	285	39	1429	283	3638	50	95	95			
4:30	290	38	1266	290	4064	70	285	39	1426	283	3702	50	95	93			
4:40	290	39	1272	288	4129	50	285	39	1435	283	3758	75	95	95			
4:58	290	38	1283	290	4241	70	285	39	1442	288	3867	75	90	90			
5:05	290	38	1292	290	4307	70	285	39	1427	283	3927	75	90	90			
5:15	290	38	1268	290	4367	65	285	39	1386	283	3983	80	90	90			
5:25	290	38	1264	288	4435	65	285	40	1428	284	4053	80	90	90			
5:35	290	41	1276	290	4612	70	285	39	1400	283	4123	80	90	90			
5:45	290	40	1323	290	4582	75	285	40	1396	282	4185	75	90	90			
5:55	290	41	1331	291	4666	75	285	39	1401	287	4259	75	90	90			
					4750						4333						

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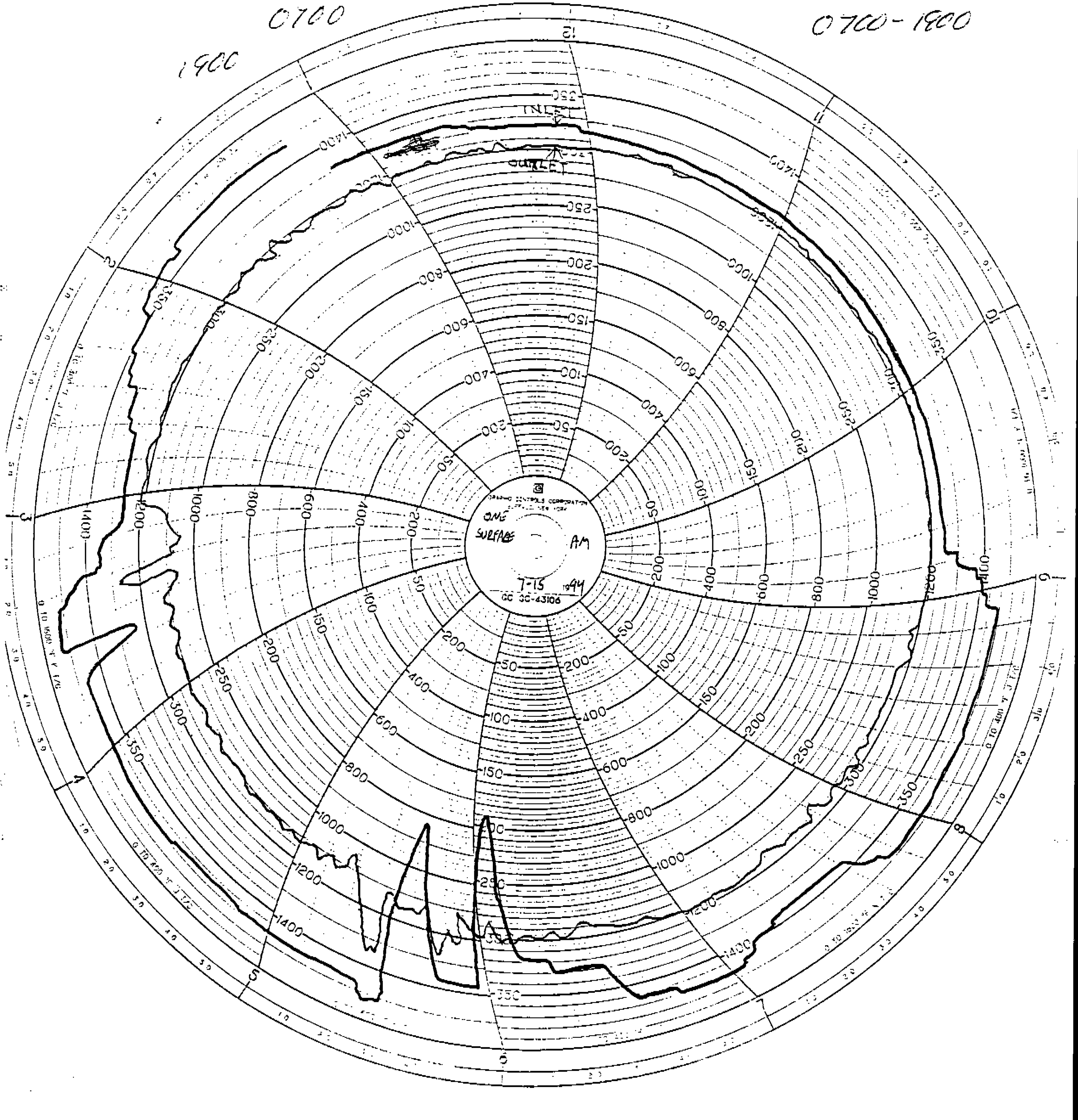
LINE I
SURFACE DRYER
CHART
7-15-94
0700-1900



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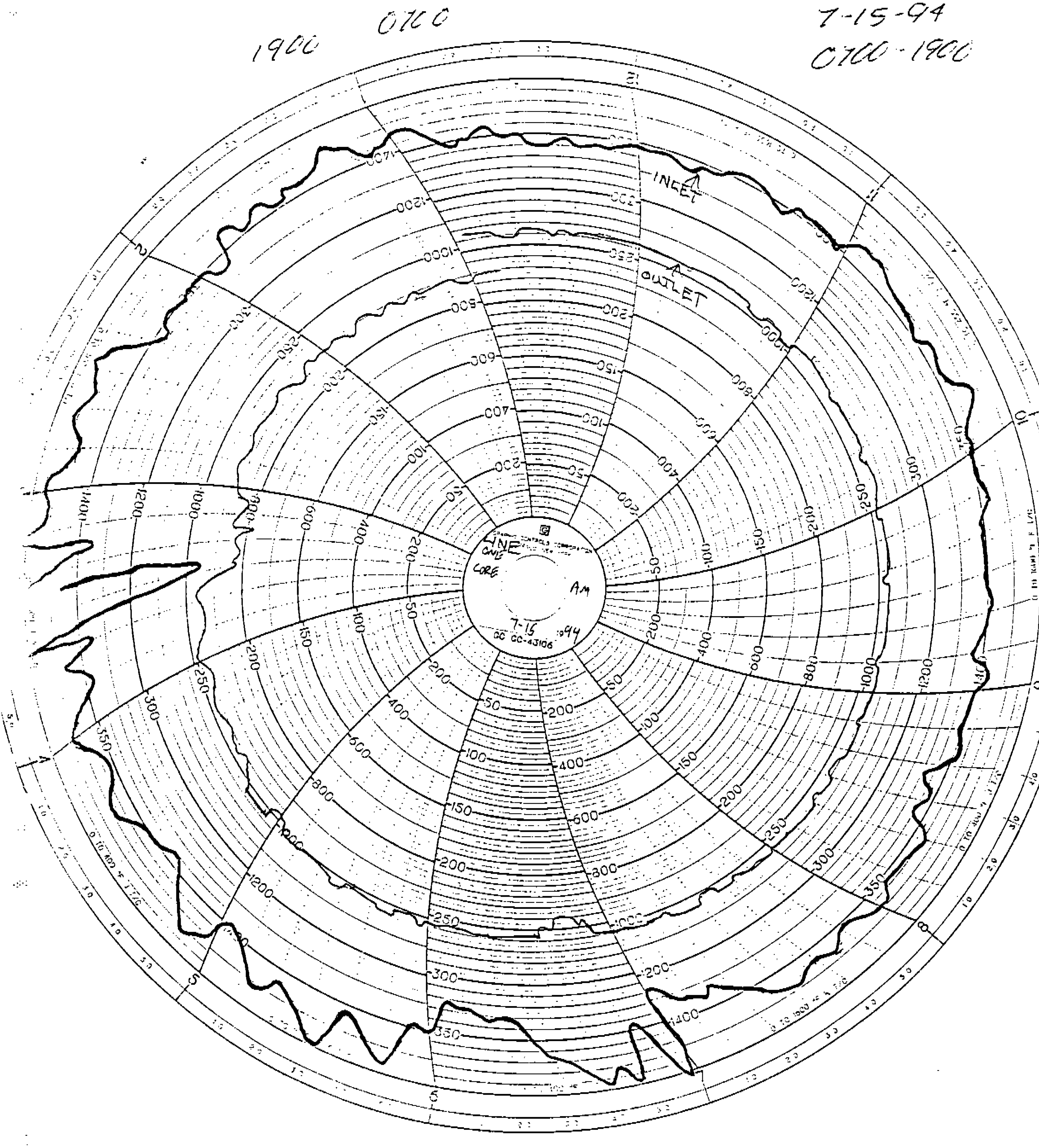
LINE I
CORE DRYER
CHART
7-15-94
0700-1900



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EFB READINGS

DATE 7/15

BY

PLANT: Hayward OSB Line I

1 OF 2

TIME	"A" SIDE				"B" SIDE				C / S	
	BED VOLT	BED CURR.	ION VOLT	ION CURR.	BED VOLT	BED CURR.	ION VOLT	ION CURR.	EFB PRESS.	BAG H. PRESS.
8:05	13	.01	36	1.8	5.0	.94	28	1.2	4.3 / 2.4	4.3
8:15	12.5	.01	36	1.4	12.0	.12	29	1.2	4.4 / 2.2	4.2
8:25	12.5	.01	37	1.5	12.0	.11	28	1.3	4.4 / 2.4	4.2
8:35	12.5	.01	37	1.3	12.0	.11	28.5	1.2	4.4 / 2.4	4.2
8:45	12.5	.01	36	1.3	12.0	.09	28.5	1.1	4.5 / 2.4	4.2
8:55	12.0	.01	36	1.3	11.5	.12	29	1.0	4.4 / 2.4	4.1
9:05	12.0	.02	36.5	1.4	11	.15	29	1.0	4.7 / 2.4	4.2
9:15	12.0	.02	32	.6	11.5	.16	30	1.0	4.6 / 2.2	4.2
9:25	11.5	.02	31	.7	11.5	.15	28	.6	4.2 / 2.2	4.1
9:35	11.5	.02	31	.6	11.5	.14	27.5	.6	4.4 / 2.2	4.1
9:45	11.0	.03	32	.6	12	.15	28	.6	4.2 / 2.4	4.3
9:55	11.0	.03	34	1.0	11.5	.12	29.5	.9	4.2 / 2.3	4.1
10:05	11.0	.03	34	1.0	12	.11	29.5	.9	4.2 / 2.2	4.2
10:15	11.5	.02	34	1.0	12	.12	30	1.0	4.2 / 2.2	4.1
10:25	11.5	.03	35	1.2	11.5	.14	30	1.0	4.2 / 2.2	4.2
10:35	10.5	.04	35	1.2	11.5	.13	30	1.0	4.1 / 2.5	4.2
10:45	11.0	.03	36	1.0	12	.12	30	1.0	4.3 / 2.2	4.0
10:55	11.0	.04	36	1.0	11.5	.14	30	1.0	4.1 / 2.4	4.1
11:05	11.5	.03	36	1.2	11.5	.15	28	1.6	4.1 / 2.3	4.1
11:15	11.0	.04	36	1.1	Down				4.4 / 1.8	4.1
11:25	11.5	.03	36	1.1	10.5	.22	26	1.5	4.2 / 3.2	4.1
11:35	11.5	.03	36	1.1	Down				4.1 / 2.5	4.1
11:45	11.0	.02	36	1.2	9.0	.32	← No Reading	←	4.0 / 2.5	4.0
11:55	11.0	.02	36	1.1	11.0	.18	25	1.0	4.0 / 2.2	4.1
12:05	12.0	.02	35	1.0	10.5	.14	27	.95	4.0 / 2.6	4.1
12:15	11.5	.02	36	1.1	11	.17	27	.8	4.2 / 2.6	4.1
12:25	11.5	.03	36	1.0	11	.16	27.5	.6	4.2 / 2.7	4.1
12:35	12.0	.03	36	1.0	11	.16	27.0	.6	4.3 / 2.6	4.1
12:45	12.0	.01	35	1.2	11	.14	27.5	.6	4.3 / 2.4	4.1
12:55	13.5	.01	34	3.1	11.5	.10	27	.6	4.3 / 2.4	4.1

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EFB READINGS

DATE 7/15/94
BY
2 OF 2

PLANT: Hayward OSB Line I

TIME	"A" SIDE				"B" SIDE				C / S	
	BED VOLT	BED CURR.	ION VOLT	ION CURR.	BED VOLT	BED CURR.	ION VOLT	ION CURR.	EFB PRESS.	BAG H. PRESS.
1:05	12	.02	35	1.2	11.5	.12	30	.8	4.2 / 2.4	4.1
1:15	12	.02	36	1.1	11.5	.12	30	1.1	4.2 / 2.4	4.2
1:25	12	.02	37	1.1	11	.13	30	1.0	4.2 / 2.4	4.1
1:35	12	.02	36	1.0	10.5	.14	31	1.0	4.4 / 2.6	4.0
1:45	11	.02	35	1.2	10.5	.11	30	.8	4.4 / 2.6	4.0
1:55	12	.02	35	1.2	11	.11	30	.9	4.4 / 2.5	4.1
2:05	12	.02	36	1.2	11	.12	31	1.0	4.3 / 2.3	4.0
2:15	12	.02	36	1.2	11.5	.10	30	1.0	4.2 / 2.8	4.0
2:25	12	.02	36	1.0	11	.11	31	1.0	4.3 / 2.3	4.0
2:35	12	.02	36	1.0	11	.12	31	.9	4.4 / 2.4	4.1
2:45	12	.02	36	1.0	11	.09	30	1.0	4.3 / 2.4	4.1
2:55	12	.02	36	1.2	12	.07	30	1.0	4.4 / 2.5	4.0
3:05	12	.02	36	1.2	12	.07	30	1.0	4.2 / 2.5	4.1
3:15	12	.02	35	1.2	11.5	.08	28	.8	4.2 / 2.4	4.1
3:25	12	.01	36	1	11.5	.08	30	.9	4.2 / 2.4	4.2
3:35	12	.02	35	1.1	11.5	.08	30	1	4.2 / 2.4	4.1
3:45	12	.02	35	1	11.5	.08	30	1.2	4.1 / 2.4	4
3:55	12	.02	36	1	12	.08	31	1.1	4.1 / 2.3	4.2
4:05	12	.02	36	1.1	11.5	.08	31	1.1	4.1 / 2.6	4.2
4:15	13	.02	36	1.1	11.5	.07	30	1.0	4.2 / 2.4	4.2
4:20	12	.02	36	1.1	11.5	.07	30	1.0	4.2 / 2.6	4.0
4:30	12	.02	36	1.1	11.0	.07	31	1.2	4.1 / 2.4	4.0
4:40	12	.01	36	1.1	11.5	.07	31	1.2	4.0 / 2.4	4.0
4:55	12.5	.01	36	1.2	11.5	.09	32	1.2	4.2 / 2.4	4.1
5:05	12	.02	36	1.1	11.5	.09	32	1.2	4.0 / 2.2	4.1
5:15	11.5	.01	37	1.2	11.5	.09	32	1.2	4.1 / 2.4	4.1
5:25	12.5	.02	36.5	1.0	11.5	.09	32	1.2	4.2 / 2.4	4.1
5:35	12.5	.01	37	1.2	11.5	.10	32	1.2	4.2 / 2.8	4.2
5:45	12.5	.01	36	1.0	12	.09	32	1.4	4.3 / 2.6	4.1
5:55	12.5	.01	36	1.2	12	.09	30	1.0	4.2 / 2.6	4.1

HAYWARD LINE I DRYER RTO 1 OF 2 JULY 15, 1994

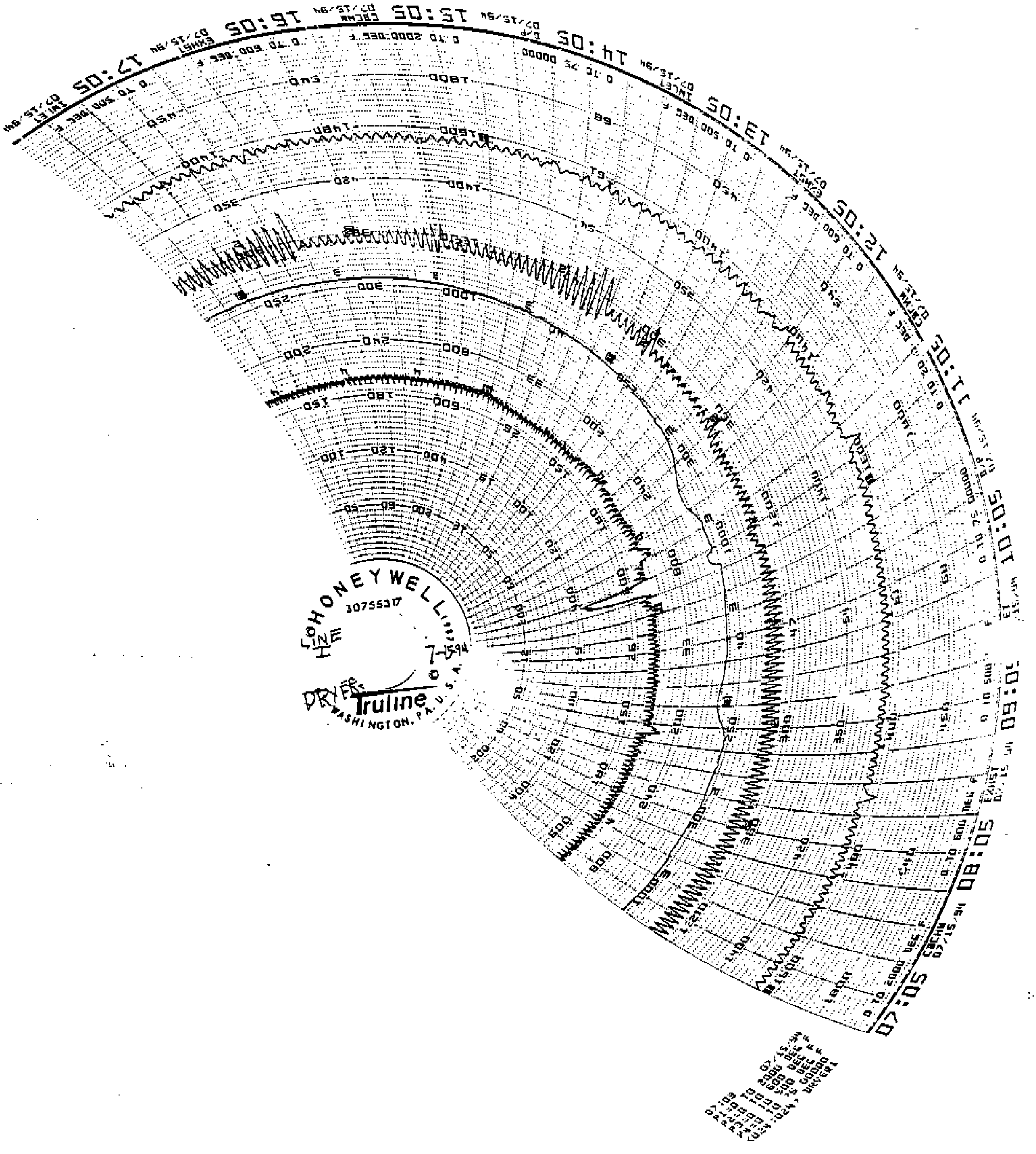
TIME						INLET PRESS.	BURNERS		INLET TEMP.	COMBUST. CHAMBER TEMP.	EXHAUST TEMP.	△	GAS
A.M.	#1	#2	#3	#4	#5		B #1	B #2					
8:00	506	471	471	496	464	5.1	1528	1561	242	1568	333	25.9	02872.4
.15	496	481	475	492	477	6.0	1547	1529	243	1572	341	25.2	02872.5
.30	498	475	478	491	475	5.0	1530	1561	243	1568	336	25.8	02872.7
.45	500	481	472	494	470	3.5	1552	2216	244	1575	330	26.1	02872.8
9:00	504	475	477	493	471	4.5	1533	1541	244	1570	339	25.7	02873.0
.15	494	482	478	490	479	4.2	1530	1535	244	1567	346	24.8	02873.1
.30	500	478	473	494	466	3.0	1546	1561	239	1577	329	26.4	02873.3
.45	500	474	469	494	461	4.1	1540	1564	230	1678	324	26.1	02873.5
10:00	496	471	468	490	463	3.9	1517	1541	231	1558	336	25.9	02873.6
.15	500	467	468	489	461	3.1	1525	1552	234	1564	333	27.5	02873.8
.30	499	467	467	489	459	4.5	1531	1559	235	1549	329	26.0	02874.0
.45	500	470	464	491	458	3.5	1552	1545	235	1576	325	24.6	02874.1
11:00	496	466	473	485	470	4.3	1514	1543	236	1555	337	25.7	02874.3
.16	483	465	487	472	483	4.5	1536	1554	237	1580	336	25.0	02874.5
.30	489	465	484	472	475	5.4	1503	1559	234	1593	331	25.3	02874.7
.45	482	470	489	470	488	3.7	1514	1542	232	1574	336	25.5	028748
P.M. 12:00	480	473	488	470	486	3.5	1626	1555	226	1600	327	25.8	028749
.15	482	473	482	471	480	4.0	1561	1533	225	1585	327	25.4	028751
.30	498	458	489	472	464	5.6	1520	1548	232	1572	330	25.3	028753
.45	499	455	496	472	470	5.3	1504	1549	240	1590	339	25.2	028755
1:00	482	462	506	461	495	3.4	1511	1542	242	1564	340	25.8	028756
.15	481	470	498	464	496	5.2	1523	1530	244	1565	341	25.0	028758
.30	475	462	512	462	504	4.5	1497	1547	247	1571	366	24.6	028760
.45	455	475	531	440	541	4.3	1510	1542	247	1571	344	24.9	028761
2:00	465	474	520	446	523	3.7	1508	1541	248	1568	319	25.0	028763

HAYWARD LINE I DRYER RTO 2 OF 2 JULY 15, 1994

							BURNERS						
2	#1	#2	#3	#4	#5	INLET PRESS.	B #1	B #2	INLET TEMP.	COMBUST, CHAMBER TEMP.	EXHAUST TEMP.	△	GAS
.15	431	480	578	416	597	4.4	1518	1547	248	1569	371	24.2	028765
.30	426	481	566	411	579	4.1	1531	1566	249	1579	359	24.7	028767
.45	442	482	551	419	556	3.8	1515	1556	250	1609	355	25.2	028769
3:00	455	479	536	429	535	5.1	1515	1544	250	1566	354	25.2	028770
15	459	489	522	439	525	4.2	1562	1535	250	1594	342	25.0	028772
.30	465	486	523	443	529	5.2	1534	1538	251	1576	343	24.7	028774
.45	469	483	533	442	542	6.7	1515	1549	253	1567	341	24.8	028776
4:00	457	481	538	434	540	5.0	1514	1546	254	1568	356	25.2	028778
.15	466	483	523	441	520	4.7	1526	1562	254	1579	352	24.9	28779
.30	468	490	517	446	525	5.0	1545	1538	254	1579	347	25.0	28781
.45	474	490	508	452	511	3.9	1556	1539	254	1592	345	24.2	28783
5:00	478	483	511	453	507	3.9	1617	1565	255	1605	353	25.0	28785
.15	431	495	571	418	602	5.5	1535	1546	255	1572	337	24.9	28788
.30	432	494	568	412	590	5.3	1514	1542	255	1570	345	25.0	28788
.45	444	497	541	421	555	5.5	1561	1533	255	1596	341	24.7	28790
6:00													
.15													
.30													
.45													
7:00													

51

DRYER RTO CHART
7-15-94



HAYWARD OSB
LINE I
JULY 15, 1994

FLAKE MOISTURE

	WET	DRY
8:00 AM	C 47.5 S 47.6	C 3.6 S 3.2
9:00 AM	C 54.6 S 54.0	C 6.7 S 3.4
10:00 AM	C 49.3 S 46.4	C11.4 S 5.2
11:00 AM	C 48.6 S 48.2	C 6.8 S 4.0
12:00 PM	C 44.6 S 48.2	C 4.2 S11.2
1:00 PM	C 44.8 S 46.0	C 2.8 S 3.2
2:00 PM	C 48.8 S 47.2	C 3.0 S 3.8
3:00 PM	C 46.6 S 46.4	C 3.6 S 5.2
4:00 PM	C 46.8 S 45.0	C 3.6 S 3.8
5:00 PM	C 47.6 S 48.4	C 2.8 S 5.0
6:00 PM	C 45.8 S 46.6	C 3.0 S 2.6

LINE 2 DRYER TESTING JULY 12, 1994 PM, CO, NOx

DATA TIME: START= 10:00 END= 16:20 HOURS= 6.33

BOARD WEIGHTS - LBS

weights of approximately every 25th untrimmed board (from press tapes)

7/16

206	188	196	186	200
206	186	192	192	200
198	194	190	190	200
202	192	194	198	194
196	192	198	194	192
194	188	194	196	196
192	190	202	200	194
190	184	198	198	192
198	190	186	196	196
198	180	194	190	188
196	196	194	206	194

194.3 lb=average untrimmed mat weight

179.7 lb=average finished board weight (untrimmed mat weight-weight of trim)

7.5% =trim %

PLANT PRODUCTION RATE

6.33 =hours during testing
111 =pressloads
1332 =no. of 8'x16' boards produced (pressloads x 12 boards per load)
239,387 =lbs of finished product (boards produced x weight of finished board)
37798 =lbs of finished product per hour (lbs of finshed product / hours)
18.90 =tons of finished product per hour (lbs of finshed product per hour / 2000 lb)

FUEL BURNING RATE ESTIMATED BY DRY FUEL INPUT

SURFACE

10 =SURFACE fuel calibration in pounds per count
2318 =SURFACE counts during testing hours
23180 =SURFACE lbs of fuel burned during testing
6.33 =hours during testing
3660 =lbs of dry fuel burned per hour during testing (pounds of dry fuel / testing hours)
1.83 =tons of dry fuel burned per hour during testing (pounds of dry fuel / 2000 lbs)
8600 =estimated BTU content per pound of dry fuel,
31.5 =estimated mmbtu input per hour (lbs of dry fuel per hour x btu content)
1090 =average inlet temperature
46.1% =average incoming moisture percent
5.5% =average dry moisture percent

CORE

10 =CORE fuel calibration in pounds per count
2642 =CORE counts during testing hours
26420 =CORE lbs of fuel burned during testing
6.33 =hours during testing
4172 =lbs of dry fuel burned per hour during testing (pounds of dry fuel / testing hours)
2.09 =tons of dry fuel burned per hour during testing (pounds of dry fuel / 2000 lbs)
8600 =estimated BTU content per pound of dry fuel,
35.9 =estimated mmbtu input per hour (lbs of dry fuel per hour x btu content)
1317 =average inlet temperature
46.1% =average incoming moisture percent
4.5% =average dry moisture percent

DRYER THROUGHPUT RATE

7832 =Total pounds of fuel burned per hour in Core and Surface Dryer
37798 =lbs of finished product per hour (lbs of finshed product / hours)
45630 =Pounds of material produced by the dryer per hour (dry basis, assumming fuel balances)
3065 = weight of trim per hour at 7.5% of finished product
4767 =weight of screened fines per hour (total fuel - trim)
10.45% =resulting loss to fines as percentage of dryer throughput

LINE 2 DRYER TESTING JULY 12, 1994 VOC, Formaldehyde
DATA TIME: START= 18:20 END= 23:00 HOURS= 4.67

4.67

BOARD WEIGHTS - LBS
weights of approximately every 25th untrimmed board (from press tapes)
7/16

192	204	184	196
190	198	188	188
184	192	184	186
180	208	192	192
186	190	178	184
180	192	190	186
190	200	188	190
194	200	196	188
200	194	190	188
196	194	194	184

190.75 lb=average untrimmed mat weight

176.4 lb=average finished board weight (untrimmed mat weight-weight of trim)
7.5% =trim %

PLANT PRODUCTION RATE
4.67 =hours during testing
83 =pressloads
996 =no. of 8'x16' boards produced (pressloads x 12 boards per load)
175,734 =lbs of finished product (boards produced x weight of finished board)
37657 =lbs of finished product per hour (lbs of finshed product / hours)
18.83 =tons of finished product per hour (lbs of finshed product per hour / 2000 lb)

FUEL BURNING RATE ESTIMATED BY DRY FUEL INPUT
SURFACE
10 =SURFACE fuel calibration in pounds per count
1644 =SURFACE counts during testing hours
16440 =SURFACE lbs of fuel burned during testing
4.67 =hours during testing
3523 =lbs of dry fuel burned per hour during testing (pounds of dry fuel / testing hours)
1.76 =tons of dry fuel burned per hour during testing (pounds of dry fuel / 2000 lbs)
8600 =estimated BTU content per pound of dry fuel,
30.3 =estimated mmbtu input per hour (lbs of dry fuel per hour x btu content)
1093 =average inlet temperature
47.6% =average incoming moisture percent
5.5% =average dry moisture percent
CORE
10 =CORE fuel calibration in pounds per count
1779 =CORE counts during testing hours
17790 =CORE lbs of fuel burned during testing
4.67 =hours during testing
3812 =lbs of dry fuel burned per hour during testing (pounds of dry fuel / testing hours)
1.91 =tons of dry fuel burned per hour during testing (pounds of dry fuel / 2000 lbs)
8600 =estimated BTU content per pound of dry fuel,
32.8 =estimated mmbtu input per hour (lbs of dry fuel per hour x btu content)
1291 =average inlet temperature
47.6% =average incoming moisture percent
4.8% =average dry moisture percent

DRYER THROUGHPUT RATE
7335 =Total pounds of fuel burned per hour in Core and Surface Dryer
37657 =lbs of finished product per hour (lbs of finshed product / hours)
44992 =Pounds of material produced by the dryer per hour (dry basis, assumming fuel balances)
3053 = weight of trim per hour at 7.5% of finished product
4282 =weight of screened fines per hour (total fuel - trim)
9.52% =resulting loss to fines as percentage of dryer throughput

55

LOUISIANA-PACIFIC CORPORATION
HAYWARD, WI

PRESS REPORT - LINE II

OPERATOR Dan Scatel SHIFT Days CREW D DATE 2-12-94

THICKNESS: 1/2 7/16

PRESS LOADS 8½ 19.5/16

OVERALL TIMER: 170 - 144

DECOMPRESSION TIME 15 - 12

PRESS TEMP: 210

TOTAL REJECTS: =

LOG COUNT: 7313

LINE SPEED	FROM	TO
53	7:20	
52	7:25	
50	7:43	
62	8:58	
50	9:34	
62	9:59	

F.C.O.S. END RADIATOR 10:00 II

Cleaned Bleeder Shrouds & Tracks =

Cleaned Deckle Chains =

Press Blow Down 10:00

Headbars Cleaned = YES/NO =

How Many =

Former End Radiator = Time

DOWNTIME		DOWNTIME (Mins)			KEY	REASONS FOR DOWNTIME
FROM	TO	M	E	O		
10:58	11:55				1	#6 TAKEOVER
2:20	2:21				1	DROPPED H.B. F# 4 LOADER
12:35	12:36		-		1	DELAY AT SAWS
1:45	1:48				3	BAG-HOUSE DOWN
6:40						DELAY AT SAW, UNIT JAMED ON
—	—	—	—	—	—	TRACK

Downtime Code: M - Mechanical E - Electrical O - Operator

LOUISIANA-PACIFIC CORPORATION
HAYWARD, WI

PRESS REPORT - LINE II

OPERATOR Halvorson SHIFT 2nd CREW B DATE 7-12-94

THICKNESS: 7/16

PRESS LOADS 210 7/16

OVERALL TIMER: 143

DECOMPRESSION TIME 12

PRESS TEMP: 210

TOTAL [illegible]: /

LOG COUNT: 7684

F.C.O.S. HYD RADIATOR / TI

Cleaned Blender Shrouds & Tracks /

Cleaned Deckle Chains /

Press Blow Down /

Headbars Cleaned YES/NO /

How Many /

Former Hyd Radiator / Time

moisture

LINE SPEED	FROM	TO
62 fm	700	4:00
60 fm	400	5:30
62 fm	5:30	7:00

DOWNTIME FROM	DOWNTIME TO	DOWNTIME (Mins) M	DOWNTIME (Mins) E	DOWNTIME (Mins) O	KEY	REASONS FOR DOWNTIME
2:38	:39	1				Lug-drive dropped screw #8
5:40	:42	2	-			Screen balled up on conv #4
6:05	:07	2				" " " conv #5
6:30	:31	1				Delay at SAWS

Downtime Code: M - Mechanical E - Electrical O - Operator

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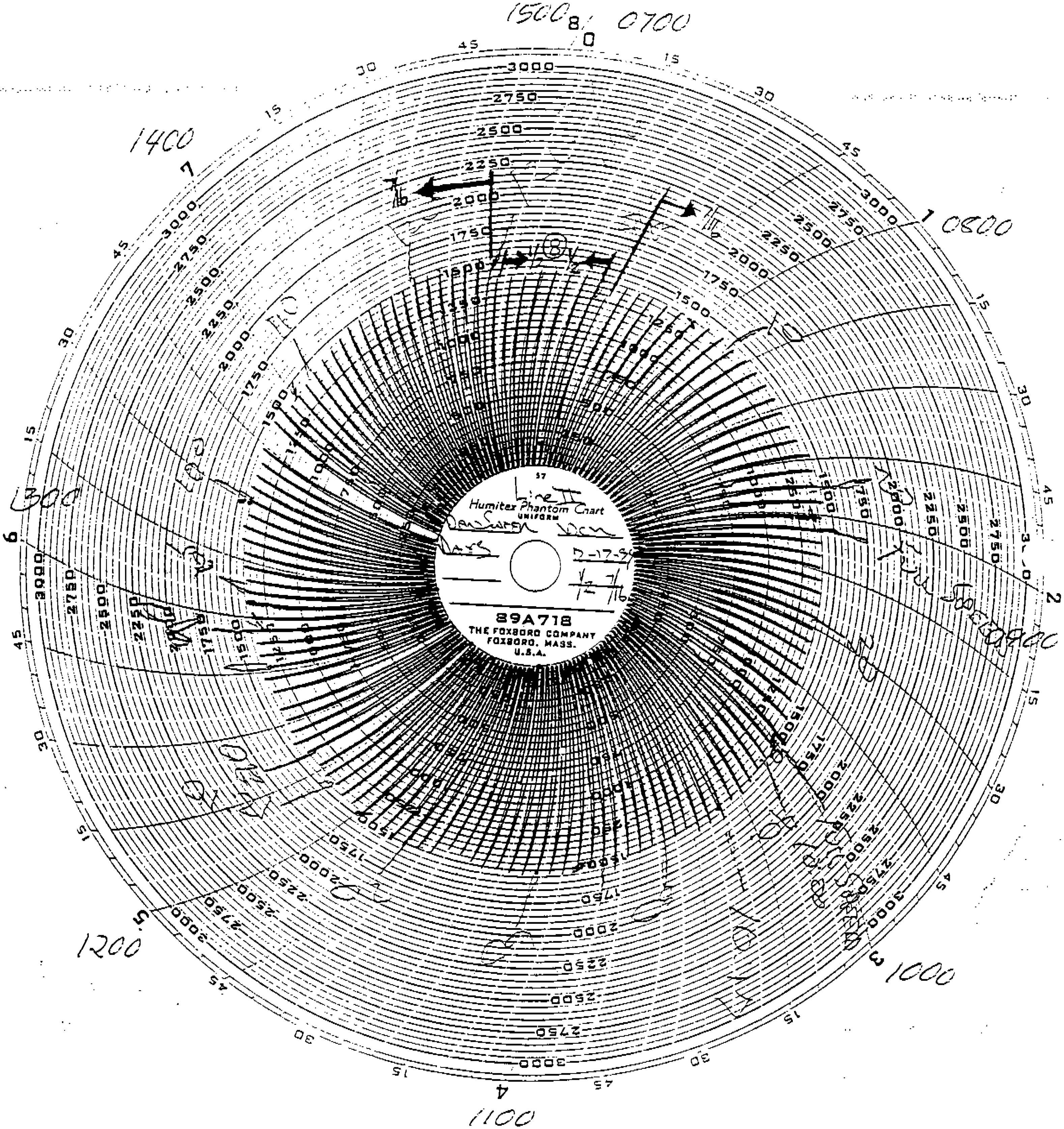
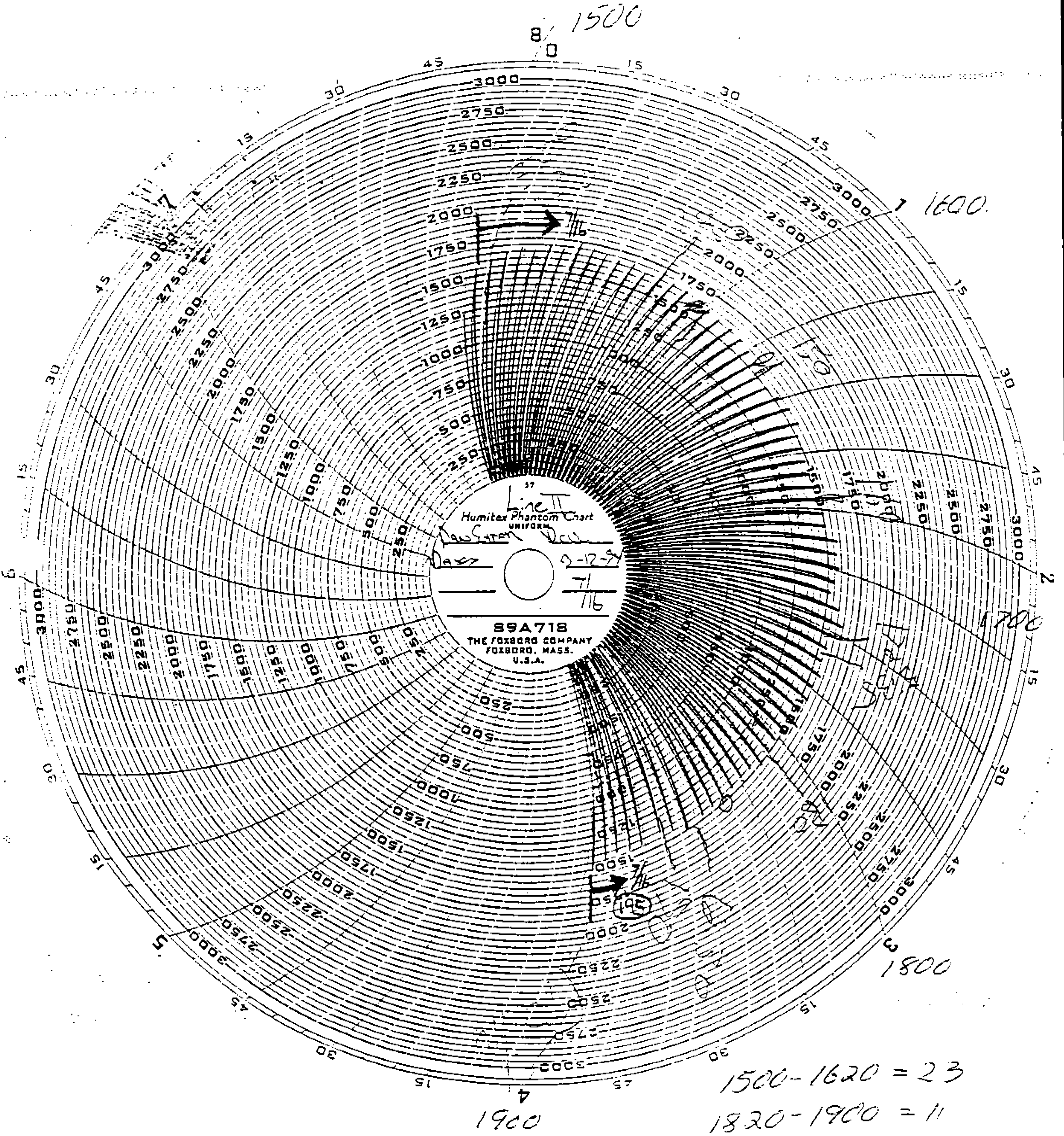
LINE II
PRESS CHART
7-12-94
0700 - 1500



1000-1500 = 88

58

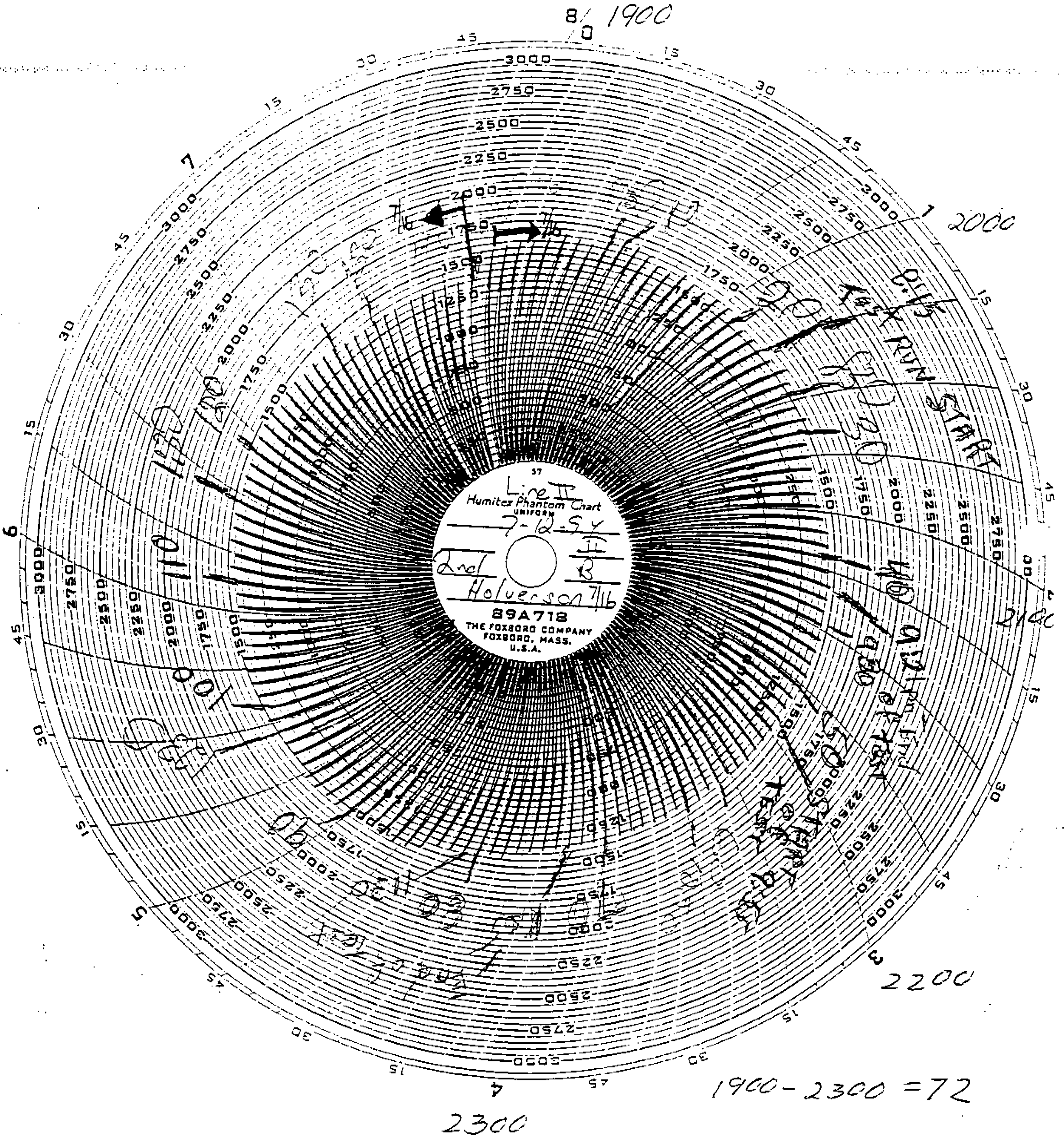
LINE II
PRESS CHART
1500 - 1900
7-12-94



1500-1620 = 23
1820-1900 = 11

59

LINE II
PRESS CHART
7-12-94
1900 - 0300



1900 - 2300 = 72

60

EVERY 10 MINUTES

Hayward Dryer Testing LINE II

DATE JULY 12, 1994
BY
PAGE 1 OF 3

FUEL CALIBRATION: face=____ lb/count core=____ lb/count

TIME	FACE OUT. SET POINT	FACE FEED RATE	FACE INLET TEMP	FACE OUTLET TEMP	FACE FUEL COUNT	FACE WET BIN LEVEL	CORE OUT. SET POINT	CORE FEED RATE	CORE INLET TEMP	CORE OUTLET TEMP	CORE FUEL COUNT	CORE WET BIN LEVEL	DRY BIN LEVEL FACE	DRY BIN LEVEL CORE	EVERY HOUR FLAKE MOISTURE IN	FACE OUT	CORE OUT
8:40	263	50	1236	250	470	60	286	46	1271	287	487	75	80	75			
8:50	263	47	1220	258	538	80	286	46	1240	285	553	80	80	75			
9:00	263	48	1168	260	604	75	286	46	1247	285	620	80	80	75			
9:10	263	47	1117	261	669	70	286	46	1238	286	687	80	75	70			
9:20	263	48	1100	260	731	70	286	47	1229	286	753	80	75	70			
9:30	263	50	1080	260	794	75	286	48	1204	285	817	80	75	70			
9:40	263	49	1094	260	857	80	286	48	1238	286	883	85	70	65			
9:50	263	50	1113	259	921	85	286	48	1230	286	947	85	70	65			
10:00	263	49	1101	261	1000	80	286	49	1221	284	1029	85	70	60		6.6	5.2
10:10	263	50	1101	261	1042	80	286	48	1208	286	1070	85	65	60			
10:20	263	50	1098	261	1103	80	286	49	1211	286	1132	85	65	60			
10:30	263	49	1117	262	1173	75	285	48	1236	284	1202	80	70	65			
10:40	263	50	1120	262	1233	75	285	49	1241	283	1259	85	70	65			
10:50	263	50	1117	261	1295	70	285	48	1217	284	1319	80	70	65			
11:00	263	50	1105	261	1356	70	285	48	1198	284	1381	76	75	65			
11:10	263	50	1092	262	1420	70	285	48	1207	284	1450	80	75	70			
11:20	263	49	1115	261	1482	80	285	48	1230	284	1510	85	70	65			
11:30	263	50	1112	261	1542	80	285	48	1243	284	1577	85	75	70			
11:40	263	50	1141	261	1610	75	285	49	1257	284	1640	80	75	66			
11:50	263	49	1139	261	1673	75	285	49	1267	284	1704	75	75	70			
12:00	263	49	1129	261	1740	70	285	49	1289	284	1774	70	75	70			
12:10	263	50	1136	261	1804	75	285	48	1268	284	1838	70	75	65			
12:20	263	49	1122	261	1867	80	285	47	1219	284	1902	75	75	70			
12:30	263	49	1118	261	1930	70	285	47	1263	284	1965	70	80	70			
12:40	263	46	1098	261	1996	70	285	47	1280	284	2037	70	80	70			
12:50	263	45	1081	262	2054	70	285	47	1307	285	2100	75	80	70			
1:00	263	45	1058	261	2112	70	285	48	1319	284	2168	70	80	70			
1:10	263	46	1057	261	2176	70	285	47	1340	285	2240	75	80	70			
1:20	263	45	1038	260	2235	70	285	47	1343	283	2310	70	85	70			
1:30	263	45	1041	261	2297	70	285	49	1417	284	2386	70	85	70			

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Hayward Dryer Testing LINE II

DATE July 12, 1994
BY
PAGE 2 OF 3

FUEL CALIBRATION: face=_____lb./count core=_____lb./count

TIME	FACE OUT. SET POINT	FACE FEED RATE	FACE INLET TEMP	FACE OUTLET TEMP	FACE FUEL COUNT	FACE WET BIN LEVEL	CORE OUT. SET POINT	CORE FEED RATE	CORE INLET TEMP	CORE OUTLET TEMP	CORE FUEL COUNT	CORE WET BIN LEVEL	DRY BIN LEVEL		EVERY HOUR FLAKE MOISTURE		
													FACE	CORE	IN	FACE OUT	CORE OUT
1:40	263	45	1042	260	2357	70	285	46	1437	285	2461	70	80	70			
1:50	263	44	1043	261	2417	70	285	46	1450	283	2539	70	85	75			
2:00	263	44	1058	261	2481	75	285	46	1427	277	2616	75	80	70			
2:10	263	44	1071	262	2541	70	285	44	1447	279	2701	75	85	70			
2:20	263	44	1092	262	2600	75	285	44	1473	285	2781	76	80	70			
2:30	263	45	1094	262	2662	75	285	43	1476	279	2862	75	80	75			
2:40	263	44	1103	260	2719	70	285	43	1421	284	2936	75	75	70			
2:50	263	44	1109	262	2782	75	285	43	1368	285	3011	75	75	70			
3:00	263	45	1101	261	2844	75	285	44	1379	284	3087	80	75	76			
3:10	263	46	1093	261	2909	70	285	44	1353	285	3169	75	75	75			
3:20	263	45	1082	261	2971	70	285	44	1314	285	3242	85	75	70			
3:30	263	46	1061	260	3025	75	285	46	1323	284	3310	85	75	75			
3:40	263	46	1057	262	3093	75	285	46	1310	284	3381	80	80	75			
3:50	263	45	1054	261	3141	80	283	46	1318	282	3452	85	75	76			
4:00	263	45	1038	260	3195	85	283	46	1328	282	3522	85	75	75			
4:10	263	46	1076	262	3258	75	283	46	1356	283	3600	85	80	75			
4:20	263	46	1099	262	3318	76	283	46	1372	282	3671	85	80	80			
4:30	263	46	1084	262	3377	75	283	46	1378	282	3746	85	80	80			
4:40	263	45	1059	260	3440	75	283	47	1361	283	3822	85	80	80			
4:50	263	45	1062	261	3500	70	281	47	1339	281	3894	80	80	75			
5:00	263	45	1085	261	3566	75	281	47	1333	281	3969	70	80	75			
5:10	263	45	1118	262	3630	70	281	46	1297	280	4038	70	80	80			
5:20	263	45	1083	261	3690	70	281	46	1350	281	4112	75	80	75			
5:30	263	46	1083	261	3754	70	281	46	1330	281	4184	75	80	80			
5:40	263	46	1072	261	3817	70	281	46	1356	281	4255	75	75	75			
5:50	263	46	1066	261	3878	70	281	47	1333	280	4325	75	75	80			
6:00	263	45	1069	261	3937	75	281	46	1291	280	4391	75	75	80			
6:10	263	45	1058	261	3995	70	281	47	1256	280	4457	70	75	75			
6:20	263	46	1058	260	4052	75	281	46	1248	280	4520	76	75	80			
6:30	263	45	1067	262	4112	70	281	46	1248	280	4582	70	75	75			

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Hayward Dryer Testing LINE II

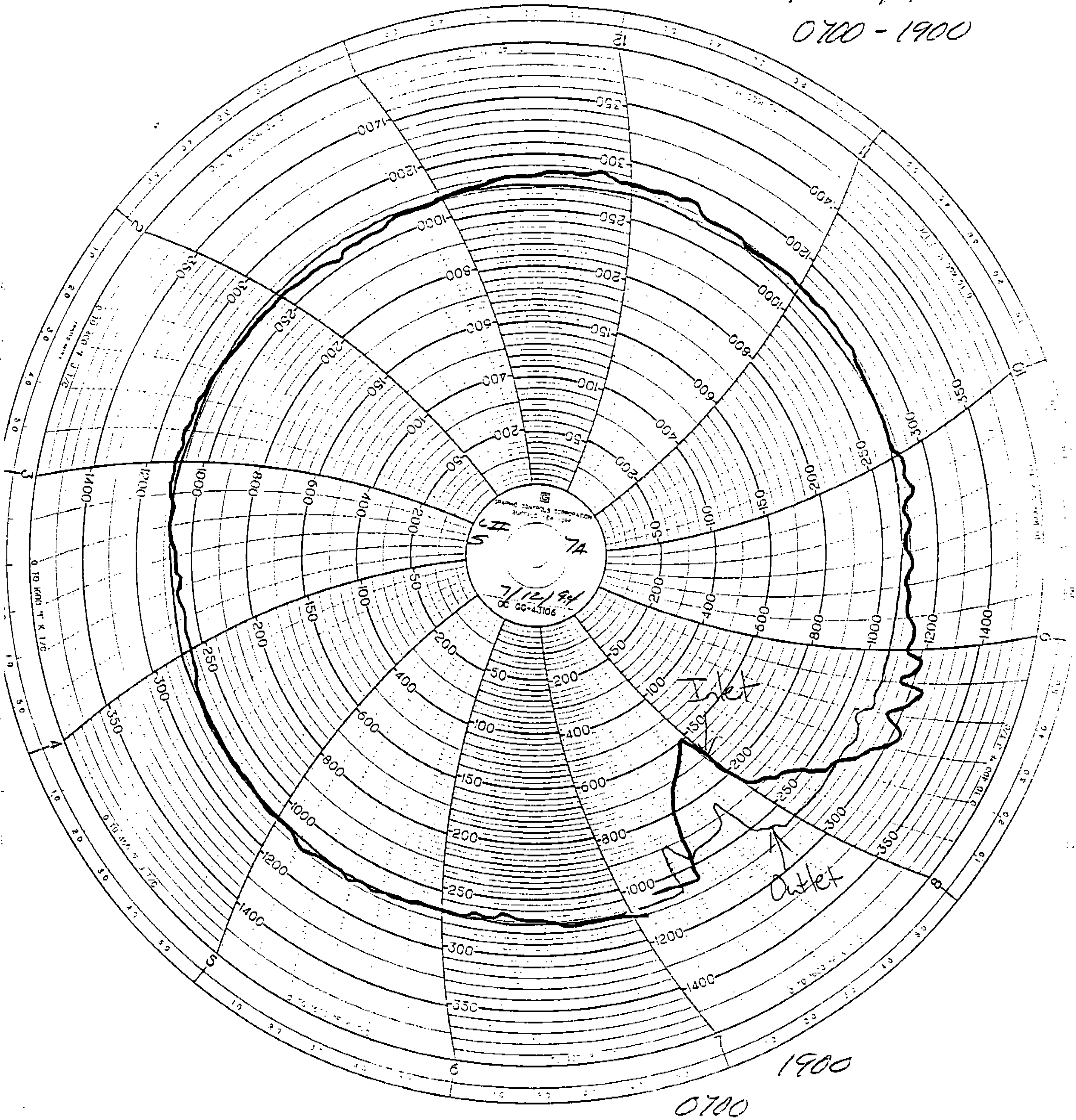
DATE July 12, 1994
BY
PAGE 3 OF 3

FUEL CALIBRATION: face=_____lb/count core=_____lb/count

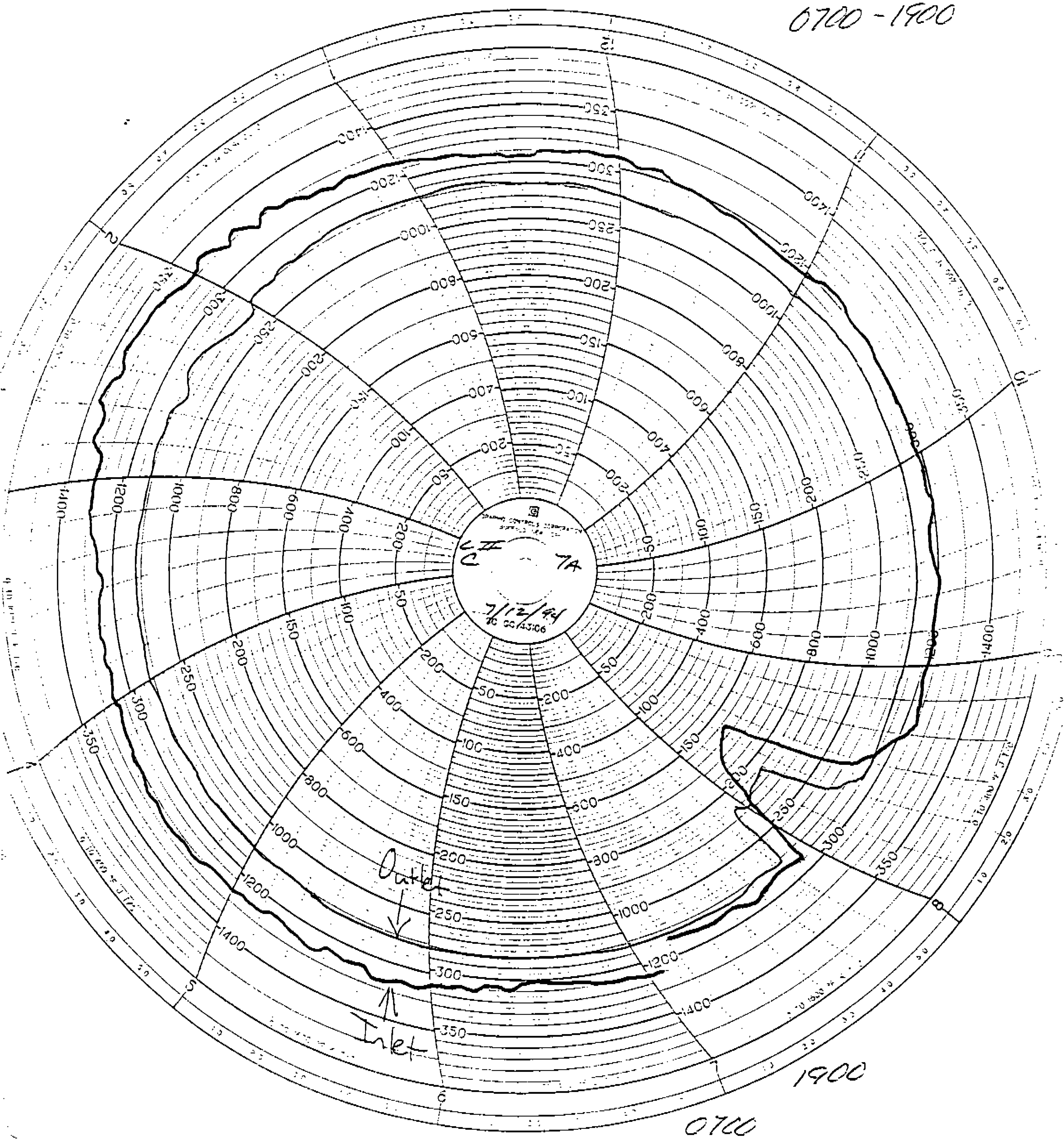
TIME	FACE OUT. SET POINT	FACE FEED RATE	FACE INLET TEMP	FACE OUTLET TEMP	FACE FUEL COUNT	FACE WET BIN LEVEL	CORE OUT. SET POINT	CORE FEED RATE	CORE INLET TEMP	CORE OUTLET TEMP	CORE FUEL COUNT	CORE WET BIN LEVEL	DRY BIN LEVEL FACE	DRY BIN LEVEL CORE	EVERY HOUR FLAKE MOISTURE IN	EVERY HOUR FLAKE MOISTURE FACE OUT	EVERY HOUR FLAKE MOISTURE CORE OUT
6:40	263	45	1094	261	4169	70	281	46	1275	280	4648	70	75	80			
6:50	263	45	1103	261	4231	75	281	46	1283	280	4715	75	75	85			
7:00	263	46	1106	261	4	70	281	47	1291	281	4	70	80	80			
7:10	263	46	1101	261	63	70	281	47	1269	280	69	70	80	85			
7:20	263	46	1096	262	121	70	281	47	1245	280	132	70	75	85			
7:30	263	46	1080	262	177	70	281	46	1270	281	199	75	80	85			
7:40	263	46	1096	262	231	70	281	46	1249	280	260	70	75	80			
7:50	263	46	1063	260	287	70	281	46	1272	280	327	75	75	80			
8:00	263	45	1065	262	344	70	281	46	1323	280	392	75	75	80			
8:10	263	45	1085	261	402	75	281	46	1322	280	461	75	75	80			
8:20	263	46	1080	261	463	75	281	46	1331	279	529	75	75	90			
8:30	263	46	1104	262	521	75	281	46	1345	279	596	75	75	80			
8:40	263	46	1111	261	588	75	281	46	1346	280	665	75	80	80			
8:50	263	45	1097	261	646	75	281	46	1345	280	728	75	80	80			
9:00	263	45	1104	262	706	75	281	47	1375	281	797	80	80	80			
9:10	263	46	1100	260	765	75	281	46	1318	280	859	75	75	85			
9:20	263	45	1086	261	832	75	281	46	1315	280	931	75	75	85			
9:30	263	45	1071	261	896	80	281	46	1282	279	988	80	75	85			
9:40	263	45	1089	262	952	80	281	46	1303	280	1064	75	95	85			
9:50	263	46	1112	261	1011	80	281	46	1302	280	1122	75	95	85			
10:00	263	46	1134	261	1086	80	281	47	1326	282	1199	75	95	85			
10:10	263	46	1167	262	1142	75	281	47	1290	280	1258	80	90	75			
10:20	263	45	1120	263	1206	80	281	46	1268	279	1322	75	90	75			
10:30	263	46	1109	263	1269	85	281	46	1277	281	1389	75	90	75			
10:40	263	45	1099	262	1346	85	281	46	1246	281	1465	75	90	75			
10:50	263	45	1093	262	1405	75	281	47	1236	280	1530	70	90	75			
11:00	263	45	1084	261	1465	75	281	46	1226	281	1584	70	95	75			
11:10	263	46	1097	262	1527	80	281	47	1210	281	1644	70	95	75			
11:20																	
11:30																	

HAYWARD DRYERS
LINE II JULY 12+13

LINE II
SURFACE DRYER
CHART
7-12-94
0700 - 1900

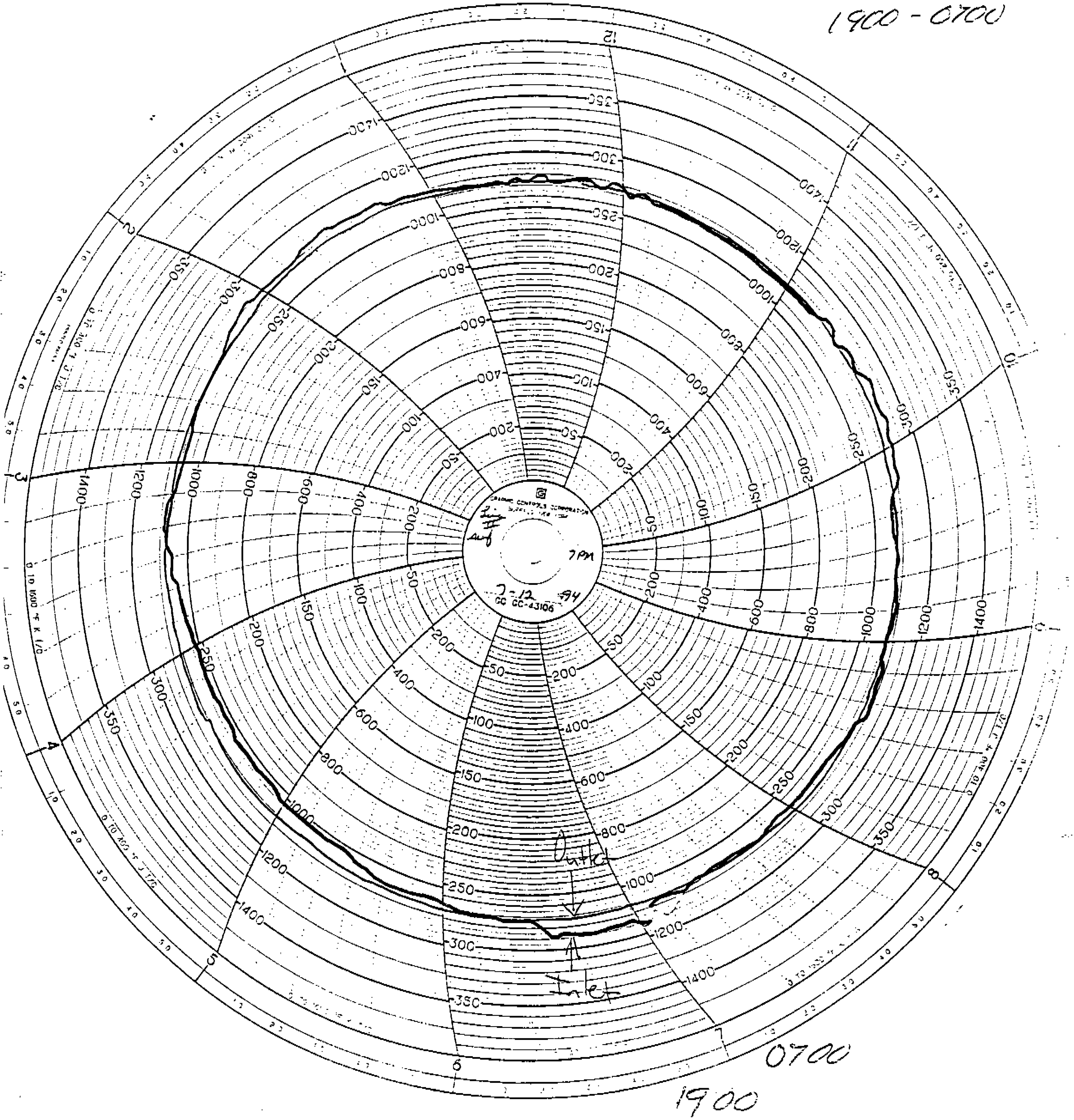


LINE II
CORE DRYER
CHART
7-12-94
0700 - 1900



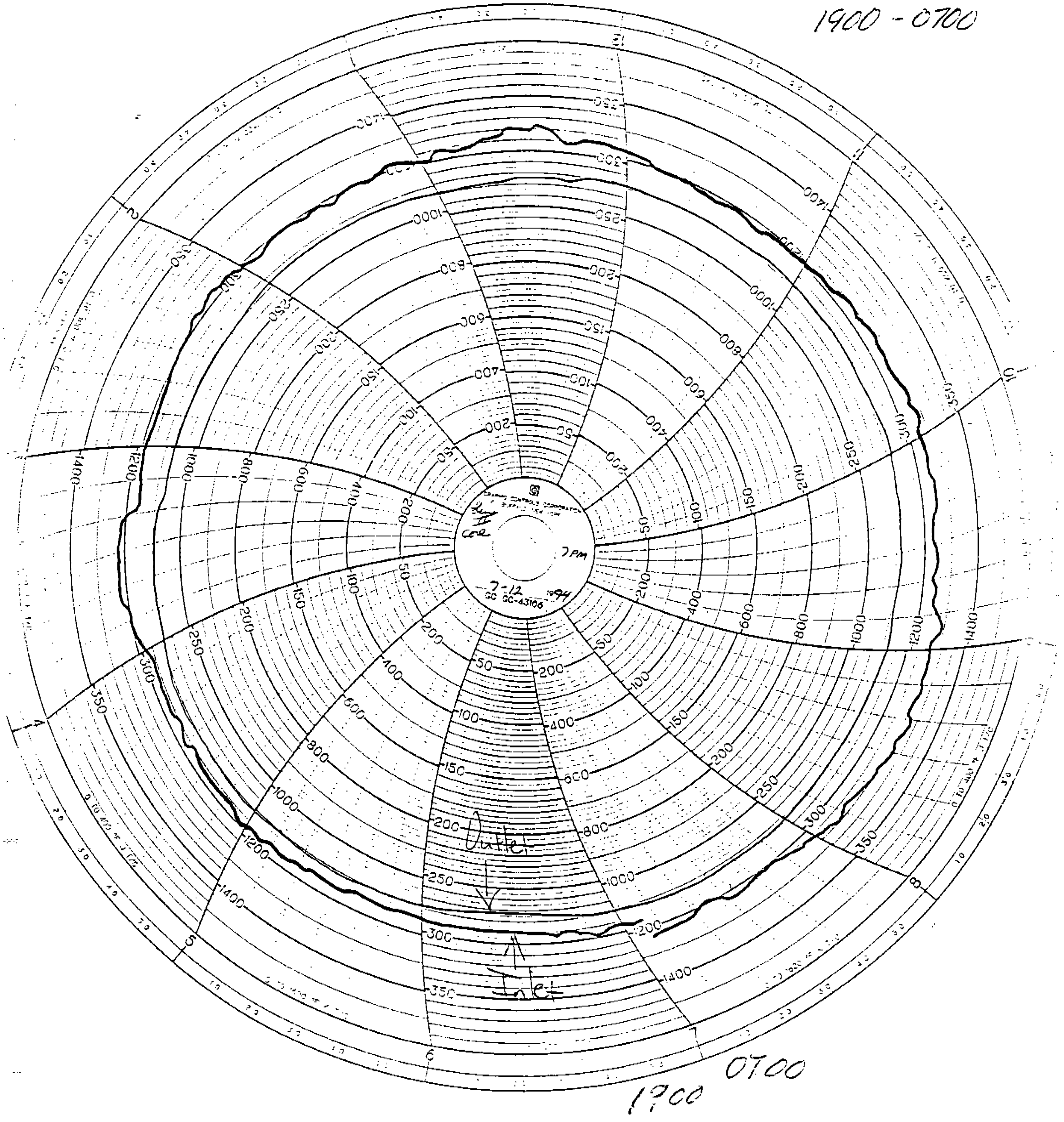
65

LINE II
SURFACE DRYER
CHART
7-12-94
1900 - 0700



66

LINE II
CORE DRYER
CHART
7-12-94
1900 - 0700



67

EVERY 10 MINUTES

EFB READINGS

DATE JULY 12, 1994

BY

PLANT: HAYWARD

source: LINE II

readings every 10 minutes

C S

TIME	"A" SIDE				"B" SIDE					
	BED VOLT	BED CURR.	ION VOLT	ION CURR.	BED VOLT	BED CURR.	ION VOLT	ION CURR.	EFB PRESS.	BAG H. PRESS.
A.m 8:40	12	.01	20.1	2	12	.01	28	1.8	4.2/4.1	2.1
8:50	12.5	.01	22	1	12.5	.01	28	1.5	4.2/4.1	2
9:00	12.5	.01	22	1.5	12.5	.01	28	1.5	4.2/4.1	2
9:10	12.5	.01	21	1	13	.01	28	1.5	4.2/4.1	2
9:20	12.5	.01	21	1	12.5	.01	28	1	4.1/4	2
9:30	12.5	.01	22	1.5	13	.01	29	1.5	4.2/4.2	2
9:40	12.5	.01	22	1.5	12.5	.01	28	1	4.2/4.2	2
9:50	12.5	.01	22	1	12	.01	28	1	4.2/4.2	2
10:00	12.5	.01	22	1	12.5	.01	28	1	4.1/4.1	2
10:10	13	.01	22	1.5	12	.01	25	1	4.2/4.2	2
10:20	13	.01	22	1	12	.01	26	1	4.2/4.2	2
10:30	13	.01	22	1	12.5	.01	26	1	4.2/4.2	2
10:40	13	.01	22	1	12	.01	26	1	4.2/4.2	2
10:50	12.5	.01	22	1	12.5	.01	0	.01 TRIP	4.2/4.3	2
11:00	12.5	.01	21.5	1	12	.01	26	1	9.2/4.2	2
11:10	12	.01	22	1	12	.01	26	1	4.3/4.4	2
11:20	12.5	.01	26	1	12.5	.01	26	1	4.3/4.4	2
11:30	12.5	.01	26	1	12	.01	0	.01	4.3/4.3	2
11:40	12	.01	28	1	12	.01	28	1	4.4/4.2	2
11:50	12	.01	28	1	12	.01	28	1.5	5/4.3	2
12:00	12.5	.01	28	1.5	12.5	.01	28	1.5	5.1/4.5	2
12:10	12.5	.01	28	1	12.5	.01	28	1.5	5.1/4.4	2
12:20	12.5	.01	28	1.5	12.5	.01	28	1.5	5.2/4.4	2
12:30	12.5	.01	28	1	12.5	.01	28	1.5	5.3/4.4	2
12:40	12.5	.01	28	1	12.5	.01	28	1.5	5.3/4.4	2
12:50	12	.01	28	1	12.5	.01	28	1.5	5.5/4.5	2
P.m. 1:00	12	.01	28	1.5	12.5	.01	28	1.5	5.5/4.3	2
1:10	12	.01	28	1	12.5	.01	28	1.5	6/4.3	2
1:20	12	.01	28	1.5	12.5	.01	28	1.5	6.1/4.4	2
1:30	12	.01	28	1.5	12.5	.01	0	.01	6.2/4.3	2

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EFB READINGS

DATE July 12, 1994

BY

PLANT: Hayward

source: Line II

readings every 10 minutes

C S

P.M.

TIME	"A" SIDE				"B" SIDE					
	BED VOLT	BED CURR.	ION VOLT	ION CURR.	BED VOLT	BED CURR.	ION VOLT	ION CURR.	EFB PRESS.	BAG H. PRESS.
1:40	12	.01	28	1.5	12.5	.01	28	1.5	6.4/5	2
1:50	12	.01	28	1.5	12.5	.01	28	1.5	6.4/4.4	2.1
2:00	12	.01	28	1.5	13	.01	26	1	7/4.1	2
2:10	12	.01	28	1.6	13	.01	28	1.5	7.1/4.4	2
2:20	12	.01	18	1	12.5	.01	28	1.6	7.2/4.4	2
2:30	12	.01	18	1.9	12.5	.01	28	1.8	7.4/4.4	2
2:40	12	.01	18	1	12.5	.01	28	1.8	7.3/4.3	2.1
2:50	12	.01	18	.09	12.5	.01	28	1.8	6.3/4.4	2.2
3:00	12.5	.01	18	.06	12.5	.01	28	1.5	6.1/4.4	2.1
3:10	12.5	.01	28	1.5	12.5	.01	28	1.5	6/5	2
3:20	12.5	.01	28	1.5	12.5	.01	28	1.5	6/5	2
3:30	12.5	.01	30	1.8	13	.01	28	1.5	5.4/4.3	2
3:40	12.5	.01	29	1.8	13	.01	28	1.5	6/4.3	2
3:50	12.5	.01	30	1.8	13	.01	28	1.5	6/4.4	1.9
4:00	12	.01	30	1.5	13	.01	28	1.5	6/4.4	2
4:10	12.5	.01	30	1.5	12.5	.01	28	1.5	5.4/4.4	2
4:20	12.5	.01	30	1.5	12.5	.01	0	.01	5.4/4.2	1.9
4:30	12	.01	30	1.5	12.5	.01	26	1	5.4/4.3	1.9
4:40	12.5	.01	30	1.5	13	.01	26	1	5.3/4.3	1.9
4:50	12.5	.01	30	1.5	13	.01	26	1	5.4/4.4	2
5:00	12.5	.01	30	1.5	12.5	.01	26	1	5.3/4.4	2
5:10	12.5	.01	29	1.5	12.5	.01	28	1	5.3/4.2	2
5:20	12.5	.01	29	1.5	12.5	.01	.01	1.5 ~~.01~~	5.3/4.3	1.9
5:30	12.5	.01	29	1.5	12.5	.01	28	1	5.3/4.4	1.9
5:40	12.5	.01	29	1.5	13	.01	29	1	5.4/4.4	1.9
5:50	12	.01	30	1.5	12.5	.01	29	1	5.3/4.4	1.9
6:00	12.5	.01	30	1.5	13	.01	28	1	5.2/4.3	2
6:10	12.5	.01	29	1.5	13	.01	0	.01	5.3/4.3	1.9
6:20	12.5	.01	30	1.5	13	.01	28	1.5	5.3/4.3	1.9
6:30	12.5	.01	30	1.5	13	.01	28	1.5	5.3/5	1.9

EFB READINGS

DATE July 12, 1994

BY

PLANT: Hayward

source: Line II

readings every 10 minutes

c s

TIME	"A" SIDE				"B" SIDE					
	BED VOLT	BED CURR.	ION VOLT	ION CURR.	BED VOLT	BED CURR.	ION VOLT	ION CURR.	EFB PRESS.	BAG H. PRESS.
P.M. 6:40	12.5	.01	30	1.5	13	.01	28	1	5.3/4.4	2
6:50	12.5	.01	30	1.5	13	.01	28	1	5.2/4.3	2
7:00	13	.01	30	1.5	13	.01	28	1	5.3/4.3	1.9
7:10	12.5	.01	30	1.5	13	.01	28	1	5.2/4.3	2
7:20	12.5	.01	30	1.5	13	.01	28	1	5.2/5	2
7:30	12.5	.01	30	1.5	13	.01	28	1	5.2/4.3	1.9
7:40	12	.01	30	1.5	13	.01	28	1	5.2/4.4	2
7:50	12	.01	30	1.5	13	.01	28	1	5.3/4.4	1.9
8:00	12	.01	30	1.5	13	.01	28	1	5.3/4.4	1.9
8:10	12	.01	30	1.5	13	.01	28	1	5.2/5	2
8:20	12	.01	30	1.5	13	.01	28	1	5.2/4.4	1.9
8:30	12	.01	30	1.5	12	.01	28	.01	5.2/4.2	2
8:40	12.5	.03	31	1.4	13	.05	28	1.2	5.6/4.5	1.8
8:50	12	.02	30	1.5	13	.05	29	1	5.3/4.2	2
9:00	12	.04	30	1.5	13	.04	28	1.1	5.2/4.4	1.8
9:10	12.5	.03	31	1.4	12	.05	28	1	5.3/4.2	2
9:20	12	.04	31	1.5	13	.05	28	1	5.4/4.5	2
9:30	12.5	.03	31	1.4	13	.04	27	1.2	5.5/4.5	1.8
9:40	12	.04	30.5	1.4	12.5	.05	29	1.3	5.5/4.5	1.7
9:50	12.5	.04	31	1.5	12.5	.05	28	1.2	5.5/4.7	1.8
10:00	12.5	.04	30.5	1.4	12.5	.07	28.5	1.2	5.7/4.5	1.7
10:10	12.3	.03	31	1.4	12.5	.04	28	1.1	5.6/4.8	1.7
10:20	12.5	.03	30	1.4	12.6	.05	28.5	1.2	5.7/5.0	1.6
10:30	12.5	.03	31	1.4	13	.05	28	1.3	5.7/4.8	1.7
10:40	12.5	.03	30	1.4	13	.04	28	1.2	5.8/4.5	1.8
10:50	12.5	.03	31	1.4	13.5	.05	29	1.3	5.7/4.8	1.7
11:00	12.6	.025	31	1.4	13	.04	28	1.2	5.6/4.6	1.7
11:10	12.5	.02	31	1.4	13	.04	28	1.4	5.6/4.7	1.8
11:20										
11:30										

J-71

LINE II DRYER RTO (EVERY 15 MINUTES) JULY 1, 1994

.m	#1	#2	#3	#4	#5	INLET PRESS.	BURNERS B #1	BURNERS B #2	INLET TEMP.	COMBUST. CHAMBER TEMP.	EXHAUST TEMP.	Δ	GAS
.45	446	517	443	469	491	5.2	1576	1536	214	1596	319	23.0	—
.00	462	496	459	470	483	5.4	1527	1544	221	1582	341	23.3	
.15	457	516	445	482	476	5.7	1570	1636	223	1631	319	23.2	
.30	448	521	455	467	504	5.2	1581	1533	224	1598	324	23.3	
.45	465	501	467	470	491	5.3	1528	1541	225	1586	347	23.1	
0:00	462	512	457	480	480	5.4	1555	1541	225	1617	332	23.1	
.15	448	529	454	471	501	6.3	1578	1527	225	1626	319	23.0	
.30	465	502	472	468	495	5.3	1527	1544	225	1592	348	23.0	
.45	464	511	462	478	483	5.3	1557	1544	225	1624	334	23.0	
1.00	450	524	463	465	510	52	1579	1533	225	1599	325	23.1	
.15	454	516	470	461	512	4.8	1576	1536	225	1590	330	23.0	
.30	462	516	458	479	483	5.7	1567	1538	224	1629	327	22.8	
.45	451	528	456	473	497	5.2	1577	1522	223	1625	319	23.0	
2:P	451	522	465	462	511	5.6	1575	1533	223	1588	325	23.0	
.15	466	508	466	474	485	5.0	1558	1541	223	1603	337	22.7	
.30	458	524	454	480	481	5.4	1556	1540	224	1637	324	22.5	
.45	453	532	452	480	490	3.9	1585	1528	224	1633	323	22.7	
1:00	462	511	471	468	500	3.6	1518	1541	225	1578	348	22.6	
.15	460	524	456	483	484	5.5	1653	1549	225	1637	327	21.7	
.30	455	532	454	482	488	6.3	1582	1538	226	1643	325	22.0	
.45	459	516	472	467	506	5.3	1516	1535	225	1568	350	22.1	
2:00	464	517	466	478	488	5.1	1532	1542	225	1596	340	21.5	
.15	446	542	453	476	503	5.1	1578	1524	225	1612	319	21.3	
.30	456	521	469	468	509	5.2	1534	1538	224	1570	353	21.3	
.45	453	535	469	467	511	5.6	1545	1541	225	1576	350	21.8	

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1-72

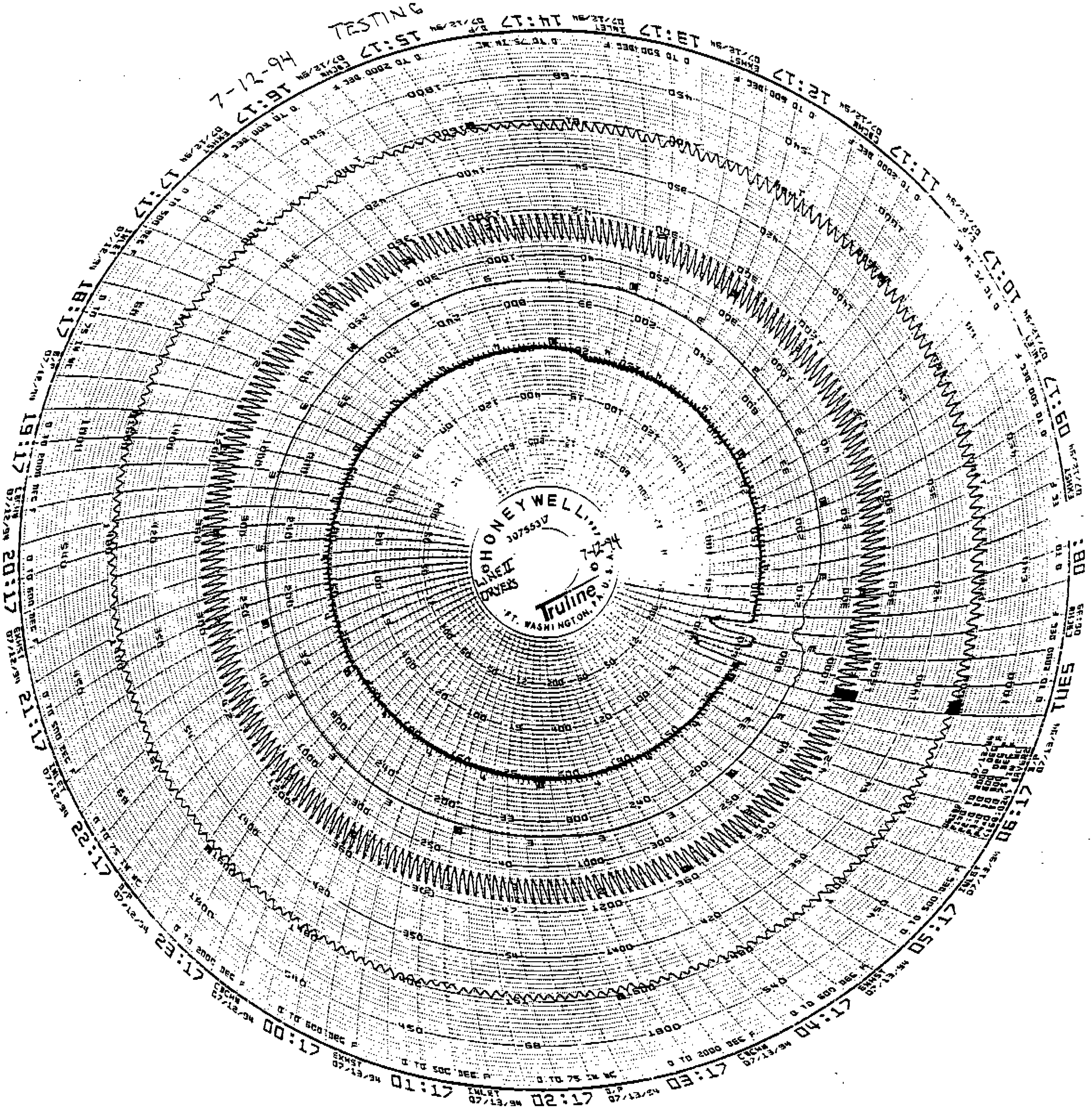
LINE II DRYER RTO (EVERY 15 MINUTES) JULY 12, 1994

	#1	#2	#3	#4	#5	INLET PRESS.	BURNERS B #1	BURNERS B #2	INLET TEMP.	COMBUST. CHAMBER TEMP.	EXHAUST TEMP.	△ ~~AMP.~~	GAS
00	448	543	450	480	498	5.4	1575	1521	225	1618	319	22.6	—
15	445	542	453	475	505	6.2	1581	1527	225	1613	320	22.2	
30	446	539	457	471	511	5.7	1581	1525	225	1593	327	22.4	
45	463	516	466	477	491	5.1	1533	1540	226	1589	347	22.4	
:00	447	537	459	471	512	5.6	1584	1531	226	1603	325	22.3	
15	461	515	473	468	506	4.2	1517	1544	227	1580	350	22.7	
30	455	534	464	482	492	5.4	1571	1532	226	1640	325	22.7	
45	448	540	457	473	509	6.1	1581	1620	226	1601	322	22.3	
:00	457	519	473	466	513	4.6	1523	1541	226	1576	353	22.6	
15	464	515	470	473	496	4.9	1531	1541	225	1598	347	22.4	
30	448	537	460	470	515	5.5	1584	1531	225	1603	326	22.3	
45	463	513	475	468	508	4.0	1514	1537	226	1573	350	22.8	
:00	466	516	467	479	491	4.6	1542	1562	226	1613	339	22.6	
15	453	537	455	480	502	5.2	1568	1521	225	1622	323	23.1	
:30	465	518	464	481	490	5.6	1550	1548	226	1619	337	22.6	
45	468	511	470	477	495	5.0	1532	1539	226	1589	344	22.6	
:00	451	534	460	474	509	5.1	1576	1520	226	1613	320	22.6	
15	451	529	465	468	518	5.5	1581	1529	226	1605	326	22.6	
30	459	512	477	464	519	4.5	1637	1541	226	1579	351	22.6	
45	463	518	463	480	491	5.6	1540	1544	226	1631	332	22.6	
:00	453	522	469	464	521	5.5	1579	1536	225	1595	328	22.9	
15	468	505	475	470	503	4.7	1525	1541	226	1581	352	22.4	
30	467	508	470	474	497	4.8	1536	1639	225	1590	341	22.8	
45	459	520	460	478	495	5.6	1568	1542	225	1639	326	23.0	
:00	455	515	475	459	523	5.5	1565	1537	225	1575	336	23.1	

LINE II DRYER RTO (EVERY 15 MINUTES) July 12, 1994

	#1	#2	#3	#4	#5	INLET PRESS.	BURNERS B #1	BURNERS B #2	INLET TEMP.	COMBUST. CHAMBER TEMP.	EXHAUST TEMP.	Δ ~~AMP~~.	GAS
5	464	502	481	463	510	5.1	1518	1539	225	1576	346	23.1	—
30	450	517	474	459	525	4.8	1574	1529	224	1579	330	23.2	
45	458	505	479	461	518	4.4	1521	1540	224	1673	347	23.1	
:00	461	512	465	477	492	5.2	1655	1647	225	1617	335	22.7	
15	446	529	463	469	516	6.2	1578	1623	224	1603	319	22.8	
30	446	529	462	470	515	6.1	1575	1522	225	1605	318	22.9	
45	461	513	464	478	495	5.5	1555	1549	224	1622	334	22.9	
:00	463	504	477	467	508	5.7	1518	1540	225	1575	349	23.1	
15	464	504	476	468	505	4.5	1524	1536	225	1578	350	22.6	
30													
45													
:00													

LINE II
DRYER RTO CHART
7-12-94



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HAYWARD OSB
LINE II
JULY 12, 1994

SECONDARIES

CORE				SURFACE			
TIME	BARREL FULL	BARREL EMPTY	TOTAL WEIGHT	TIME	BARREL FULL	BARREL EMPTY	TOTAL WEIGHT
10:17	STARTING TIME			10:17	STARING TIME		
10:47	39.0	18.4	20.6	10:47	52.2	31.2	21.0
11:17	54.2	33.8	20.4	11:17	52.6	31.4	21.2
11:47	38.4	18.4	20.0	11:47	53.9	31.2	22.7
12:17	53.2	33.6	19.6	12:17	52.2	31.4	20.8
12:47	36.2	18.4	17.8	12:47	51.7	31.2	20.5
1:17	52.7	33.2	19.5	1:17	49.4	31.4	18.0
1:47	36.0	18.2	17.8	1:47	51.8	31.2	20.6
2:17	49.4	32.6	16.8	2:17	49.2	31.4	17.8
2:47	34.6	18.4	16.2	2:47	50.4	31.2	19.2
3:17	49.6	31.8	17.8	3:17	52.8	31.4	21.4
3:47	34.6	18.4	16.2	3:47	50.2	31.2	19.0
4:17	49.6	31.8	17.8	4:17	51.2	31.4	19.8

40.33

36.75

HAYWARD OSB
LINE II
JULY 12, 1994

FLAKE MOISTURE

	WET	DRY
8:00 AM	C 44.4 S 47.9	C 5.8 S 5.6
9:00 AM	C 46.3 S 45.3	C 5.4 S 5.7
10:00 AM	C 43.6 S 42.0	C 4.0 S 5.6
11:00 AM	C 44.0 S 45.9	C 4.5 S 5.3
12:00 PM	C 48.7 S 45.3	C 6.0 S 4.9
1:00 PM	C 46.5 S 47.4	C 5.2 S 5.9
2:00 PM	C 48.4 S 48.2	C 3.9 S 5.7
3:00 PM	C 47.8 S 47.3	C 3.8 S 4.9
4:00 PM	C 45.0 S 44.4	C 3.8 S 6.0
5:00 PM	C 48.9 S 45.6	C 3.4 S 4.4
6:00 PM	C 47.5 S 44.8	C 4.8 S 4.5
7:00 PM	C 47.6 S 44.7	C 5.2 S 4.7
8:00 PM	C 48.6 S 48.1	C 4.3 S 5.6
9:00 PM	C 50.1 S 48.3	C 4.9 S 4.5
10:00 PM	C 48.4 S 47.9	C 5.2 S 6.0
11:00 PM	C 45.1 47.5	C 4.6 S 6.7

AVERAGE 46.6

[illegible]

LINE II
PRESS WTS
7/16
TRIM %

JULY 12, 19

#2296
2136 AFTER SAWS
160 lb trim
7.5%

LINE 2 DRYER TESTING JULY 13, 1994 PHENOL
DATA TIME: START= 08:40 END= 14:00 HOURS= 5.33

BOARD WEIGHTS - LBS

weights of approximately every 25th untrimmed board (from press tapes)

7/16

194	184	194	184	186
196	192	186	190	184
190	192	192	190	
194	198	190	190	
182	192	190	194	
198	190	188	194	
192	196	192	192	
196	160	192	192	
190	196	190	188	
192	198	190	190	
188	190	192	188	

190.4 lb=average untrimmed mat weight

176.1 lb=average finished board weight (untrimmed mat weight-weight of trim)

7.5% =trim %

PLANT PRODUCTION RATE

5.33 =hours during testing
90 =pressloads
1080 =no. of 8'x16' boards produced (pressloads x 12 boards per load)
190,199 =lbs of finished product (boards produced x weight of finished board)
35662 =lbs of finished product per hour (lbs of finshed product / hours)
17.83 =tons of finished product per hour (lbs of finshed product per hour / 2000 lb)

FUEL BURNING RATE ESTIMATED BY DRY FUEL INPUT

SURFACE

10 =SURFACE fuel calibration in pounds per count
2033 =SURFACE counts during testing hours
20330 =SURFACE lbs of fuel burned during testing
5.33 =hours during testing
3812 =lbs of dry fuel burned per hour during testing (pounds of dry fuel / testing hours)
1.91 =tons of dry fuel burned per hour during testing (pounds of dry fuel / 2000 lbs)
8600 =estimated BTU content per pound of dry fuel,
32.8 =estimated mmbtu input per hour (lbs of dry fuel per hour x btu content)
1108 =average inlet temperature
46.9% =average incoming moisture percent
5.4% =average dry moisture percent

CORE

10 =CORE fuel calibration in pounds per count
1960 =CORE counts during testing hours
19600 =CORE lbs of fuel burned during testing
5.33 =hours during testing
3675 =lbs of dry fuel burned per hour during testing (pounds of dry fuel / testing hours)
1.84 =tons of dry fuel burned per hour during testing (pounds of dry fuel / 2000 lbs)
8600 =estimated BTU content per pound of dry fuel,
31.6 =estimated mmbtu input per hour (lbs of dry fuel per hour x btu content)
1127 =average inlet temperature
46.9% =average incoming moisture percent
6.6% =average dry moisture percent

DRYER THROUGHPUT RATE

7487 =Total pounds of fuel burned per hour in Core and Surface Dryer
35662 =lbs of finished product per hour (lbs of finshed product / hours)
43149 =Pounds of material produced by the dryer per hour (dry basis, assumming fuel balances)
2892 = weight of trim per hour at 7.5% of finished product
4595 =weight of screened fines per hour (total fuel - trim)
10.65% =resulting loss to fines as percentage of dryer throughput

LINE 2 DRYER TESTING JULY 13, 1994 POM
DATA TIME: START= 08:40 END= 17:20 HOURS= 8.67

BOARD WEIGHTS - LBS

weights of approximately every 25th untrimmed board (from press tapes)

194	192	192	190	192	198
196	192	190	194	196	202
190	198	190	194	188	196
194	192	188	192	192	194
182	190	192	192	192	186
198	196	192	188	190	194
192	160	190	190	188	194
196	196	190	188	194	198
190	198	192	186	196	188
192	190	184	184	206	192
188	194	190	188	196	192
184	186	190	186	198	192

191.5 lb=average untrimmed mat weight

177.1 lb=average finished board weight (untrimmed mat weight-weight of trim)

7.5% =trim %

PLANT PRODUCTION RATE

8.67 =hours during testing
146 =pressloads
1752 =no. of 8'x16' boards produced (pressloads x 12 boards per load)
310,297 =lbs of finished product (boards produced x weight of finished board)
35803 =lbs of finished product per hour (lbs of finshed product / hours)
17.90 =tons of finished product per hour (lbs of finshed product per hour / 2000 lb)

FUEL BURNING RATE ESTIMATED BY DRY FUEL INPUT

SURFACE

10 =SURFACE fuel calibration in pounds per count
3274 =SURFACE counts during testing hours
32740 =SURFACE lbs of fuel burned during testing
8.67 =hours during testing
3778 =lbs of dry fuel burned per hour during testing (pounds of dry fuel / testing hours)
1.89 =tons of dry fuel burned per hour during testing (pounds of dry fuel / 2000 lbs)
8600 =estimated BTU content per pound of dry fuel,
32.5 =estimated mmbtu input per hour (lbs of dry fuel per hour x btu content)
1099 =average inlet temperature
46.9% =average incoming moisture percent
5.5% =average dry moisture percent

CORE

10 =CORE fuel calibration in pounds per count
3362 =CORE counts during testing hours
33620 =CORE lbs of fuel burned during testing
8.67 =hours during testing
3879 =lbs of dry fuel burned per hour during testing (pounds of dry fuel / testing hours)
1.94 =tons of dry fuel burned per hour during testing (pounds of dry fuel / 2000 lbs)
8600 =estimated BTU content per pound of dry fuel,
33.4 =estimated mmbtu input per hour (lbs of dry fuel per hour x btu content)
1174 =average inlet temperature
46.9% =average incoming moisture percent
5.5% =average dry moisture percent

DRYER THROUGHPUT RATE

7657 =Total pounds of fuel burned per hour in Core and Surface Dryer
35803 =lbs of finished product per hour (lbs of finshed product / hours)
43460 =Pounds of material produced by the dryer per hour (dry basis, assumming fuel balances)
2903 = weight of trim per hour at 7.5% of finished product
4754 =weight of screened fines per hour (total fuel - trim)
10.94% =resulting loss to fines as percentage of dryer throughput

LOUISIANA-PACIFIC CORPORATION
HAYWARD, WI

PRESS REPORT - LINE II

OPERATOR Leste SHIFT 7am - 7pm CREW A DATE 7-13-

THICKNESS: 7/16SR

PRESS LOADS 203

OVERALL TIMER: 143

DECOMPRESSION TIME 12

PRESS TEMP: 210°

TOTAL REJECTS: 0

LOG COUNT: 7144

F.C.O.S. END RADIATOR 1015

~~Cleaned Header Shrouds & Stacks~~

Cleaned Deckle Chains

Press Blow Down 9:45

~~Headers Cleaned~~ ~~YES/NO~~

~~How Many~~

~~Former End Radiator~~ Time

3/8 = 363,786

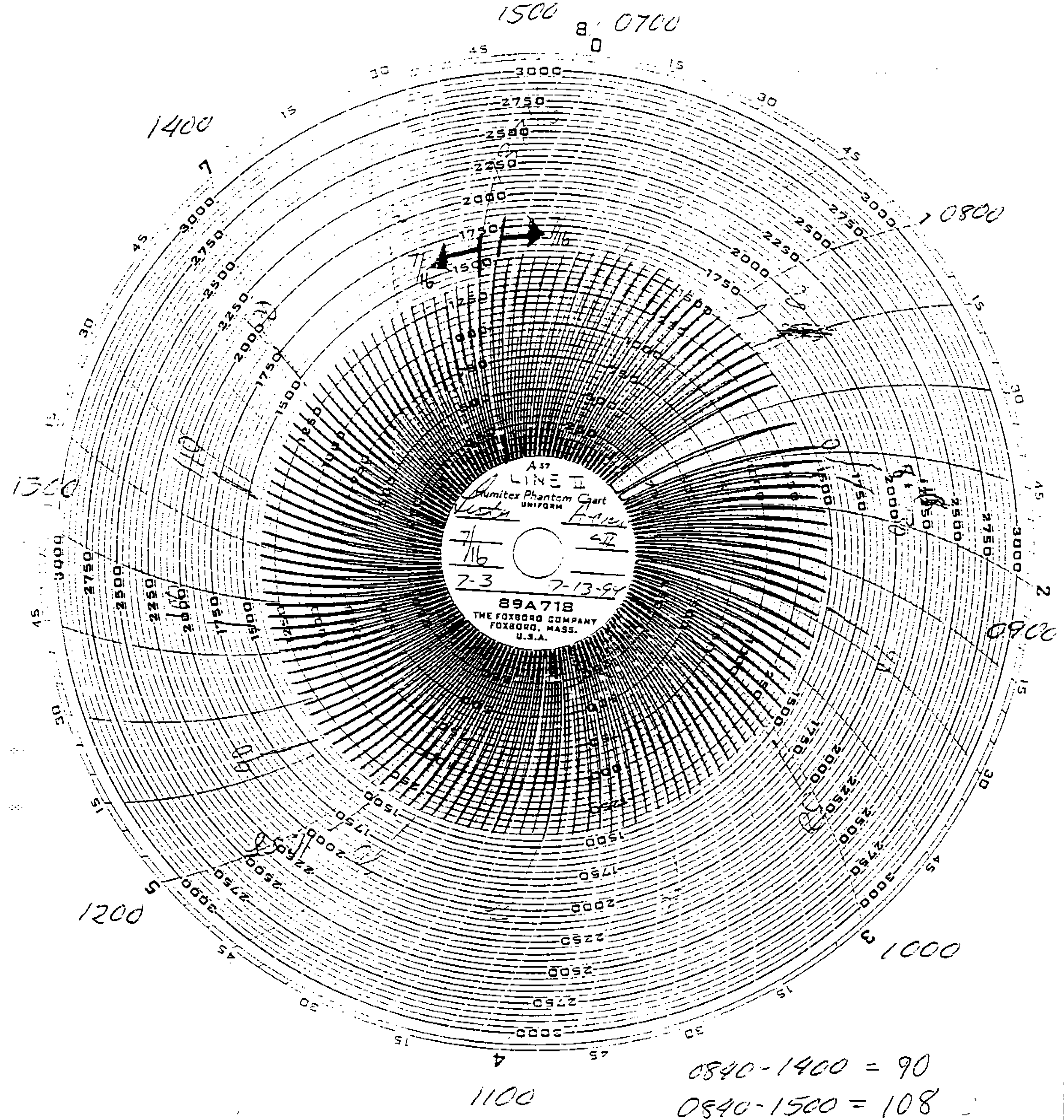
LINE SPEED	FROM	TO
62	7:00	7:00

DOWNTIME		DOWNTIME (Mins)			KEY	REASONS FOR DOWNTIME
FROM	TO	M	E	O		
8:30	:37	✓			5	Board stuck in press Slot #1.
8:43	:45	✓			2	Caul in feed drive limit wand broke.
9:33	:36	✓			3	Screen balled up #3B conv.
3:12	:17	✓			5	Screen ~~fishtail~~ slipping #4 conv. *
3:31	:33	✓			2	" " " " *
4:32	:34	✓			2	" " " " *
5:52	:54	✓			2	" " " " *
6:21	:23	✓			2	" " " " *
						* Screens slipping due to oil
						flowing from press and
						saturating the belts on 3A, 3B,
						and #4 convs.

Downtime Code: M - Mechanical E - Electrical O - Operator

80

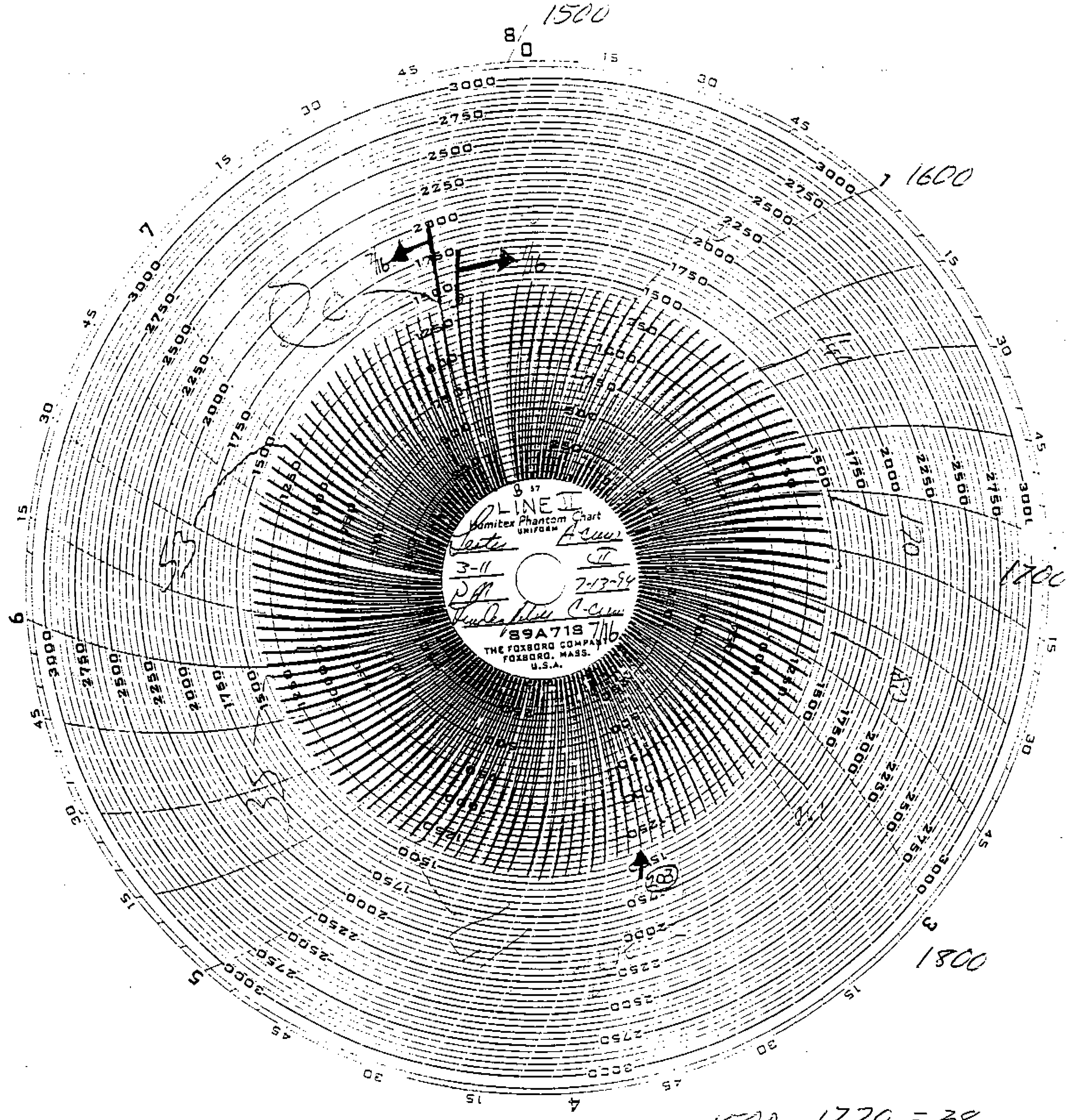
LINE II
PRESS CHART
7-13-94
0700 - 1500



0840-1400 = 90
0840-1500 = 108

81

LINE II
PRESS CHART
7-13-94
1500 -2300



1500 - 1720 = 38

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J-83

Hayward Dryer Testing LINE II

DATE JULY 13 1994
BY
PAGE 1 OF 2

FUEL CALIBRATION: face=____ lb/count core=____ lb/count

TIME	FACE OUT. SET POINT	FACE FEED RATE	FACE INLET TEMP	FACE OUTLET TEMP	FACE FUEL COUNT	FACE WET BIN LEVEL	CORE OUT. SET POINT	CORE FEED RATE	CORE INLET TEMP	CORE OUTLET TEMP	CORE FUEL COUNT	CORE WET BIN LEVEL	DRY BIN LEVEL FACE	DRY BIN LEVEL CORE	EVERY HOUR FLAKE MOISTURE IN	EVERY HOUR FLAKE MOISTURE FACE OUT	EVERY HOUR FLAKE MOISTURE CORE OUT
8:10	263	45	1059	261	297	80	280	45	1143	279	441	80	60	80			
8:20	263	47	1064	261	331	80	280	44	1160	280	474	75	60	80			
8:30	263	46	1131	261	399	80	280	44	1156	279	534	75	65	85			
8:40	262	47	1115	260	464	80	280	45	1167	280	596	75	70	85			
8:50	262	46	1120	261	531	85	280	41	1130	279	658	75	70	85			
9:00	262	47	1112	261	590	85	280	41	1103	277	710	80	70	85			
9:10	262	47	1121	261	655	85	280	41	1094	280	767	75	70	85			
9:20	262	46	1110	260	716	85	280	40	1080	278	823	75	75	85			
9:30	262	47	1120	260	780	85	280	43	1072	280	879	80	80	86			
9:40	262	46	1114	260	843	80	280	42	1084	279	938	75	80	80			
9:50	262	47	1082	261	921	80	280	42	1096	278	1013	75	80	85			
10:00	262	46	1075	261	960	80	280	42	1094	279	1052	75	80	80			
10:10	262	47	1079	260	1022	80	280	43	1103	278	1111	75	80	90			
10:20	262	47	1104	261	1086	80	280	43	1094	280	1170	80	80	80			
10:30	262	47	1087	260	1143	80	280	43	1087	278	1226	80	80	75			
10:40	262	46	1085	260	1202	85	280	42	1099	279	1284	85	75	75			
10:50	262	47	1085	260	1266	95	280	44	1139	278	1352	85	80	75			
11:00	262	47	1094	260	1327	85	280	45	1164	279	1410	85	80	75			
11:10	262	46	1128	261	1391	80	280	44	1164	279	1472	85	80	80			
11:20	262	46	1123	260	1455	80	280	44	1178	280	1535	85	80	80			
11:30	262	46	1154	258	1524	80	280	45	1153	279	1598	80	85	75			
11:40	262	46	1171	258	1586	80	280	44	1130	280	1655	75	85	75			
11:50	262	46	1163	259	1656	75	280	45	1120	279	1720	75	85	75			
12:00	262	46	1143	260	1720	70	280	45	1093	278	1780	70	85	75			
12:10	262	46	1129	259	1788	75	280	45	1113	277	1845	75	85	75			
12:20	262	46	1112	259	1849	80	280	45	1121	277	1905	75	85	75			
12:30	262	47	1123	260	1915	75	280	46	1121	279	1968	75	85	75			
12:40	262	47	1107	260	1979	80	280	45	1112	279	2030	75	85	70			
12:50	263	46	1106	260	2066	80	280	45	1147	279	2115	80	85	70			

83

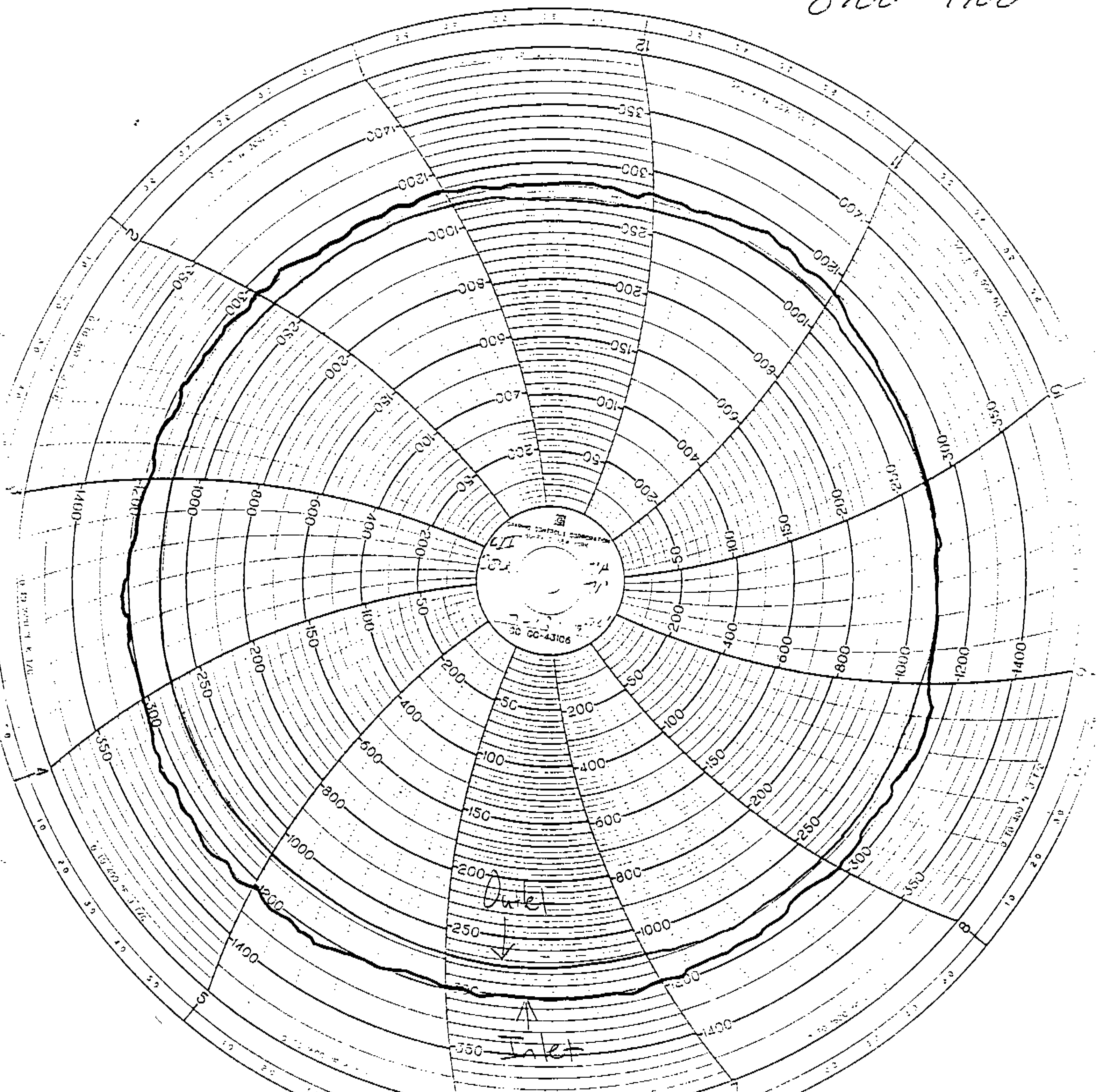
Hayward Dryer Testing Line II

DATE 7-13-94
BY
PAGE 2 OF 2

FUEL CALIBRATION: face=_____lb./count core=_____lb./count

TIME	FACE OUT. SET POINT	FACE FEED RATE	FACE INLET TEMP	FACE OUTLET TEMP	FACE FUEL COUNT	FACE WET BIN LEVEL	CORE OUT. SET POINT	CORE FEED RATE	CORE INLET TEMP	CORE OUTLET TEMP	CORE FUEL COUNT	CORE WET BIN LEVEL	DRY BIN LEVEL FACE	DRY BIN LEVEL CORE	EVERY HOUR FLAKE MOISTURE IN	EVERY HOUR FLAKE MOISTURE FACE OUT	EVERY HOUR FLAKE MOISTURE CORE OUT
13:00	263	46	1079	261	2110	80	280	45	1156	279	2162	80	85	70			
13:10	263	47	1092	262	2175	80	281	45	1168	280	2228	75	85	70			
13:20	263	47	1097	261	2244	70	281	46	1170	281	2297	70	85	70			
13:30	263	46	1089	262	2307	75	281	46	1150	278	2360	70	85	70			
13:40	263	47	1074	261	2376	75	281	46	1170	279	2429	75	85	70			
13:50	263	47	1083	261	2436	80	281	45	1155	279	2492	80	85	70			
14:00	263	47	1076	261	2497	85	281	46	1166	280	2556	85	85	70			
14:10	263	47	1068	261	2560	85	281	46	1184	280	2626	85	85	70			
14:20	263	46	1081	261	2623	85	281	45	1196	281	2694	85	85	70			
14:30	263	47	1107	262	2685	85	281	45	1209	281	2763	85	85	70			
14:40	263	47	1109	261	2752	80	281	46	1219	280	2833	85	85	70			
14:50	263	46	1088	260	2816	80	281	45	1204	280	2901	85	85	65			
15:00	263	46	1098	261	2879	85	280	46	1209	280	2969	85	85	65			
15:10	263	47	1135	261	2947	85	280	47	1208	279	3038	80	85	70			
15:20	263	46	1142	262	3012	80	280	46	1257	280	3108	80	85	70			
15:30	263	46	1160	261	3075	75	280	46	1280	280	3179	85	85	70			
15:40	263	46	1135	261	3144	80	280	46	1266	279	3252	80	85	70			
15:50	262	44	1178	262	3212	85	280	47	1257	279	3320	85	85	75			
16:00	262	42	1140	259	3276	80	279	46	1259	279	3388	85	85	75			
16:10	262	41	1096	260	3333	80	279	46	1280	279	3458	85	85	75			
16:20	263	40	1059	260	3393	80	279	46	1279	279	3533	80	85	76			
16:30	263	39	1053	262	3452	80	279	47	1278	278	3602	85	85	75			
16:40	263	39	1025	260	3507	80	279	46	1302	278	3674	85	85	75			
16:50	265	37	1009	263	3562	85	279	47	1295	278	3744	85	85	75			
17:00	265	38	1021	261	3622	85	279	46	1287	279	3815	85	85	75			
17:10	265	38	1014	263	3680	85	279	46	1268	277	3885	88	85	80			
17:20	265	38	998	261	3738	85	279	45	1271	277	3958	85	85	80			
17:30																	
17:40																	
17:50																	

LINE II
CORE DRYER
CHART
7-13-94
0700 - 1900

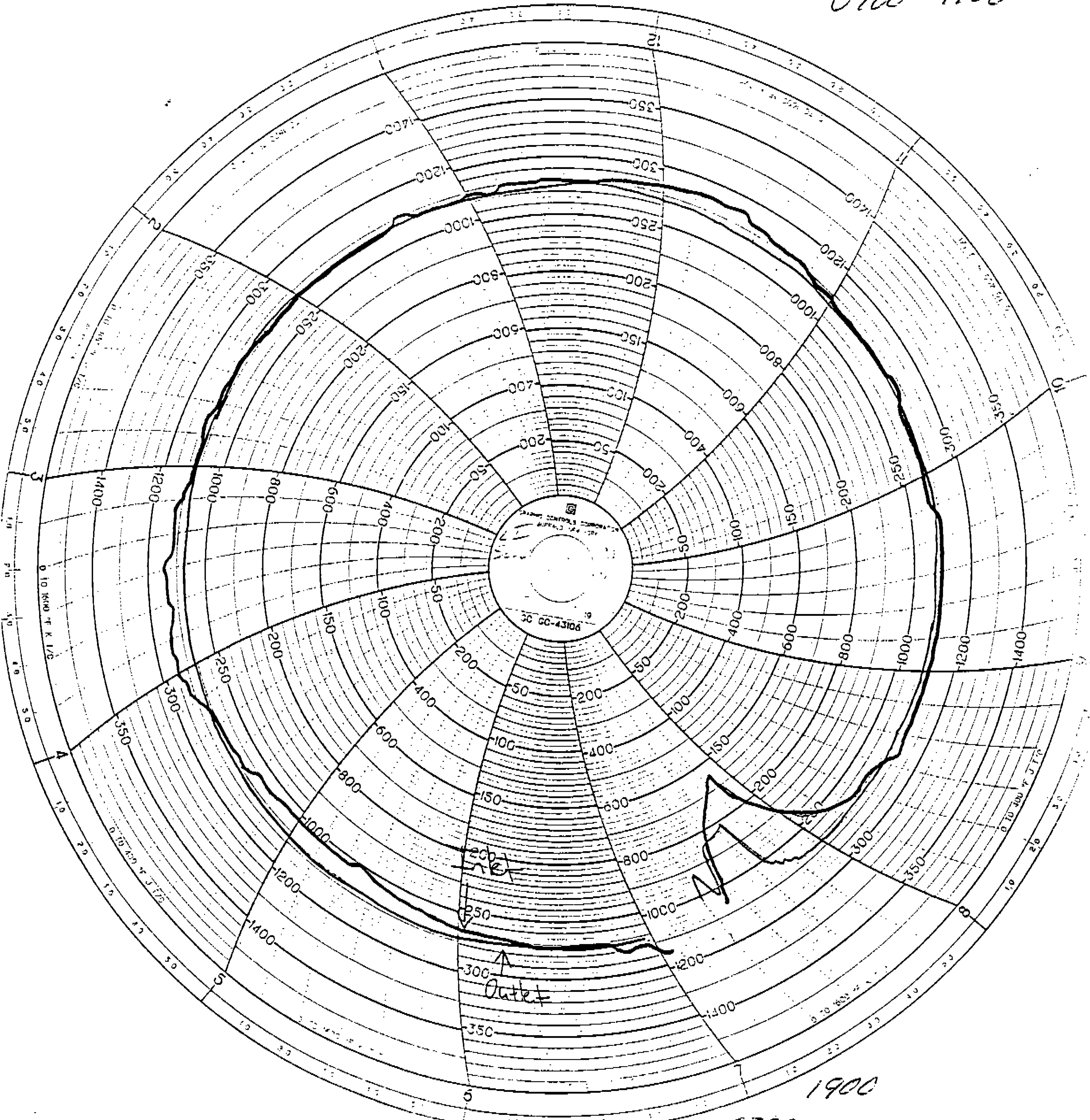


1900

0700

85

LINE II
SURFACE DRYER
CHART
7-13-94
0700 - 1900



1900

0700

86

EFB READINGS

DATE 7-13-94

BY

PLANT:- Hayward - LINE II

c / s

TIME	"A" SIDE				"B" SIDE					
	BED VOLT	BED CURR.	ION VOLT	ION CURR.	BED VOLT	BED CURR.	ION VOLT	ION CURR.	EFB PRESS.	BAG H. PRESS.
8:10	11.5	.01	30	1.5	12	.01	20	2	5/4.2	2
8:20	12	.01	30	1.5	12.5	.01	22	1.5	5.1/4.2	2
8:30	11	.01	30	1.5	12.5	.01	24	2	5/4.3	2
8:40	12	.01	30	1.5	12.5	.01	22	2	5.1/4.3	2
8:50	12	.01	30	1.5	13	.01	24	2	5/4.3	2
9:00	11.5	.01	30	1.5	12.5	.01	26	2	5/4.1	1.9
9:10	12	.01	28	3	12.5	.01	26	2	5/4.3	1.9
9:20	11.5	.01	28	3	12.5	.01	26	2	5/4.3	1.9
9:30	12	.01	28	3	12.5	.01	26	2	4.4/9.3	1.9
9:40	11.5	.01	28	3	13	.01	26	2	5/4.2	1.9
9:50	12	.01	28	3	13	.01	26	2	5/4.4	2
10:00	12	.01	30	2.5	13	.01	26	2	5/4.3	1.9
10:10	11.5	.01	28	2.5	13	.01	26	2	5/4.3	1.9
10:20	12	.01	28	3	13	.01	28	2	5/4.3	1.9
10:30	12	.01	28	2.5	13	.01	26	2	5/4.3	1.9
10:40	11.5	.01	28	2.5	12.5	.01	26	2	5/4.4	1.9
10:50	11	.01	30	2.5	13	.01	28	2	5/4.3	1.9
11:00	11	.01	30	2	13	.01	26	2	5/4.4	2
11:10	10	.01	30	2.5	13	.01	28	2	5/4.2	2
11:20	12	.01	30	2.5	13	.01	28	1.9	5/4.2	1.9
11:30	12	.01	30	2	12.5	.01	28	1.5	4.4/4.4	2
11:40	11.5	.01	30	2	13	.01	28	2	5/4.3	1.9
11:50	12	.01	30	2	13	.01	28	2	5/4.2	1.9
12:00	12	.01	30	2	13	.01	28	1.5	5/4.3	1.9
12:10	11.5	.01	30	2	13	.01	28	1.5	5/4.4	1.9
12:20	11.5	.01	30	2	13	.01	28	1.9	5/5	1.9
12:30	12	.01	30	2	13	.01	28	1.5	5/4.3	1.5
12:40	12	.01	30	2	13	.01	28	1.5	5/4.2	2
12:50	11.5	.01	30	2	13	.01	28	1.9	5/4.4	2

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EFB READINGS

DATE 7-13-94

BY

PLANT: Hayward Line II

c/s

TIME	"A" SIDE				"B" SIDE					
	BED VOLT	BED CURR.	ION VOLT	ION CURR.	BED VOLT	BED CURR.	ION VOLT	ION CURR.	EFB PRESS.	BAG H. PRESS.
13:00	12	.01	30	2	13	.01	28	1.9	4.3/4.4	1.9
13:10	11	.01	30	2	13	.01	28	1.9	4.4/4.4	1.9
13:20	11.5	.01	30	2	13	.01	28	2	4.4/4.3	2
13:30	11.5	.01	30	2	13	.01	28	1.5	4.4/4.2	2
13:40	11	.01	30	2	13	.01	28	1.5	4.4/4.2	1.5
13:50	11	.01	30	2	13	.01	28	1.9	5/4.4	2
14:00	11.5	.01	29	2	13	.01	28	1.9	4.4/4.3	1.9
14:10	11.5	.01	30	2	13	.01	28	1.5	4.4/4.2	2
14:20	11.5	.01	30	2	13	.01	29	1.5	4.4/4.3	1.9
14:30	11.5	.01	30	2	13	.01	29	1.5	5/4.3	2
14:40	11	.01	30	2	13	.01	29	1.9	4.4/4.4	1.9
14:50	11	.01	30	2	13	.01	29	1.5	4.4/4.2	2
15:00	11	.01	30	2	13	.01	29	1.5	4.4/4.1	1.9
15:10	11	.01	30	2	13	.01	29	1.5	4.4/4.3	2
15:20	11	.01	30	2	13	.01	29	1.5	5/4.3	1.9
15:30	11	.01	30	2	13	.01	29	1.5	4.4/4.4	1.9
15:40	11	.01	30	2	13	.01	29	1.5	4.4/4.2	1.9
15:50	11	.01	30	2	13	.01	29	1.5	5/4.3	1.9
16:00	11	.01	30	2	13	.01	29	1.5	5/4.2	1.9
16:10	11	.01	30	2	13	.01	29	1.5	4.4/4.4	1.9
16:20	11	.01	30	2	13	.01	29	1.9	4.4/4.4	1.8
16:30	11	.01	30	2	13	.01	29	1.5	4.3/4.3	1.9
16:40	11	.01	30	2	13	.01	28	1.5	4.4/4.4	1.9
16:50	11	.01	30	2	13	.01	28	1.5	4.4/4.3	1.9
17:00	11	.01	30	2	13	.01	28	2	4.4/4.4	1.9
17:10	11	.01	30	2	13	.01	29	1.5	4.4/4.4	1.9
17:20	11	.01	30	2	13	.01	28	2	4.4/4.3	1.9
17:30										
17:40										
17:50										

J-89

LINE II RTO DRYER July 13 1994

M	#1	#2	#3	#4	#5	INLET PRESS.	BURNERS B #1	B #2	INLET TEMP.	COMBUST. CHAMBER TEMP.	EXHAUST TEMP.	Δ ~~AMP.~~	GAS
:00	451	514	444	473	493	6.1	1572	1538	211	1647	316	23.3	—
15	457	493	455	463	493	4.7	1528	1542	213	1519	339	23.1	
.30	438	515	445	459	512	5.6	1577	1526	218	1593	318	23.1	
.45	451	497	459	459	508	4.7	1520	1540	221	1571	343	23.3	
9:00	451	498	460	461	508	4.5	1516	1538	221	1575	344	23.4	
15	441	520	442	475	498	5.1	1571	1523	221	1620	314	23.9	
30	441	512	454	464	514	5.4	1571	1535	222	1588	323	23.4	
45	455	499	453	479	483	4.9	1549	1551	222	1615	329	23.4	
:00	440	519	446	476	499	5.0	1573	1521	221	1616	314	23.4	
.15	448	498	464	467	506	4.4	1521	1541	222	1571	345	23.4	
.30	437	514	455	467	514	5.4	1575	1524	222	1583	321	23.4	
.45	436	519	448	478	498	4.9	1573	1521	221	1634	315	23.7	
1:00	446	494	467	470	501	3.9	1511	1537	221	1569	343	23.3	
.15	444	507	450	487	483	5.5	1561	1541	221	1629	323	23.1	
.30	433	518	448	479	501	4.9	1575	1524	221	1619	314	23.2	
.45	441	497	466	468	509	4.3	1523	1541	221	1572	347	23.1	
P.M. 100	445	500	456	485	485	5.2	1548	1545	221	1609	331	23.2	
.15	431	514	457	471	514	5.4	1578	1528	221	1590	321	23.3	
.30	446	493	465	478	493	4.5	1529	1545	221	1594	342	23.1	
.45	446	492	468	475	500	5.5	1518	1540	221	1575	344	23.3	
1:00	430	516	453	477	508	6.1	1575	1521	220	1600	314	23.0	
.15	430	511	458	470	516	5.4	1576	1533	221	1598	322	23.3	
.30	441	503	454	486	486	5.4	1556	1546	221	1623	329	23.0	
.45	432	509	461	470	516	5.6	1576	1530	222	1582	324	23.3	
2:00	442	494	469	471	507	4.3	1508	1541	223	1572	344	23.3	

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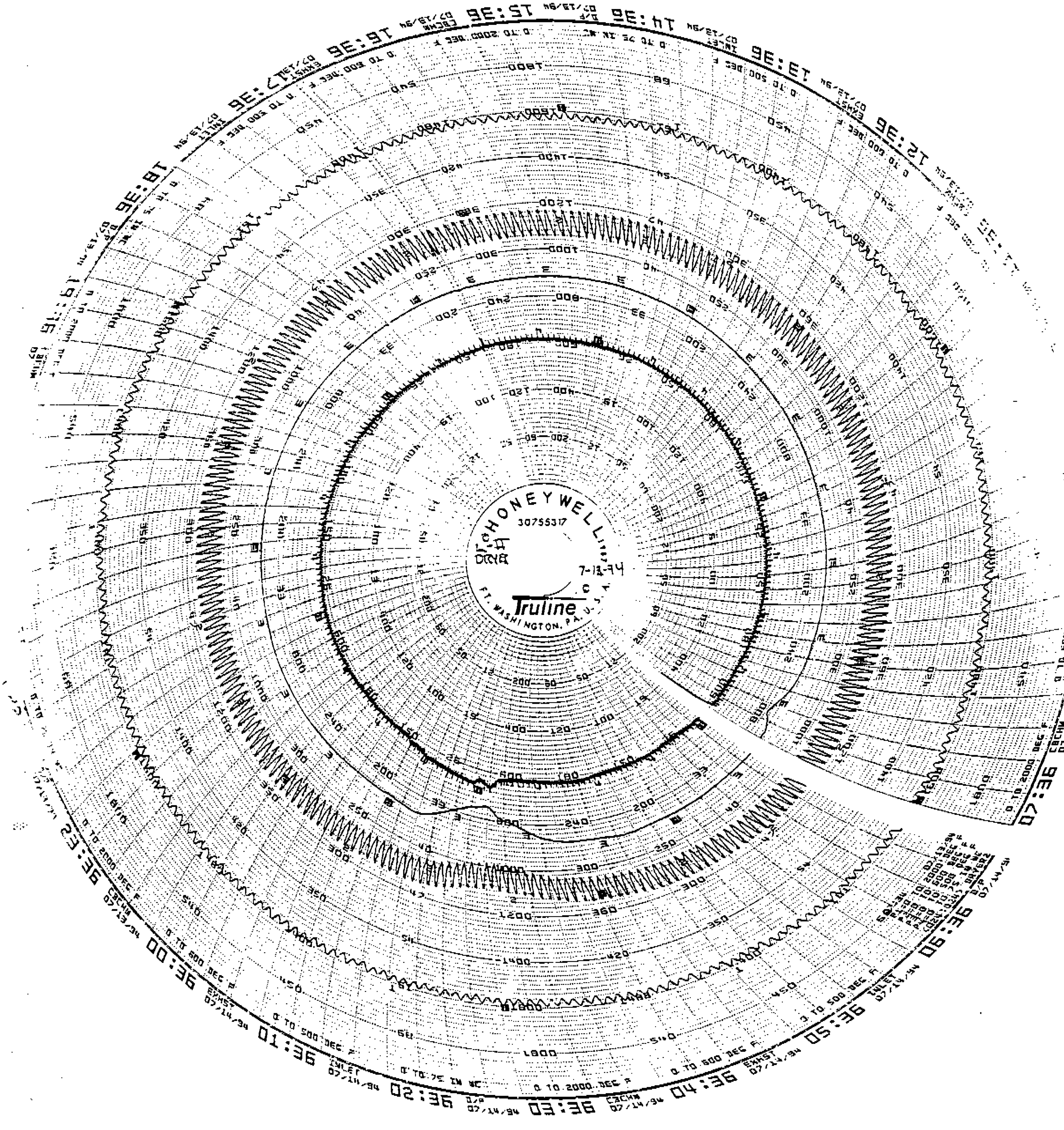
LINE II RIO DRYER July 13 1994

	#1	#2	#3	#4	#5	INLET PRESS.	BURNERS B #1	BURNERS B #2	INLET TEMP.	COMBUST. CHAMBER TEMP.	EXHAUST TEMP.	Δ	GAS
.15	445	497	461	483	489	4.3	1541	1546	222	1606	334	23.2	
30	431	518	450	481	502	5.1	1572	1519	223	1624	316	22.7	
.45	443	493	470	470	506	3.8	1511	1540	223	1575	343	23.0	
1:00	441	505	452	486	487	5.5	1559	1544	223	1631	327	23.5	
.15	430	515	456	473	514	5.4	1573	1527	223	1597	320	22.6	
.30	438	498	468	468	514	4.3	1528	1540	223	1568	349	22.8	
.45	440	506	452	487	489	5.6	1565	1546	223	1642	325	22.8	
4:00	430	513	456	473	516	6.5	1578	1527	223	1595	321	22.8	
.15	438	496	467	469	516	43	1527	1544	223	1573	348	23.0	
.30	443	492	468	474	507	2.6	1511	1536	223	1571	345	23.2	
.45	429	517	449	480	508	4.9	1575	1522	223	1613	314	23.1	
5:00	437	495	464	471	516	4.4	1519	1538	223	1569	347	23.0	
.15	445	492	462	481	495	4.9	1530	1541	223	1590	340	23.0	
.30	442	498	455	487	490	5.4	1543	1541	223	1604	332	23.1	

LINE II
DRYER RTO
CHART
7-13-94



HAYWARD OSB
LINE II
JULY 13, 1994

FLAKE MOISTURE

	WET	DRY
8:00 AM	C 48.7 S 48.4	C 6.6 S 5.0
9:00 AM	C 47.5 S 48.6	C 4.9 S 5.7
10:00 AM	C 46.8 S 46.0	C 6.5 S 5.2
11:00 AM	C 47.9 S 46.6	C 6.1 S 5.3
12:00 PM	C 46.3 S 46.0	C 6.5 S 5.6
1:00 PM	C 47.6 S 46.2	C 7.8 S 5.9
2:00 PM	C 46.8 S 46.0	C 6.2 S 5.6
3:00 PM	C 49.8 S 47.9	C 6.8 S 5.4
4:00 PM	C 44.4 S 47.5	C 4.7 S 6.2
5:00 PM	C 44.3 S 46.4	C 4.6 S 5.0

APPENDIX K

PROCEDURES

Particulate Loading and Emission Rates

The particulate emission rates were determined per EPA Methods 1 - 5, CFR Title 40, Part 60, Appendix A (revised July 1, 1992). In this procedure, a preliminary velocity profile of the gases in the flue is obtained by means of a temperature and velocity traverse. On the basis of these values, sampling nozzles of appropriate diameter are selected to allow isokinetic sampling, a necessary prerequisite for obtaining a representative sample.

The sampling train consists of a heated glass or stainless steel-lined sampling probe equipped with a Type S pitot and a thermocouple. The probe is attached to a sampling module which houses the all-glass in line filter holder in a temperature controlled oven. In addition, the sampling module also houses the impinger case and a Drierite drying column. The sampling module is connected by means of an umbilical cord to the control module which houses the dry test gas meter, the calibrated orifice, a leakless pump, two inclined manometers, and all controls required for operating the sampling train.

Particulate samples were collected as follows: The sample gas was drawn in through the sampling probe isokinetically and passed through a 4-inch diameter Gelman Type A/E glass fiber filter. The particulates were removed at this point and collected on the filter. The gases then passed through an ice-cooled impinger train and a desiccant-packed drying column which quantitatively absorb all moisture from the sample gas stream after which the sample gas passes through the pump and the dry test gas meter which integrates the sample gas flow throughout the course of the test. A calibrated orifice attached to the outlet of the gas meter provides instantaneous flow rate data.

A representative particulate sample was acquired by sampling for equal periods of time at the centroid of a number of equal area regions in the duct. The sampling rate is adjusted at each site such that an isokinetic sampling condition prevails. Nomographs are used to aid in the rapid determination of the sampling rate.

Particulate Loading and Emission Rates

After sampling is complete, the filter is removed and placed in a clean container. The nozzle and inlet side of the filter holder are quantitatively washed with acetone and the washings are stored in a second container. A brush is often used in the cleaning step to help dislodge deposits. The samples are returned to the laboratory where they are logged in and analyzed. The volume of the acetone rinse ("probe wash") is noted and then the rinse is quantitatively transferred to a tared 120 cc porcelain evaporating dish and the acetone evaporated off at 97-105 °F. This temperature is used to prevent condensation of atmospheric moisture due to the cooling effect induced by the evaporation of acetone. The acetone-free sample is then transferred to an oven and dried at 105 °C for 30 minutes, cooled in a desiccator over Drierite, and then weighed to the nearest .01 mg. The filter sample is quantitatively transferred to a 6-inch watch glass and dried in an oven at 105 °C for two hours. The filter and watch glass are then cooled in a desiccator and the filter weighed to the nearest .01 mg. All weighings are performed in a balance room where the relative humidity is hydrostatted to less than 50% relative humidity. Microscopic examination of the samples is performed if any unusual characteristics are observed. The weight of the acetone rinse is corrected for the acetone blank. The Drierite column is weighed on-site and the water collected by Drierite is added to the condensate so that the total amount of absorbed water may be ascertained.

Integrated flue gas samples for Orsat analysis were collected simultaneously with each pollutant sample. The samples were collected in 15-liter gas sampling bags at a constant flow rate throughout each particulate run. The bags were at a constant flow rate throughout each particulate run. The bags were then returned to the laboratory and analyzed by Orsat analysis. Standard commercially prepared solutions were used in the Orsat analyzer (sat. KOH for carbon dioxide and reduced methylene blue for oxygen).

Condensible Organic Compounds Analysis

(State of Wisconsin - EPA Method 5)

Method II-8672-WI

Equipment:	Separatory funnel - 500 cc with Teflon stopcock
	Powder funnel - 75 mm ID with a glass wool plug
	Evaporating dish(es) - 200 cc or 250 cc beaker
Reagents:	Methylene chloride
	Sodium sulfate - (ACS) granular anhydrous (purified by heating for four hours in a shallow tray)

SAMPLING

An all-glass impinger assembly is used in the back half of the EPA Method 5 sampling train when an organic wet catch is to be collected. The impinger assembly consists of a modified impinger, a Greenburg Smith impinger followed by another modified impinger. The third impinger should have a temperature measuring device at the outlet upstream of a final impinger or desiccant column to monitor the temperature of the outlet gas stream. Prior to the start of the test, each of the first two impingers should be charged with 100 g of Class I water. The Method 5 train should be operated as provided for in EPA Method 5. Ice should be added to the impinger bath to keep the temperature of the gas at the outlet at or less than 68°F. After the post test leak check, the impinger train is removed and impinger contents poured into a tared all-glass sample bottle and closed with a Teflon-lined cap. The sample bottle is then weighed and the total condensate calculated by subtraction of the bottle tare weight and the weight of initial water added to the impingers (200 g). A label is affixed and the sample is returned to the laboratory for analysis. The sample should be stored at 4°C if the analysis is not conducted within 48 hours.

ANALYSIS

1. Sample bottles are removed from storage and the contents quantitatively transferred to a clean 500 cc separatory funnel equipped with a Teflon stopcock.

2. Rinse the sample container with distilled water and add to separatory funnel.

3. Then rinse the sample container with acetone and pour through sodium sulfate into a tare beaker marked A.

4. The sample is then extracted consecutively with three 50 cc aliquots of methylene chloride. The extraction is performed according to normal laboratory practice observing the customary safety precaution of releasing excess pressure after each shaking.

5. After each of the three extractions are completed, the organic solvent should be dried by passing it through a funnel containing anhydrous sodium sulfate and collecting it and two 50 cc rinses in the tared beaker marked A (the same one used to catch the acetone container rinse).

6. Evaporate to dryness in a hood at 70°F or less. <u>Do not</u> evaporate so quickly as to allow evaporative cooling to lower the temperature of the container below the dew point otherwise water will be condensed in the container.

7. Desiccate for two hours in a sealed desiccator and final weigh. Report all results in grams. All weighings should be made to nearest 0.1 mg (four places).

8. The remaining liquid in the separatory funnel is then transferred to a tared beaker marked B and is evaporated to dryness at 220°F ± 10°F. The analyst may take an aliquot of the sample, transferring it to a tared beaker and evaporate to dryness at 220°F ± 10°F. If an aliquot is used, the weight of the sample and aliquot will have to be taken to correct for the total sample weight.

9. After the drying step, the sample is cooled in a desiccator and weighted to a constant weight to the nearest 0.1 mg.

Calculation (if aliquot is taken):

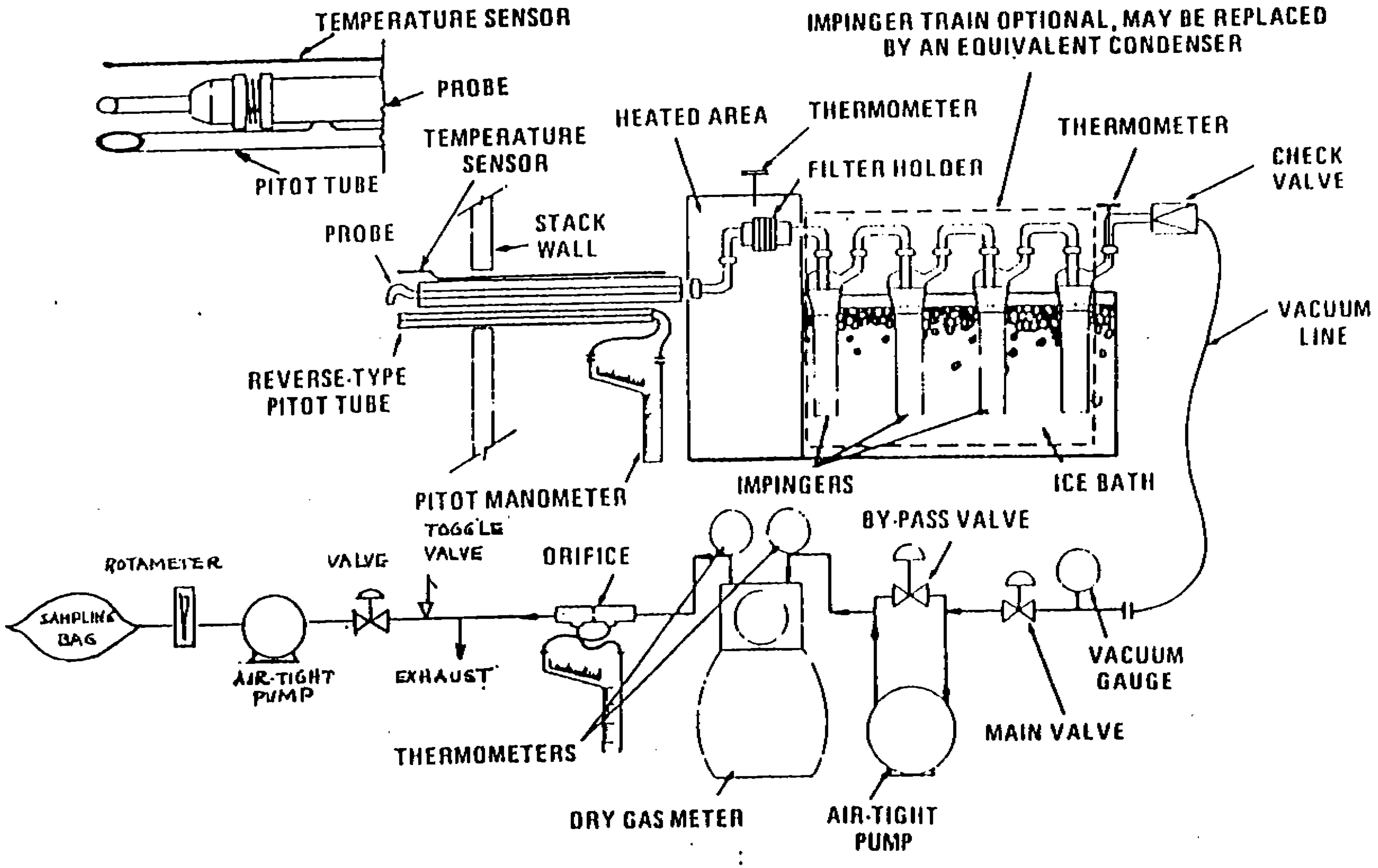
$$\text{grams} = \frac{\text{(grams recovered from aliquot) x (total volume (ml) or grams of sample)}}{\text{(aliquot volume (ml) or grams used)}}$$

If volume is used, it must be used for both the aliquot and sample. The same goes for using weight.

10. A field blank should be analyzed in an identical manner. If a field blank is not submitted, take an aliquot of Class I water equal in volume to the samples and analyze in a similar manner.

11. The results for container A are to be marked in the organic section of Interpoll Form #LSC-03G.

12. The results for container B are to be marked in the inorganic section of Interpoll Form #LSC-03G.



Particulate-sampling train.

Flow

Flow determinations were carried out in accordance with EPA Method 2, CFR Title 40, Part 60, Appendix A (Revised July 1, 1987). A type S pitot was used to sense velocity pressure and an inclined manometer was used to measure velocity pressures. Gas temperatures were measured using a calibrated Type K thermocouple and digital temperature meter. Gas density (i.e. molecular weight) was calculated from the composition of the gas which was determined by Orsat.

Gas Flow Density

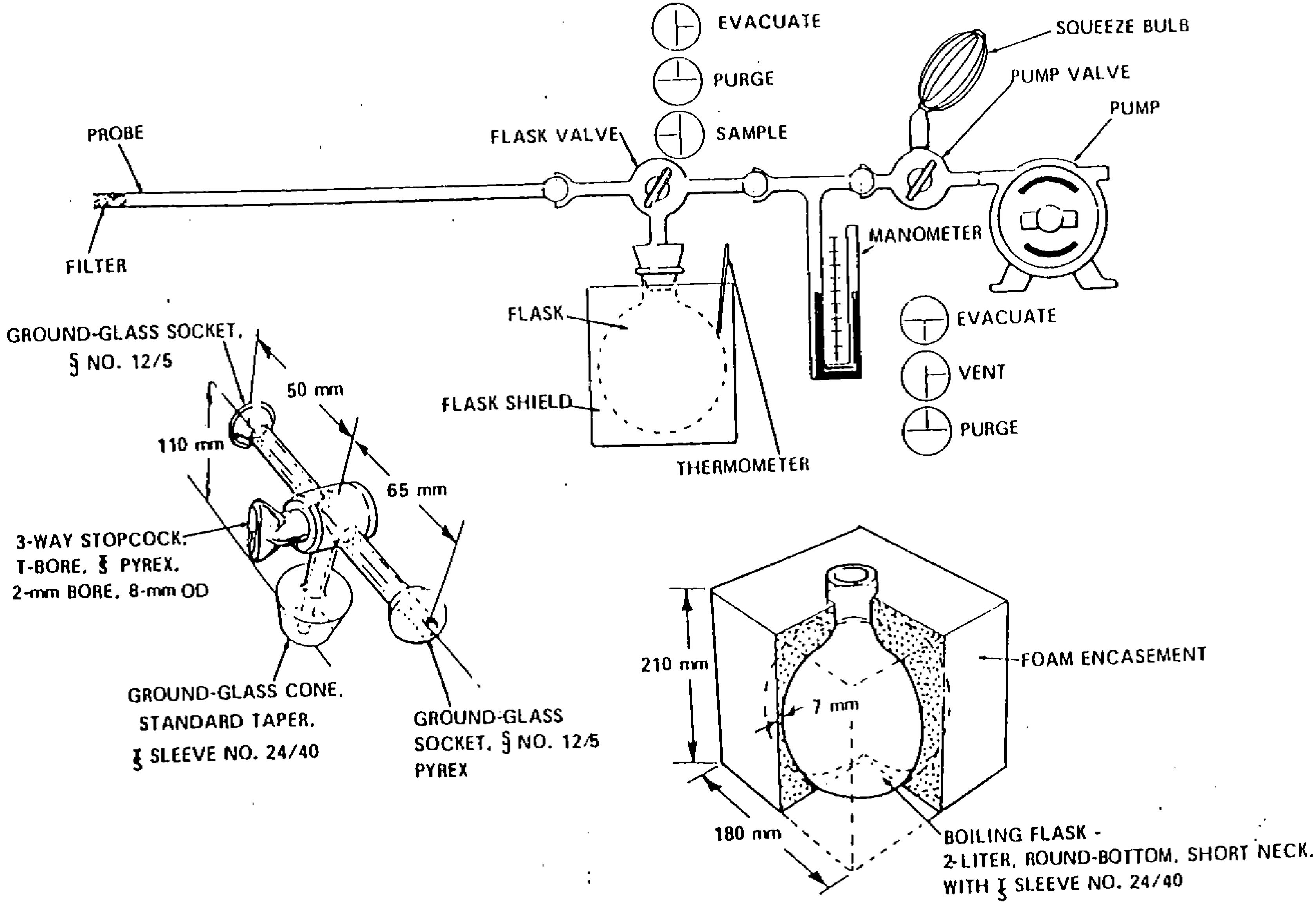
Gas compositions were determined as per Method 3 by Orsat analysis of an integrated gas sample collected from the stack during the oxides of nitrogen determinations. Standard commercially prepared solutions were used in the Orsat analyzer (sat. KOH for carbon dioxide and reduced methylene blue for oxygen).

Oxides of Nitrogen

Oxides of nitrogen concentrations were collected in accordance with EPA Method 7 (see above-cited reference) with a specially designed all glass manifold and valving assembly and a heated stainless steel-lined probe. Samples were collected in two-liter evacuated insulated flasks which contained 25 cc of acidified peroxide solution (Method 7 reagent). Nine sets or more of three samples each were collected over a period of 4.5 to 5 hours.

The sampling train was leak checked through the probe at the beginning and end of the test and, in addition, the system leak checked at the time of evacuation of each flask. Before the samples were collected, the probe was purged to eliminate dead volume effects and to raise the temperature of the probe outlet and manifold assembly to minimize condensation of moisture. A plug of microfiber glass wool inserted in the probe inlet was used to prevent particulate material from entering into the flask. The temperature of the flask, vacuum in the flask and barometric pressure at the time of sampling was recorded for each flask. After sampling was complete, as evidenced by the in-line vacuum gauge, the flask valve was closed, the flask assembly disconnected from the manifold/valve assembly and the flask shook for several minutes to promote oxidation and absorption. The recovered oxides of nitrogen samples were returned to the laboratory and analyzed immediately by ion chromatography as per EPA 7A.

The internal volume of each numbered flask assembly has been measured prior to initial use by filling with water, weighing before and after and then converting the weight of water to volume by means of the density of water at room temperature. Flask volumes are stored in the computer and recalled automatically in the computer calculation.



Sampling train, flask valve, and flask.

METHOD 7E—DETERMINATION OF NITROGEN OXIDES EMISSIONS FROM STATIONARY SOURCES (INSTRUMENTAL ANALYZER PROCEDURE)

1. *Applicability and Principle*

1.1 Applicability. This method is applicable to the determination of nitrogen oxides (NO_x) concentrations in emissions from stationary sources only when specified within the regulations.

1.2 Principle. A gas simple is continuously extracted from a stack, and a portion of the sample is conveyed to an instrumental chemiluminescent analyzer for determination of NO_x concentration. Performance specifications and test procedures are provided to ensure reliable data.

2. *Range and Sensitivity*

Same as Method 6C, Sections 2.1 and 2.2.

3. *Definitions*

3.1 Measurement System. The total equipment required for the determination of NO_x concentration. The measurement system consists of the following major subsystems:

3.1.1 Sample Interface, Gas Analyzer, and Data Recorder. Same as Method 6C, Sections 3.1.1, 3.1.2, and 3.1.3.

3.1.2 NO_2 to NO Converter. A device that converts the nitrogen dioxide (NO_2) in the sample gas to nitrogen oxide (NO).

3.2 Span, Calibration Gas, Analyzer Calibration Error, Sampling System Bias, Zero Drift, Calibration Drift, and Response Time. Same as Method 6C, Sections 3.2 through 3.8.

3.3 Interference Response. The output response of the measurement system to a component in the sample gas, other than the gas component being measured.

4. *Measurement System Performance Specifications*

Same as Method 6C, Sections 4.1 through 4.4.

5. *Apparatus and Reagents*

5.1 Measurement System. Any measurement system for NO_x that meets the specifications of this method. A schematic of an acceptable measurement system is shown in Figure 6C-1 of Method 6C. The essential components of the measurement system are described below:

5.1.1 Sample Probe, Sample Line, Calibration Valve Assembly, Moisture Removal System, Particulate Filter, Sample Pump, Sample Flow Rate Control, Sample Gas Manifold, and Data Recorder. Same as Method 6C, Sections 5.1.1 through 5.1.9, and 5.1.11.

5.1.2 NO_2 to NO Converter. That portion of the system that converts the nitrogen dioxide (NO_2) in the sample gas to nitrogen oxide (NO). An NO_2 to NO converter is not necessary if data are presented to demonstrate that the NO_2 portion of the exhaust gas is less than 5 percent of the total NO_x concentration.

5.1.3 NO_x Analyzer. An analyzer based on the principles of chemiluminescence, to determine continuously the NO_x concentration in the sample gas stream. The analyzer shall meet the applicable performance specifications of Section 4. A means of controlling the analyzer flow rate and a device for determining proper sample flow rate (e.g., precision rotameter, pressure gauge downstream of all flow controls, etc.) shall be provided at the analyzer.

5.2 NO_x Calibration Gases. The calibration gases for the NO_x analyzer shall be NO in N_2. Three calibration gases, as specified in Sections 5.3.1 through 5.3.3. of Method 6C, shall be used. Ambient air may be used for the zero gas.

6. *Measurement System Performance Test Procedures*

Perform the following procedures before measurement of emissions (Section 7).

6.1 Calibration Gas Concentration Verification. Follow Section 6.1 of Method 6C, except if calibration gas analysis is required, use Method 7, and change all 5 percent performance values to 10 percent (or 10 ppm, whichever is greater).

6.2 Interference Response. Conduct an interference response test of the analyzer prior to its initial use in the field. Thereafter, recheck the measurement system if changes are made in the instrumentation that could alter the interference response (e.g., changes in the gas detector). Conduct the interference response in accordance with Section 5.4 of Method 20.

6.3 Measurement System Preparation, Analyzer Calibration Error, and Sample System Bias Check. Follow Sections 6.2 through 6.4 of Method 6C.

6.4 NO_2 to NO Conversion Efficiency. Unless data are presented to demonstrate that the NO_2 concentration within the sample stream is not greater than 5 percent of the NO_x concentration, conduct an NO_2 to NO conversion efficiency test in accordance with Section 5.6 of Method 20.

7. *Emission Test Procedure*

7.1 Selection of Sampling Site and Sampling Points. Select a measurement site and sampling points using the same criteria that are applicable to tests performed using Method 7.

7.2 Sample Collection. Position the sampling probe at the first measurement point, and begin sampling at the same rate as used during the system calibration drift test. Maintain constant rate sampling (i.e., ±10 percent) during the entire run. The sampling time per run shall be the same as the total time required to perform a run using Method 7, plus twice the system response time. For each run, use only those measurements obtained after twice the response time of the measurement system has elapsed, to determine the average effluent concentration.

7.3 Zero and Calibration Drift Test. Follow Section 7.4 of Method 6C.

8. *Emission Calculation*

Follow Section 8 of Method 6C.

9. *Bibliography*

Same as bibliography of Method 6C.

4.2 Performance Evaluation Tests. The owner of a lidar system shall subject such a lidar system to the performance verification tests described in Section 3, prior to first use of this method. The annual calibration shall be performed for three separate, complete runs and the results of each should be recorded. The requirements of Section 3.3.1 must be fulfilled for each of the three runs.

Once the conditions of the annual calibration are fulfilled the lidar shall be subjected to the routine verification for three separate complete runs. The requirements of Section 3.3.2 must be fulfilled for each of the three runs and the results should be recorded. The Administrator may request that the results of the performance evaluation be submitted for review.

5. *References*

5.1 The Use of Lidar for Emissions Source Opacity Determination. U.S. Environmental Protection Agency, National Enforcement Investigations Center, Denver, CO. EPA-330/1-79-003-R, Arthur W. Dybdahl, current edition [NTIS No. PB81-246662].

5.2 Field Evaluation of Mobile Lidar for the Measurement of Smoke Plume Opacity, U.S. Environmental Protection Agency, National Enforcement Investigations Center, Denver, CO. EPA/NEIC-TS-128, February 1976.

5.3 Remote Measurement of Smoke Plume Transmittance Using Lidar, C. S. Cook, G. W. Bethke, W. D. Conner (EPA/RTP). Applied Optics 11, pg 1742. August 1972.

5.4 Lidar Studies of Stack Plumes in Rural and Urban Environments, EPA-650/4-73-002, October 1973.

5.5 American National Standard for the Safe Use of Lasers ANSI Z 136.1-176, March 8, 1976.

5.6 U.S. Army Technical Manual TB MED 279, Control of Hazards to Health from Laser Radiation, February 1969.

5.7 Laser Institute of America Laser Safety Manual, 4th Edition.

5.8 U.S. Department of Health, Education and Welfare, Regulations for the Administration and Enforcement of the Radiation Control for Health and Safety Act of 1968, January 1976.

5.9 Laser Safety Handbook, Alex Mallow, Leon Chabot, Van Nostrand Reinhold Co., 1978.

METHOD 10—DETERMINATION OF CARBON MONOXIDE EMISSIONS FROM STATIONARY SOURCES

1. *Principle and Applicability*

1.1 Principle. An integrated or continuous gas sample is extracted from a sampling point and analyzed for carbon monoxide (CO) content using a Luft-type nondispersive infrared analyzer (NDIR) or equivalent.

1.2 Applicability. This method is applicable for the determination of carbon monoxide emissions from stationary sources only when specified by the test procedures for determining compliance with new source performance standards. The test procedure will indicate whether a continuous or an integrated sample is to be used.

2. *Range and Sensitivity*

2.1 Range. 0 to 1,000 ppm.

2.2 Sensitivity. Minimum detectable concentration is 20 ppm for a 0 to 1,000 ppm span.

3. *Interferences*

Any substance having a strong absorption of infrared energy will interfere to some extent. For example, discrimination ratios for water (H_2O) and carbon dioxide (CO_2) are 3.5 percent H_2O per 7 ppm CO and 10 percent CO_2 per 10 ppm CO, respectively, for devices measuring in the 1,500 to 3,000 ppm range. For devices measuring in the 0 to 100 ppm range, interference ratios can be as high as 3.5 percent H_2O per 25 ppm CO and 10 percent CO_2 per 50 ppm CO. The use of silica gel and ascarite traps will alleviate the major interference problems. The measured gas volume must be corrected if these traps are used.

4. *Precision and Accuracy*

4.1 Precision. The precision of most NDIR analyzers is approximately ±2 percent of span.

4.2 Accuracy. The accuracy of most NDIR analyzers is approximately ±5 percent of span after calibration.

5. *Apparatus*

5.1 Continuous Sample (Figure 10-1).

5.1.1 Probe. Stainless steel or sheathed Pyrex[1] glass, equipped with a filter to remove particulate matter.

5.1.2 Air-Cooled Condenser or Equivalent. To remove any excess moisture.

5.2 Integrated Sample (Figure 10-2).

5.2.1 Probe. Stainless steel or sheathed Pyrex glass, equipped with a filter to remove particulate matter.

5.2.2 Air-Cooled Condenser or Equivalent. To remove any excess moisture.

5.2.3 Valve. Needle valve, or equivalent, to to adjust flow rate.

5.2.4 Pump. Leak-free diaphragm type, or equivalent, to transport gas.

5.2.5 Rate Meter. Rotameter, or equivalent, to measure a flow range from 0 to 1.0 liter per min (0.035 cfm).

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[1] Mention of trade names or specific products does not constitute endorsement by the Environmental Protection Agency.

5.2.6 Flexible Bag. Tedlar, or equivalent, with a capacity of 60 to 90 liters (2 to 3 ft³). Leak-test the bag in the laboratory before using by evacuating bag with a pump followed by a dry gas meter. When evacuation is complete, there should be no flow through the meter.

5.2.7 Pitot Tube. Type S, or equivalent, attached to the probe so that the sampling rate can be regulated proportional to the stack gas velocity when velocity is varying with the time or a sample traverse is conducted.

5.3 Analysis (Figure 10-3).

5.3.1 Carbon Monoxide Analyzer. Nondispersive infrared spectrometer, or equivalent. This instrument should be demonstrated, preferably by the manufacturer, to meet or exceed manufacturer's specifications and those described in this method.

5.3.2 Drying Tube. To contain approximately 200 g of silica gel.

5.3.3 Calibration Gas. Refer to section 6.1.

5.3.4 Filter. As recommended by NDIR manufacturer.

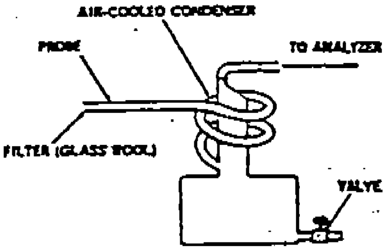

Figure 10-1. Continuous sampling train.

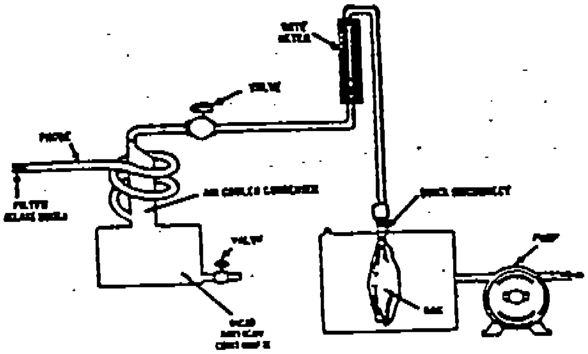

Figure 10-2. Integrated gas sampling train.

5.3.5 CO_2 Removal Tube. To contain approximately 500 g of ascarite.

5.3.6 Ice Water Bath. For ascarite and silica gel tubes.

5.3.7 Valve. Needle valve, or equivalent, to adjust flow rate

5.3.8 Rate Meter. Rotameter or equivalent to measure gas flow rate of 0 to 1.0 liter per min (0.035 cfm) through NDIR.

5.3.9 Recorder (*optional*). To provide permanent record of NDIR readings.

6. *Reagents*

6.1 Calibration Gases. Known concentration of CO in nitrogen (N_2) for instrument span, prepurified grade of N_2 for zero, and two additional concentrations corresponding approximately to 60 percent and 30 percent span. The span concentration shall not exceed 1.5 times the applicable source performance standard. The calibration gases shall be certified by the manufacturer to be within ±2 percent of the specified concentration.

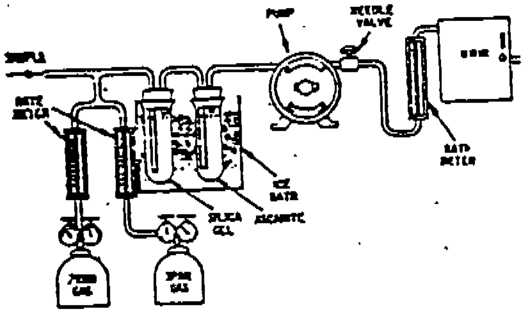

Figure 10-3. Analytical equipment.

6.2 Silica Gel. Indicating type, 6 to 16 mesh, dried at 175° C (347° F) for 2 hours.

6.3 Ascarite. Commercially available.

7. *Procedure*

7.1 Sampling.

7.1.1 Continuous Sampling. Set up the equipment as shown in Figure 10-1 making sure all connections are leak free. Place the probe in the stack at a sampling point and purge the sampling line. Connect the analyzer and begin drawing sample into the analyzer. Allow 5 minutes for the system to stabilize, then record the analyzer reading as required by the test procedure. (See section 7.2 and 8). CO_2 content of the gas may be determined by using the Method 3 integrated sample procedure, or by weighing the ascarite CO_2 removal tube and computing CO_2 concentration from the gas volume sampled and the weight gain of the tube.

7.1.2 Integrated Sampling. Evacuate the flexible bag. Set up the equipment as shown in Figure 10-2 with the bag disconnected. Place the probe in the stack and purge the sampling line. Connect the bag, making sure that all connections are leak free. Sample at a rate proportional to the stack velocity. CO_2 content of the gas may be determined by using the Method 3 integrated sample procedures, or by weighing the ascarite CO_2 removal tube and computing CO_2 concentration from the gas volume sampled and the weight gain of the tube.

7.2 CO Analysis. Assemble the apparatus as shown in Figure 10-3, calibrate the instrument, and perform other required operations as described in section 8. Purge analyzer with N_2 prior to introduction of each sample. Direct the sample stream through the instrument for the test period, recording the readings. Check the zero and span again after the test to assure that any drift or malfunction is detected. Record the sample data on Table 10-1.

8. *Calibration*

Assemble the apparatus according to Figure 10-3. Generally an instrument requires a warm-up period before stability is obtained. Follow the manufacturer's instructions for specific procedure. Allow a minimum time of 1 hour for warm-up. During this time check the sample conditioning apparatus, i.e., filter, condenser, drying tube, and CO_2 removal tube, to ensure that each component is in good operating condition. Zero and calibrate the instrument according to the manufacturer's procedures using, respectively, nitrogen and the calibration gases.

TABLE 10-1—FIELD DATA

	Comments
Location	
Test	
Date	
Operator	

Clock time	Rotameter setting, liters per minute (cubic feet per minute)

9. *Calculation*

Calculate the concentration of carbon monoxide in the stack using Equation 10-1.

$$C_{CO\ stack} = C_{CO\ NDIR}(1 - F_{CO_2}) \qquad \text{Eq. 10-1}$$

Where:

$C_{CO\ stack}$ = Concentration of CO in stack, ppm by volume (dry basis).

$C_{CO\ NDIR}$ = Concentration of CO measured by NDIR analyzer, ppm by volume (dry basis).

F_{CO_2} = Volume fraction of CO_2 in sample, i.e., percent CO_2 from Orsat analysis divided by 100.

10. *Alternative Procedures*

10.1 Interference Trap. The sample conditioning system described in Method 10A sections 2.1.2 and 4.2, may be used as an alternative to the silica gel and ascarite traps.

11. *Bibliography*

1. McElroy, Frank, The Intertech NDIR-CO Analyzer. Presented at 11th Methods Conference on Air Pollution, University of California, Berkeley, CA. April 1, 1970.
2. Jacobs, M. B., et al., Continuous Determination of Carbon Monoxide and Hydrocarbons in Air by a Modified Infrared Analyzer, J. Air Pollution Control Association, 9(2): 110-114. August 1959.
3. MSA LIRA Infrared Gas and Liquid Analyzer Instruction Book, Mine Safety Appliances Co., Technical Products Division, Pittsburgh, PA.
4. Models 215A, 315A, and 415A Infrared Analyzers, Beckman Instruments, Inc., Beckman Instructions 1635-B, Fullerton, CA. October 1967.
5. Continuous CO Monitoring System, Model A5611, Intertech Corp., Princeton, NJ.
6. UNOR Infrared Gas Analyzers, Bendix Corp., Ronceverte, WV

ADDENDA

A. PERFORMANCE SPECIFICATIONS FOR NDIR CARBON MONOXIDE ANALYZERS

Range (minimum)	0–1000 ppm.
Output (minimum)	0–10mV.
Minimum detectable sensitivity.	20 ppm.
Rise time, 90 percent (maximum).	30 seconds.
Fall time, 90 percent (maximum).	30 seconds.
Zero drift (maximum)	10% in 8 hours.
Span drift (maximum)	10% in 8 hours.
Precision (minimum)	±2% of full scale.
Noise (maximum)	±1% of full scale.
Linearity (maximum deviation)	2% of full scale.
Interference rejection ratio	CO_2—1000 to 1, H_2O—500 to 1.

B. *Definitions of Performance Specifications.*

Range—The minimum and maximum measurement limits.

Output—Electrical signal which is proportional to the measurement; intended for connection to readout or data processing devices. Usually expressed as millivolts or milliamps full scale at a given impedance.

Full scale—The maximum measuring limit for a given range.

Minimum detectable sensitivity—The smallest amount of input concentration that can be detected as the concentration approaches zero.

EPA
METHOD 0011

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INTERPOLL LABORATORIES

SAMPLING FOR FORMALDEHYDE EMISSIONS FROM STATIONARY SOURCES

1.0 SCOPE AND APPLICATION

1.1 This method is applicable to the determination of Destruction and Removal Efficiency (DRE) of formaldehyde, CAS Registry number 50-00-0, and possibly other aldehydes and ketones from stationary sources as specified in the regulations. The methodology has been applied specifically to formaldehyde; however, many laboratories have extended the application to other aldehydes and ketones. Compounds derivatized with 2,4-dinitrophenylhydrazine can be detected as low as 6.4 x 10^{-8} lbs/cu ft (1.8 ppbv) in stack gas over a 1 h sampling period, sampling approximately 45 cu ft.

2.0 SUMMARY OF METHOD

2.1 Gaseous and particulate pollutants are withdrawn isokinetically from an emission source and are collected in aqueous acidic 2,4-dinitrophenylhydrazine. Formaldehyde present in the emissions reacts with the 2,4-dinitrophenylhydrazine to form the formaldehyde dinitrophenylhydrazone derivative. The dinitrophenylhydrazone derivative is extracted, solvent-exchanged, concentrated, and then analyzed by high performance liquid chromatography.

3.0 INTERFERENCES

3.1 A decomposition product of 2,4-dinitrophenylhydrazine, 2,4-dinitroaniline, can be an analytical interferent if concentrations are high. 2,4-dinitroaniline can coelute with the 2,4-dinitrophenylhydrazone of formaldehyde under high performance liquid chromatography conditions which may be used for the analysis. High concentrations of highly oxygenated compounds, especially acetone, that have the same retention time or nearly the same retention time as the dinitrophenylhydrazone of formaldehyde and that also absorb at 360 nm will interfere with the analysis.

Formaldehyde, acetone, and 2,4-dinitroaniline contamination of the aqueous acidic 2,4-dinitrophenylhydrazine (DNPH) reagent is frequently encountered. The reagent must be prepared within five days of use in the field and must be stored in an uncontaminated environment both before and after sampling in order to minimize blank problems. Some level of acetone contamination is unavoidable, because acetone is ubiquitous in laboratory and field operations. However, the acetone contamination must be minimized.

4.0 APPARATUS AND MATERIALS

4.1 A schematic of the sampling train is shown in Figure 1. This sampling train configuration is adapted from EPA Method 5 procedures. The sampling train consists of the following components: Probe Nozzle, Pitot Tube, Differential Pressure Gauge, Metering System, Barometer, and Gas Density Determination Equipment.

4.1.1 Probe Nozzle: Quartz or glass with sharp, tapered (30° angle) leading edge. The taper shall be on the outside to preserve a constant inner diameter. The nozzle shall be buttonhook or elbow design. A range of nozzle sizes suitable for isokinetic sampling should be available in increments of 0.16 cm (1/16 in), e.g., 0.32 to 1.27 cm (1/8 to 1/2 in), or larger if higher volume sampling trains are used. Each nozzle shall be calibrated according to the procedures outlined in Section 8.1.

4.1.2 Probe Liner: Borosilicate glass or quartz shall be used for the probe liner. The tester should not allow the temperature in the probe to exceed 120 ± 14°C (248 ± 25°F).

4.1.3 Pitot Tube: The Pitot tube shall be Type S, as described in Section 2.1 of EPA Method 2, or any other appropriate device. The pitot tube shall be *attached to the probe to allow constant monitoring of the stack gas velocity. The impact (high pressure) opening plane of the pitot tube shall be even with or above the nozzle entry plane (see EPA Method 2, Figure 2-6b) during sampling. The Type S pitot tube assembly shall have a known coefficient, determined as outlined in Section 4 of EPA Method 2.

4.1.4 Differential Pressure Gauge: The differential pressure gauge shall be an inclined manometer or equivalent device as described in Section 2.2 of EPA Method 2. One manometer shall be used for velocity-head readings and the other for orifice differential pressure readings.

4.1.5 Impingers: The sampling train requires a minimum of four impingers, connected as shown in Figure 1, with ground glass (or equivalent) vacuum-tight fittings. For the first, third, and fourth impingers, use the Greenburg-Smith design, modified by replacing the tip with a 1.3-cm inside diameter (1/2 in) glass tube extending to 1.3 cm (1/2 in) from the bottom of the flask. For the second impinger, use a Greenburg-Smith impinger with the standard tip. Place a thermometer capable of measuring temperature to within 1°C (2°F) at the outlet of the fourth impinger for monitoring purposes.

4.1.6 Metering System: The necessary components are a vacuum gauge, leak-free pump, thermometers capable of measuring temperature within 3°C (5.4°F), dry-gas meter capable of measuring volume to within 1%, and related equipment as shown in Figure 1. At a minimum, the pump should be capable of 4 cfm free flow, and the dry gas meter should have a recording capacity of 0-999.9 cu ft with a resolution of 0.005 cu ft. Other metering systems may be used which are capable of maintaining sampling rates within 10% of isokinetic collection and of determining sample volumes to within 2%. The metering system may be used in conjunction with a pitot tube to enable checks of isokinetic sampling rates.

4.1.7 Barometer: The barometer may be mercury, aneroid, or other barometer capable of measuring atmospheric pressure to within 2.5 mm Hg (0.1 in Hg). In many cases, the barometric reading may be obtained from a nearby National Weather Service Station, in which case the station value (which is the absolute barometric pressure) is requested and an adjustment for elevation differences between the weather station and sampling point is applied at a rate of minus 2.5 mm Hg (0.1 in Hg) per 30 m (100 ft) elevation increase (vice versa for elevation decrease).

4.1.8 Gas Density Determination Equipment: Temperature sensor and pressure gauge (as described in Sections 2.3 and 2.4 of EPA Method 2), and gas analyzer, if necessary (as described in EPA Method 3). The temperature sensor ideally should be permanently attached to the pitot tube or sampling probe in a fixed configuration such that the tip of the sensor extends beyond the leading edge of the probe sheath and does not touch any metal. Alternatively, the sensor may be attached just prior to use in the field. Note, however, that if the temperature sensor is attached in the field, the sensor must be placed in an interference-free arrangement with respect to the Type S pitot tube openings (see EPA Method 2, Figure 2-7). As a second alternative, if a difference of no more than 1% in the average velocity measurement is to be introduced, the temperature gauge need not be attached to the probe or pitot tube.

4.2 Sample Recovery

4.2.1 Probe Liner: Probe nozzle and brushes; Teflon® bristle brushes with stainless steel wire handles are required. The probe brush shall have extensions of stainless steel, Teflon®, or inert material at least as long as the probe. The brushes shall be properly sized and shaped to brush out the probe liner, the probe nozzle, and the impingers.

4.2.2 Wash Bottles: Three wash bottles are required. Teflon® or glass wash bottles are recommended; polyethylene wash bottles should not be used because organic contaminants may be extracted by exposure to organic solvents used for sample recovery.

4.2.3 Graduated Cylinder and/or Balance: A graduated cylinder or balance is required to measure condensed water to the nearest 1 mL or 1 g. Graduated cylinders shall have divisions not >2 mL. Laboratory balances capable of weighing to ±0.5 g are required.

4.2.4 Amber Glass Storage Containers: One-liter wide-mouth amber flint glass bottles with Teflon®-lined caps are required to store impinger water samples. The bottles must be sealed with Teflon® tape.

4.2.5 Rubber Policeman and Funnel: A rubber policeman and funnel are required to aid in the transfer of materials into and out of containers in the field.

5.0 REAGENTS

Reagent grade chemicals or better grades shall be used in all tests. Unless otherwise indicated, all reagents shall conform to the specifications of the Committee on Analytical Reagents of the American Chemical Society, where such specifications are available.

5.1 Water: HPLC-grade water is used in preparation of DNPH reagent and in all other applications in the sampling train.

5.2 Silica Gel: Silica gel shall be indicating type, 6-16 mesh. If the silica gel has been used previously, dry at 175°C (350°F) for 2 h before using. New silica gel may be used as received. Alternatively, other types of desiccants (equivalent or better) may be used.

5.3 Crushed Ice: Quantities ranging from 10-50 lb may be necessary during a sampling run, depending upon ambient temperature. Samples which have been taken must be stored and shipped cold; sufficient ice for this purpose must be allowed.

5.4 2,4-Dinitrophenylhydrazine Reagent: The 2,4-dinitrophenylhydrazine reagent must be prepared in the laboratory within five days of sampling use in the field. Preparation of DNPH can also be done in the field, with consideration of appropriate procedures required for safe handling of solvent in the field. When a container of prepared DNPH reagent is opened in the field, the contents of the opened container should be used within 48 hours. All laboratory glassware must be washed with detergent and water and rinsed with water, methanol, and methylene chloride prior to use.

NOTE: The glassware must not be rinsed with acetone or unacceptable levels of acetone contamination will be introduced. If field preparation of DNPH is performed, caution must be exercised in avoiding acetone contamination.

Reagent bottles for storage of cleaned DNPH derivatizing solution must be rinsed with acetonitrile and dried before use. Baked glassware is not essential for preparation of DNPH reagent.

NOTE: DNPH crystals or DNPH solution should be handled with plastic gloves at all times, with prompt and extensive use of running water in case of skin exposure.

5.4.1 Preparation of Aqueous Acidic DNPH: The following materials and reagents are required for preparation of the reagent.

5.4.1.1 Bottles/Caps: amber 1- or 4 L bottles with Teflon®-lined caps are required for storing cleaned DNPH solution. Additional 4-L bottles are required to collect waste organic solvents.

5.4.1.2 Large Glass Container: at least one large glass container (8 to 16 L) is required for mixing the aqueous acidic DNPH solution.

5.4.1.3 Stir Plate/Large Stir Bars/Stir Bar Retriever: a magnetic stir plate and large stir bar are required for the mixing of the aqueous acidic DNPH solution. A stir bar retriever is needed for removing the stir bar from the large container holding the DNPH solution.

5.4.1.4 Buchner Filter/Filter Flask/Filter Paper: a large filter flask (2-4 L) with a buchner filter, appropriate rubber stopper, filter paper, and connecting tubing are required for filtering the aqueous acidic DNPH solution prior to cleaning.

5.4.1.5 Separatory Funnels: at least one large separatory funnel (2 L) is required for cleaning the DNPH prior to use.

5.4.1.6 Beakers: beakers (150 mL, 250 mL, and 400 mL) are useful for holding/measuring organic liquids when cleaning the aqueous acidic DNPH solution and for weighing DNPH crystals.

5.4.1.7 Funnels: at least one large funnel is needed for pouring the aqueous acidic DNPH into the separatory funnel.

5.4.1.8 Graduated Cylinders: at least one large graduated cylinder (1 to 2 L) is required for measuring HPLC-grade water and acid when preparing the DNPH solution.

5.4.1.9 Top-Loading Balance: a one-place top loading balance is needed for weighing out the DNPH crystals used to prepare the aqueous acidic DNPH solution.

5.4.1.10 Spatulas: spatulas are needed for weighing out DNPH when preparing the aqueous DNPH solution.

5.4.1.11 HPLC-Grade Water: water (HPLC-grade) is required to mix the aqueous DNPH solution.

5.4.1.12 Hydrochloric Acid: reagent grade hydrochloric acid (approximately 12N) is required for acidifying the aqueous DNPH solution.

5.4.1.13 2,4-Dinitrophenylhydrazine: a supply of moist solid 2,4-dinitrophenylhydrazine (DNPH) is required for preparation of aqueous acidic DNPH solution. The quantity of water may vary from 10 to 30%. Reagent grade or equivalent is required.

5.4.1.14 Methylene Chloride: methylene chloride (suitable for residue and pesticide analysis, GC/MS, HPLC, GC, Spectrophotometry or equivalent) is required for cleaning the aqueous acidic DNPH solution, rinsing glassware, and recovery of sample trains.

5.4.1.15 Cyclohexane: cyclohexane (HPLC grade) is required for cleaning the aqueous acidic DNPH solution.

NOTE: Do not use spectroanalyzed grades of cyclohexane if this sampling methodology is extended to aldehydes and ketones with four or more carbon atoms.

5.4.1.16 Methanol: methanol (HPLC grade or equivalent) is required for rinsing glassware.

5.4.1.17 Acetonitrile: acetonitrile (HPLC grade or equivalent) is required for rinsing glassware.

5.4.1.18 Formaldehyde: Analytical grade or equivalent formaldehyde is required for preparation of standards. If other aldehydes or ketones are used, analytical grade or equivalent is required.

5.4.2 Preparation of Aqueous Acidic DNPH Derivatizing Reagent: Each batch of DNPH reagent should be prepared and purified within five days of sampling, according to the procedure described below.

5.4.2.1 Place an 8-L container under a fume hood on a magnetic stirrer. Add a large stir bar and fill the container half full of HPLC-grade water. Save the empty bottle from HPLC-grade water. Start the stirring bar and adjust the stir rate to be as fast as possible. Using a graduated cylinder, measure 1.4 mL of concentrated hydrochloric acid. Slowly pour the acid into the stirring water. Fumes may be generated and the water may become warm. Weigh the DNPH crystals on a one-place balance (see Table 1 for approximate amounts) and add to the stirring acid solution. Fill the 8 L container to the 8 L mark with HPLC water and stir overnight. If all of the DNPH crystals have dissolved overnight, add additional DNPH and stir for two more hours. Continue the process of adding DNPH with additional stirring until a saturated solution has been formed. Filter the DNPH solution using vacuum filtration. Gravity filtration may be used, but a much longer time is required. Store the filtered solution in an amber bottle at room temperature.

TABLE 1. APPROXIMATE AMOUNT OF CRYSTALLINE DNPH USED TO PREPARE A SATURATED SOLUTION

Amount of Moisture in DNPH	Weight Required per 8 L of Solution
10 weight percent	31 g
15 weight percent	33 g
30 weight percent	40 g

Within five days of proposed use, place about 1.6 L of the DNPH reagent in a 2 L separatory funnel. Add approximately 200 mL of methylene chloride and stopper the funnel. Wrap the stopper of the funnel with paper towels to absorb any leakage. Invert and vent the funnel. Then shake vigorously for 3 minutes. Initially, the funnel should be vented frequently (every 10 - 15 sec). After the layers have separated, discard the lower (organic) layer.

Extract the DNPH a second time with methylene chloride and finally with cyclohexane. When the cyclohexane layer has separated from the DNPH reagent, the cyclohexane layer will be the top layer in the separatory funnel. Drain the lower layer (the cleaned extracted DNPH reagent solution) into an amber bottle that has been rinsed with acetonitrile and allowed to dry.

5.4.3 Quality Control: Take two aliquots of the extracted DNPH reagent. The size of the aliquots is dependent upon the exact sampling procedure used, but 100 mL is reasonably representative. To ensure that the background in the reagent is acceptable for field use, analyze one aliquot of the reagent according to the procedure of EPA Draft Method 8315. Save the other aliquot of aqueous acidic DNPH for use as a method blank when the analysis is performed.

5.4.4 Shipment to the Field: Tightly cap the bottle containing extracted DNPH reagent using a Teflon®-lined cap. Seal the bottle with Teflon® tape. After the bottle is labeled, the bottle may be placed in a friction-top can (paint can or equivalent) containing a 1 -2 inch layer of granulated charcoal and stored at ambient temperature until use.

If the DNPH reagent has passed the Quality Control criteria, the reagent may be packaged to meet necessary shipping requirements and sent to the sampling area. If the Quality Control criteria are not met, the reagent solution may be re-extracted or the solution may be re-prepared and the extraction sequence repeated.

If the DNPH reagent is not used in the field within five days of extraction, an aliquot may be taken and analyzed as described Draft Method 8315. If the reagent meets the Quality Control requirements, the reagent may be used. If the reagent does not meet Quality Control requirements, the reagent must be discarded and new reagent must be prepared and tested.

5.4.5 Calculation of Acceptable Levels of Impurities in DNPH Reagent: The acceptable impurity level (AIL, µg/mL) is calculated from the expected analyte level in the sampled gas (EAL, ppbv), the volume of air that will be sampled at standard conditions (SVOL, L), the formula weight of the analyte (FW, g/mol), and the volume of DNPH reagent that will be used in the impingers (RVOL, mL):

$$AIL = 0.1 \times [EAL \times SVOL \times FW/22.4 \times (FW + 180)/FW]/(RVOL \times 1000).$$

where 0.1 is the acceptable contaminant level, 22.4 is a factor relating ppbv to g/L, 180 is a factor relating the underivatized analyte to the derivatized analyte, and 1000 is a unit conversion factor.

5.4.6 Disposal of Excess DNPH Reagent: Excess DNPH reagent may be returned to the laboratory and recycled or treated as aqueous waste for disposal purposes. 2,4-Dinitrophenylhydrazine is a flammable solid when dry so water should not be evaporated from the solution of the reagent.

5.5 Field Spike Standard Preparation: To prepare a formaldehyde field spiking standard at 4.01 mg/mL, use a 500µL syringe to transfer 0.5 mL of 37% by weight of formaldehyde (401 mg/mL) to a 50 mL volumetric flask containing approximately 40 mL of methanol. Dilute to 50 mL with methanol.

6.0 SAMPLE COLLECTION, PRESERVATION, AND HANDLING

6.1 Because of the complexity of this method, field personnel should be trained in and experienced with the test procedures in order to obtain reliable results.

6.2 Laboratory Preparation:

6.2.1 All the components shall be maintained and calibrated according to the procedure described in APTD-0576, unless otherwise specified.

6.2.2 Weigh several 200- to 300-g portions of silica gel in airtight containers to the nearest 0.5 g. Record on each container the total weight of the silica gel plus containers. As an alternative to preweighing the silica gel, it may instead be weighed directly in the impinger or sampling holder just prior to train assembly.

6.3 Preliminary Field Determinations:

6.3.1 Select the sampling site and the minimum number of sampling points according to EPA Method 1 or other relevant criteria. Determine the stack pressure, temperature, and range of velocity heads using EPA Method 2. A leak-check of the pitot lines according to EPA Method 2, Section 3.1, must be performed. Determine the stack gas moisture content using EPA Approximation Method 4 or its alternatives to establish estimates of isokinetic sampling-rate settings. Determine the stack gas dry molecular weight, as described in EPA Method 2, Section 3.6. If integrated EPA Method 3 sampling is used for molecular weight determination, the integrated bag sample shall be taken simultaneously with, and for the same total length of time as, the sample run.

6.3.2 Select a nozzle size based on the range of velocity heads so that it is not necessary to change the nozzle size in order to maintain isokinetic sampling rates below 28 L/min (1.0 cfm). During the run, do not change the nozzle.

Ensure that the proper differential pressure gauge is chosen for the range of velocity heads encountered (see Section 2.2 of EPA Method 2).

6.3.3 Select a suitable probe liner and probe length so that all traverse points can be sampled. For large stacks, to reduce the length of the probe, consider sampling from opposite sides of the stack.

6.3.4 A minimum of 45 ft^3 of sample volume is required for the determination of the Destruction and Removal Efficiency (DRE) of formaldehyde from incineration systems (45ft^3 is equivalent to one hour of sampling at 0.75 dscf). Additional sample volume shall be collected as ecessitated by the capacity of the DNPH reagent and analytical detection limit constraints. To determine the minimum sample volume required, refer to sample calculations in Section 10.

6.3.5 Determine the total length of sampling time needed to obtain the identified minimum volume by comparing the anticipated average sampling rate with the volume requirement. Allocate the same time to all traverse points defined by EPA Method 1. To avoid timekeeping errors, the length of time sampled at each traverse point should be an integer or an integer plus 0.5 min.

6.3.6 In some circumstances (e.g., batch cycles) it may be necessary to sample for shorter times at the traverse points and to obtain smaller gas-volume samples. In these cases, careful documentation must be maintained in order to allow accurate calculation of concentrations.

6.4 Preparation of Collection Train:

6.4.1 During preparation and assembly of the sampling train, keep all openings where contamination can occur covered with Teflon® film or aluminum foil until just prior to assembly or until sampling is about to begin.

6.4.2 Place 100 mL of cleaned DNPH solution in each of the first two impingers, and leave the third impinger empty. If additional capacity is required for high expected concentrations of formaldehyde in the stack gas, 200 mL of DNPH per impinger may be used or additional impingers may be used for sampling. Transfer approximately 200 to 300 g of pre-weighed silica gel from its container to the fourth impinger. Care should be taken to ensure that the silica gel is not entrained and carried out from the impinger during sampling. Place the silica gel container in a clean place for later use in the sample recovery. Alternatively, the weight of the silica gel plus impinger may be determined to the nearest 0.5 g and recorded.

6.4.3 With a glass or quartz liner, install the selected nozzle using a Viton-A O-ring when stack temperatures are <260°C (500°F) and a woven glass-fiber gasket when temperatures are higher. See APTD-0576 (Rom, 1972) for details. Other connecting systems utilizing either 316 stainless steel or Teflon® ferrules may be used. Mark the probe with heat-resistant tape or by some other method to denote the proper distance into the stack or duct for each sampling point.

6.4.4 Assemble the train as shown in Figure 1. During assembly, do not use any silicone grease on ground-glass joints upstream of the impingers. Use Teflon® tape, if required. A very light coating of silicone grease may be used on ground-glass joints downstream of the impingers, but the silicone grease should be limited to the outer portion (see APTD-0576) of the ground-glass joints to minimize silicone grease contamination. If necessary, Teflon® tape may be used to seal leaks. Connect all temperature sensors to an appropriate potentiometer/display unit. Check all temperature sensors at ambient temperature.

6.4.5 Place crushed ice all around the impingers.

6.4.6 Turn on and set the probe heating system at the desired operating temperature. Allow time for the temperature to stabilize.

6.5 Leak-Check Procedures:

6.5.1 Pre-test Leak Check:

6.5.1.1 After the sampling train has been assembled, turn on and set the probe heating system at the desired operating temperature. Allow time for the temperature to stabilize. If a Viton-A O-ring or other leak-free connection is used in assembling the probe nozzle to the probe liner, leak-check the train at the sampling site by plugging the nozzle and pulling a 381-mm Hg (15 in Hg) vacuum.

NOTE: A lower vacuum may be used, provided that the lower vacuum is not exceeded during the test.

6.5.1.2 If an asbestos string is used, do not connect the probe to the train during the leak check. Instead, leak-check the train by first attaching a carbon-filled leak check impinger to the inlet and then plugging the inlet and pulling a 381-mm Hg (15 in Hg) vacuum. (A lower vacuum may be used if this lower vacuum is not exceeded during the test.) Then connect the probe to the train and leak-check at about 25 mm Hg (1 in Hg) vacuum. Alternatively, leak-check the probe with the rest of the sampling train in one step at 381 mm Hg (15 in Hg) vacuum. Leakage rates in excess of 4% of the average sampling rate or >0.00057 m^3/min (0.02 cfm), whichever is less, are acceptable.

6.5.1.3 The following leak check instructions for the sampling train described in APTD-0576 and APTD-0581 may be helpful. Start the pump with the fine-adjust valve fully open and coarse-adjust valve completely closed. Partially open the coarse-adjust valve and slowly close the fine-adjust valve until the desired vacuum is reached. Do not reverse direction of the fine-adjust valve, as liquid will back up into the train. If the desired vacuum is exceeded, either perform the leak check at this higher vacuum or end the leak check, as shown below, and start over.

6.5.1.4 When the leak check is completed, first slowly remove the plug from the inlet to the probe. When the vacuum drops to 127 mm (5 in) Hg or less, immediately close the coarse-adjust valve. Switch off the pumping system and reopen the fine-adjust valve. Do not reopen the fine-adjust valve until the coarse-adjust valve has been closed to prevent the liquid in the impingers from being forced backward into the sampling line and silica gel from being entrained backward into the third impinger.

6.5.2 Leak Checks During Sampling Runs:

6.5.2.1 If, during the sampling run, a component change (i.e., impinger) becomes necessary, a leak check shall be conducted immediately after the interruption of sampling and before the change is made. The leak check shall be done according to the procedure described in Section 6.5.1, except that it shall be done at a vacuum greater than or equal to the maximum value recorded up to that point in the test. If the leakage rate is found to be no greater than 0.00057 m^3/min (0.02 cfm) or 4% of the average sampling rate (whichever is less), the results are acceptable. If a higher leakage rate is obtained, the tester must void the sampling run.

NOTE: Any correction of the sample volume by calculation reduces the integrity of the pollutant concentration data generated and must be avoided.

6.5.2.2 Immediately after a component change and before sampling is re-initiated, a leak check similar to a pre-test leak check must also be conducted.

6.5.3 Post-test Leak Check:

6.5.3.1 A leak check is mandatory at the conclusion of each sampling run. The leak check shall be done with the same procedures as the pre-test leak check, except that the post-test leak check shall be conducted at a vacuum greater than or equal to the maximum value reached during the sampling run. If the leakage rate is found to be no greater than 0.00057 m^3/min (0.02 cfm) or 4% of the average sampling rate (whichever is less), the results are acceptable. If, however, a higher leakage rate is obtained, the tester shall record the leakage rate and void the sampling run.

6.6 Sampling Train Operation:

6.6.1 During the sampling run, maintain an isokinetic sampling rate to within 10% of true isokinetic, below 28 L/min (1.0 cfm). Maintain a temperature around the probe of 120° ± 14°C (248° ± 25°F).

6.6.2 For each run, record the data on a data sheet such as the one shown in Figure 2. Be sure to record the initial dry-gas meter reading. Record the dry-gas meter readings at the beginning and end of each sampling time increment, when changes in flow rates are made, before and after each leak check, and when sampling is halted. Take other readings required by Figure 2 at least once at each sample point during each time increment and additional readings when significant adjustments (20% variation in velocity head readings) necessitate additional adjustments in flow rate. Level and zero the manometer. Because the manometer level and zero may drift due to vibrations and temperature changes, make periodic checks during the traverse.

6.6.3 Clean the stack access ports prior to the test run to eliminate the chance of sampling deposited material. To begin sampling, remove the nozzle cap, verify that the filter and probe heating systems are at the specified temperature, and verify that the pitot tube and probe are properly positioned. Position the nozzle at the first traverse point, with the tip pointing directly into the gas stream. Immediately start the pump and adjust the flow to isokinetic conditions. Nomographs, which aid in the rapid adjustment of the isokinetic sampling rate without excessive computations, are available. These nomographs are designed for use when the Type S pitot tube coefficient is 0.84 ± 0.02 and the stack gas equivalent density (dry molecular weight) is equal to 29 ± 4. APTD-0576 details the procedure for using the nomographs. If the stack gas molecular weight and the pitot tube coefficient are outside the above ranges, do not use the nomographs unless appropriate steps are taken to compensate for the deviations.

6.6.4 When the stack is under significant negative pressure (equivalent to the height of the impinger stem), take care to close the coarse-adjust valve before inserting the probe into the stack in order to prevent liquid from backing up through the train. If necessary, the pump may be turned on with the coarse-adjust valve closed.

6.6.5 When the probe is in position, block off the openings around the probe and stack access port to prevent unrepresentative dilution of the gas stream.

6.6.6 Traverse the stack cross section, as required by EPA Method 1, being careful not to bump the probe nozzle into the stack walls when sampling near the walls or when removing or inserting the probe through the access port, in order to minimize the chance of extracting deposited material.

6.6.7 During the test run, make periodic adjustments to keep the temperature around the probe at the proper levels. Add more ice and, if necessary, salt, to maintain a temperature of <20°C (68°F) at the silica gel outlet. Also, periodically check the level and zero of the manometer.

6.6.8 A single train shall be used for the entire sampling run, except in cases where simultaneous sampling is required in two or more separate ducts or at two or more different locations within the same duct, or in cases where equipment failure necessitates a change of trains. An additional train or additional trains may also be used for sampling when the capacity of a single train is exceeded.

6.6.9 When two or more trains are used, separate analyses of components from each train shall be performed. If multiple trains have been used because the capacity of a single train would be exceeded, first impingers from each train may be combined, and second impingers from each train may be combined.

6.6.10 At the end of the sampling run, turn off the coarse-adjust valve, remove the probe and nozzle from the stack, turn off the pump, record the final dry gas meter reading, and conduct a post-test leak check. Also, leak check the pitot lines as described in EPA Method 2. The lines must pass this leak check in order to validate the velocity-head data.

6.6.11 Calculate percent isokineticity (see Method 2) to determine whether the run was valid or another test should be made.

7.0 SAMPLE RECOVERY

7.1 Preparation:

7.1.1 Proper cleanup procedure begins as soon as the probe is removed from the stack at the end of the sampling period. Allow the probe to cool. When the probe can be handled safely, wipe off all external particulate matter near the tip of the probe nozzle and place a cap over the tip to prevent losing or gaining particulate matter. Do not cap the probe tip tightly while the sampling train is cooling because a vacuum will be created, drawing liquid from the impingers back through the sampling train.

7.1.2 Before moving the sampling train to the cleanup site, remove the probe from the sampling train and cap the open outlet, being careful not to lose any condensate that might be present. Remove the umbilical cord from the last impinger and cap the impinger. If a flexible line is used, let any condensed water or liquid drain into the impingers. Cap off any open impinger inlets and outlets. Ground glass stoppers, Teflon® caps, or caps of other inert materials may be used to seal all openings.

7.1.3 Transfer the probe and impinger assembly to an area that is clean and protected from wind so that the chances of contaminating or losing the sample are minimized.

7.1.4 Inspect the train before and during disassembly, and note any abnormal conditions.

7.1.5 Save a portion of all washing solutions (methylene chloride, water) used for cleanup as a blank. Transfer 200 mL of each solution directly from the wash bottle being used and place each in a separate, pre-labeled sample container.

7.2 Sample Containers:

7.2.1 Container 1: Probe and Impinger Catches. Using a graduated cylinder, measure to the nearest mL, and record the volume of the solution in the first three impingers. Alternatively, the solution may be weighed to the nearest 0.5 g. Include any condensate in the probe in this determination. Transfer the impinger solution from the graduated cylinder into the amber flint glass bottle. Taking care that dust on the outside of the probe or other exterior surfaces does not get into the sample, clean all surfaces to which the sample is exposed (including the probe nozzle, probe fitting, probe liner, first impinger, and impinger connector) with methylene chloride. Use less than 500 mL for the entire wash (250 mL would be better, if possible). Add the washings to the sample container.

7.2.1.1 Carefully remove the probe nozzle and rinse the inside surface with methylene chloride from a wash bottle. Brush with a Teflon® bristle brush, and rinse until the rinse shows no visible particles or yellow color, after which make a final rinse of the inside surface. Brush and rinse the inside parts of the Swagelok® fitting with methylene chloride in a similar way.

7.2.1.2 Rinse the probe liner with methylene chloride. While squirting the methylene chloride into the upper end of the probe, tilt and rotate the probe so that all inside surfaces will be wetted with methylene chloride. Let the methylene chloride drain from the lower end into the sample container. The tester may use a funnel (glass or polyethylene) to aid in transferring the liquid washes to the container. Follow the rinse with a Teflon® brush. Hold the probe in an inclined position, and squirt methylene chloride into the upper end as the probe brush is being pushed with a twisting action through the probe. Hold the sample container underneath the lower end of the probe, and catch any methylene chloride, water, and particulate matter that is brushed from the probe. Run the brush through the probe three times or more. With stainless steel or other metal probes, run the brush through in the above prescribed manner at least six times since there may be small crevices in which particulate matter can be entrapped. Rinse the brush with methylene chloride or water, and quantitatively collect these washings in the sample container. After the brushings, make a final rinse of the probe as described above.

NOTE: Two people should clean the probe in order to minimize sample losses. Between sampling runs, brushes must be kept clean and free from contamination.

7.2.1.3 Rinse the inside surface of each of the first three impingers (and connecting tubing) three separate times. Use a small portion of methylene chloride for each rinse, and brush each surface to which sample is exposed with a Teflon® bristle brush to ensure recovery of fine particulate matter. Water will be required for the recovery of the impingers in addition to the specified quantity of methylene chloride. There will be at least two phases in the impingers. This two-phase mixture does not pour well, and a significant amount of the impinger catch will be left on the walls. The use of water as a rinse makes the recovery quantitative. Make a final rinse of each surface and of the brush, using both methylene chloride and water.

7.2.1.4 After all methylene chloride and water washings and particulate matter have been collected in the sample container, tighten the lid so that solvent, water, and DNPH reagent will not leak out when the container is shipped to the laboratory. Mark the height of the fluid level to determine whether leakage occurs during transport. Seal the container with Teflon® tape. Label the container clearly to identify its contents.

7.2.1.5 If the first two impingers are to be analyzed separately to check for breakthrough, separate the contents and rinses of the two impingers into individual containers. Care must be taken to avoid physical carryover from the first impinger to the second. The formaldehyde hydrazone is a solid which floats and froths on top of the impinger solution. Any physical carryover of collected moisture into the second impinger will invalidate a breakthrough assessment.

7.2.2 Container 2: Sample Blank. Prepare a blank by using an amber flint glass container and adding a volume of DNPH reagent and methylene chloride equal to the total volume in Container 1. Process the blank in the same manner as Container 1.

7.2.3 Container 3: Silica Gel. Note the color of the indicating silica gel to determine whether it has been completely spent and make a notation of its condition. The impinger containing the silica gel may be used as a sample transport container with both ends sealed with tightly fitting caps or plugs. Ground-glass stoppers or Teflon® caps may be used. The silica gel impinger should then be labeled, covered with aluminum foil, and packaged on ice for transport to the laboratory. If the silica gel is removed from the impinger, the tester may use a funnel to pour the silica gel and a rubber policeman to remove the silica gel from the impinger. It is not necessary to remove the small amount of dust particles that may adhere to the impinger wall and are difficult to remove. Since the gain in weight is to be used for moisture calculations, do not use water or other liquids to transfer the silica gel. If a balance is available in the field, the spent silica gel (or silica gel plus impinger) may be weighed to the nearest 0.5 g.

7.2.4 Sample containers should be placed in a cooler, cooled by although not in contact with ice. Sample containers must be placed vertically and, since they are glass, protected from breakage during shipment. Samples should be cooled during shipment so they will be received cold at the laboratory.

8.0 CALIBRATION

8.1 Probe Nozzle: Probe nozzles shall be calibrated before their initial use in the field. Using a micrometer, measure the inside diameter of the nozzle to the nearest 0.025 mm (0.001 in). Make measurements at three separate places across the diameter and obtain the average of the measurements. The difference between the high and low numbers shall not exceed 0.1 mm (0.004 in). When the nozzles become nicked or corroded, they shall be replaced and calibrated before use. Each nozzle must be permanently and uniquely identified.

8.2 Pitot tube: The Type S pitot tube assembly shall be calibrated according to the procedure outlined in Section 4 of EPA Method 2, or assigned a nominal coefficient of 0.84 if it is not visibly nicked or corroded and if it meets design and intercomponent spacing specifications.

8.3 Metering system:

8.3.1 Before its initial use in the field, the metering system shall be calibrated according to the procedure outlined in APTD-0576. Instead of physically adjusting the dry-gas meter dial readings to correspond to the wet-test meter readings, calibration factors may be used to correct the gas meter dial readings mathematically to the proper values. Before calibrating the metering system, it is suggested that a leak check be conducted. For metering systems having diaphragm pumps, the normal leak check procedure will not detect leakages within the pump. For these cases, the following leak check procedure will apply: make a ten-minute calibration run at 0.00057 m^3/min (0.02 cfm). At the end of the run, take the difference of the measured wet-test and dry-gas meter volumes and divide the difference by 10 to get the leak rate. The leak rate should not exceed 0.00057 m^3/min (0.02 cfm).

8.3.2 After each field use, check the calibration of the metering system by performing three calibration runs at a single intermediate orifice setting (based on the previous field test). Set the vacuum at the maximum value reached during the test series. To adjust the vacuum, insert a valve between the wet-test meter and the inlet of the metering system. Calculate the average value of the calibration factor. If the calibration has changed by more than 5%, recalibrate the meter over the full range of orifice settings, as outlined in APTD-0576.

8.3.3 Leak check of metering system: The portion of the sampling train from the pump to the orifice meter (see Figure 1) should be leak-checked prior to initial use and after each shipment. Leakage after the pump will result in less volume being recorded than is actually sampled. Use the following procedure: Close the main valve on the meter box. Insert a one-hole rubber stopper with rubber tubing attached into the orifice exhaust pipe. Disconnect and vent the low side of the orifice manometer. Close off the low side orifice tap. Pressurize the system to 13 - 18 cm (5 - 7 in) water column by blowing into the rubber tubing. Pinch off the tubing and observe the manometer for 1 min. A loss of pressure on the manometer indicates a leak in the meter box. Leaks must be corrected.

NOTE: If the dry-gas-meter coefficient values obtained before and after a test series differ by >5%, either the test series must be voided or calculations for test series must be performed using whichever meter coefficient value (i.e., before or after) gives the lower value of total sample volume.

8.4 Probe heater: The probe heating system must be calibrated before its initial use in the field according to the procedure outlined in APTD-0576. Probes constructed according to APTD-0581 need not be calibrated if the calibration curves in APTD-0576 are used.

8.5 Temperature gauges: Each thermocouple must be permanently and uniquely marked on the casting. All mercury-in-glass reference thermometers must conform to ASTM E-1 63C or 63F specifications. Thermocouples should be calibrated in the laboratory with and without the use of extension leads. If extension leads are used in the field, the thermocouple readings at ambient air temperatures, with and without the extension lead, must be noted and recorded. Correction is necessary if the use of an extension lead produces a change >1.5%.

8.5.1 Impinger and dry-gas meter thermocouples: For the thermocouples used to measure the temperature of the gas leaving the impinger train, three-point calibration at ice water, room air, and boiling water temperatures is necessary. Accept the thermocouples only if the readings at all three temperatures agree to ±2°C (3.6°F) with those of the absolute value of the reference thermometer.

8.5.2 Probe and stack thermocouple: For the thermocouples used to indicate the probe and stack temperatures, a three-point calibration at ice water, boiling water, and hot oil bath temperatures must be performed. Use of a point at room air temperature is recommended. The thermometer and thermocouple must agree to within 1.5% at each of the calibration points. A calibration curve (equation) may be constructed (calculated) and the data extrapolated to cover the entire temperature range suggested by the manufacturer.

8.6 Barometer: Adjust the barometer initially and before each test series to agree to within ±2.5 mm Hg (0.1 in Hg) of the mercury barometer or the corrected barometric pressure value reported by a nearby National Weather Service Station (same altitude above sea level).

8.7 Triple-beam balance: Calibrate the triple-beam balance before each test series, using Class S standard weights. The weights must be within ±0.5% of the standards, or the balance must be adjusted to meet these limits.

9.0 CALCULATIONS

Carry out calculations, retaining at least one extra decimal figure beyond that of the acquired data. Round off figures after final calculation.

9.1 Calculation of Total Formaldehyde:

To determine the total formaldehyde in mg, use the following equation:

$$\text{Total mg formaldehyde} = C_d \times V \times DF \times ([\text{g/mole aldehyde}]/[\text{g/mole DNPH derivative}]) \times 10^{-3}\ \text{mg}/\mu\text{g}$$

where:

C_d = measured concentration of DNPH-formaldehyde derivative, µg/mL

V = organic extract volume, mL

DF = dilution factor

9.2 Formaldehyde concentration in stack gas:

Determine the formaldehyde concentration in the stack gas using the following equation:

$$C_f = K\ [\text{total formaldehyde, mg}] / V_{m(std)}$$

where:

K = 35.31 ft^3/m^3 if $V_{m(std)}$ is expressed in English units

= 1.00 m^3/m^3 if $V_{m(std)}$ is expressed in metric units

$V_{m(std)}$ = volume of gas sample as measured by dry gas meter, corrected to standard conditions, dscm (dscf)

9.3 Average Dry Gas Meter Temperature and Average Orifice Pressure Drop are obtained from the data sheet.

9.4 Dry Gas Volume: Calculate $V_{m(std)}$ and adjust for leakage, if necessary, using the equation in Section 6.3 of EPA Method 5.

9.5 Volume of Water Vapor and Moisture Content: Calculate the volume of water vapor and moisture content from equations 5-2 and 5-3 of EPA Method 5.

10.0 DETERMINATION OF VOLUME TO BE SAMPLED

To determine the minimum sample volume to be collected, use the following sequence of equations.

10.1 From prior analysis of the waste feed, the concentration of formaldehyde (FORM) introduced into the combustion system can be calculated. The degree of destruction and removal efficiency that is required is used to determine the maximum amount of FORM allowed to be present in the effluent. This amount may be expressed as:

$\text{Max FORM}_i\text{ Mass}$ =

$$[\,(\text{WF})\,(\text{FORM}_i\text{ conc})\,(100 - \%\text{DRE})\,]\,/\,100$$

where:

WF = mass flow rate of waste feed per h, g/h (lb/h)

FORM_i = concentration of FORM (wt %) introduced into the combustion process

DRE = percent Destruction and Removal Efficiency required

Max FORM = mass flow rate (g/h [lb/h]) of FORM emitted from the combustion source

10.2 The average discharge concentration of the FORM in the effluent gas is determined by comparing the Max FORM with the volumetric flow rate being exhausted from the source. Volumetric flow rate data are available as a result of preliminary EPA Method 1 - 4 determinations:

$$\text{Max FORM}_i\text{ conc} = [\text{Max FORM}_i\text{ Mass}\,]\,/\,DV_{eff(std)}$$

where:

$DV_{eff(std)}$ = volumetric flow rate of exhaust gas, dscm (dscf)

FORM_i conc = anticipated concentration of the FORM in the exhaust gas stream, g/dscm (lb/dscf)

10.3 In making this calculation, it is recommended that a safety margin of at least ten be included.

$$[LDL_{FORM} \times 10]\,/\,[\text{FORM}_{i\ conc}] = V_{tbc}$$

where:

LDL_{FORM} = detectable amount of FORM in entire sampling train

V_{tbc} = minimum dry standard volume to be collected at dry-gas meter

10.4 The following analytical detection limits and DNPH Reagent Capacity (based on a total volume of 200 mL in two impingers) must also be considered in determining a volume to be sampled.

Table 2. Instrument Detection Limits and Reagent Capacity for Formaldehyde Analysis[1]

Analyte	Detection Limit, ppbv[2]	Reagent Capacity, ppmv
formaldehyde	1.8	66
acetaldehyde	1.7	70
acrolein	1.5	75
acetone/propionaldehyde	1.5	75
butyraldehyde	1.5	79
methyl ethyl ketone	1.5	79
valeraldehyde	1.5	84
isovaleraldehyde	1.4	84
hexaldehyde	1.3	88
benzaldehyde	1.4	84
o-/m-/p-tolualdehyde	1.3	89
dimethylbenzaldehyde	1.2	93

[1] Oxygenated compounds in addition to formaldehyde are included for comparison with formaldehyde; extension of the methodology to other compounds is possible.

[2] Detection limits are determined in solvent. These values therefore represent the optimum capability of the methodology.

11.0 QUALITY CONTROL

11.1 <u>Sampling</u>: See EPA Manual 600/4-77-027b for Method 5 quality control.

11.2 <u>Analysis</u>: The quality assurance program required for this method includes the analysis of field and method blanks, procedure validations, and analysis of field spikes. The assessment of combustion data and positive identification and quantitation of formaldehyde are dependent on the integrity of the samples received and the precision and accuracy of the analytical methodology. Quality Assurance procedures for this method are designed to monitor the performance of the analytical methodology and to provide the required information to take corrective action if problems are observed in laboratory operations or in field sampling activities.

11.2.1 <u>Field Blanks</u>: Field blanks must be submitted with the samples collected at each sampling site. The field blanks include the sample bottles containing aliquots of sample recovery solvents, methylene chloride and water, and unused DNPH reagent. At a minimum, one complete sampling train will be assembled in the field staging area, taken to the sampling area, and leak-checked at the beginning and end of the testing (or for the same total number of times as the actual sampling train). The probe of the blank train must be heated during the sample test. The train will be recovered as if it were an actual test sample. No gaseous sample will be passed through the Blank sampling train.

11.2.2 <u>Method Blanks</u>: A method blank must be prepared for each set of analytical operations, to evaluate contamination and artifacts that can be derived from glassware, reagents, and sample handling in the laboratory.

11.2.3 Field Spike: A field spike is performed by introducing 200 µL of the Field Spike Standard into an impinger containing 200 mL of DNPH solution. Standard impinger recovery procedures are followed and the field spike sample is returned to the laboratory for analysis. The field spike is used as a check on field handling and recovery procedures. An aliquot of the field spike standard is retained in the laboratory for derivatization and comparative analysis.

12.0 METHOD PERFORMANCE

12.1 Method performance evaluation: The following expected method performance parameters for precision, accuracy, and detection limits are provided in Table 3.

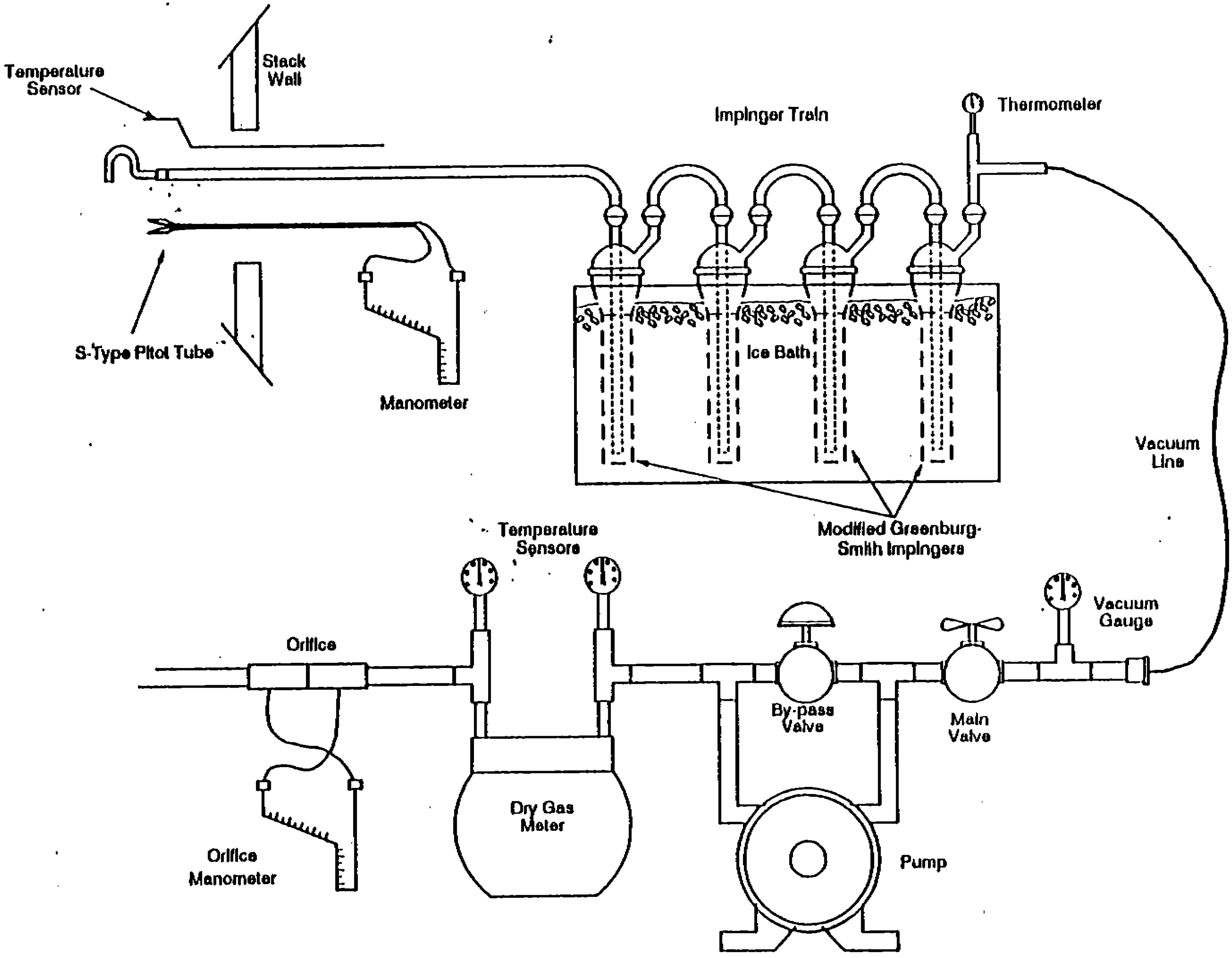
Table 3. Expected Method Performance for Formaldehyde

Parameter	Precision	[1]Accuracy[2]	Detection Limit[3]
Matrix: Dual trains	±15% RPD	±20%	1.5×10^{-7} lb/ft^3 (1.8 ppbv)

[1] Relative percent difference limit for dual trains.

[2] Limit for field spike recoveries.

[3] The lower reporting limit having less than 1% probability of false positive detection.



Formaldehyde Sampling Train

Location ____________________

Operator ____________________

Date ____________________

Run No. ____________________

Sample Box No. ____________________

Meter Box No. ____________________

Meter H@ ____________________

C Factor ____________________

Pitot Tube Coefficient C_p ____________________

Schematic of Stack Cross Section

Ambient Temperature ____________________

Barometric Pressure ____________________

Assumed Moisture % ____________________

Probe Length, m(ft) ____________________

Nozzle Identification No. ____________________

Average Calibrated Nozzle Diameter, cm (in) ____________________

Probe Heating Setting ____________________

Leak Rate, m^3/min. (cfm) ____________________

Probe Liner Material ____________________

Static Pressure, mm Hg (in. Hg) ____________________

Filter No. ____________________

Traverse Point Number	Sampling Time (0) Min.	Vacuum mm Hg (in. Hg)	Stack Temperature (T_s) °C (°F)	Velocity Head (P_s) mm (in) H_2O	Pressure Differential Across Orifice Meter mm (H_2O) (in H_2O)	Gas Sample Volume m^3 (ft^3)	Gas Sample Temp. at Dry Gas Meter		Filter Holder Temperature °C(°F)	Temperature of Gas Leaving Last Impinger °C(°F)
							Inlet °C(°F)	Outlet °C(°F)		
Total							Avg.	Avg.		
Average										

340434ER

Figure 2. Field Data Sheet

PHENOL

Phenol samples were collected using a Method 5 sampling train at 0.75 CFM using neutral-buffered absorbing reagent. The first impinger in each sampling was spiked with isotopically-labeled phenol (phenol-d_5) and 2-fluorophenol for sampling and recovery efficiency surrogates. The recovered samples were extracted and the extracts analyzed by GC/MS for phenol, phenol-d_5 and 2-fluorophenol as per EPA Method 8270. The recoveries of phenol-d_5 and 2-fluorophenol were used to adjust the measured phenol concentrations.

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COLLECTION OF SEMIVOLATILE COMPOUNDS

EPA METHOD 0010

(Interpoll Method II-8788 - Version 1.0)

EPA Method SW846 USEPA Office of Solid Waste and Emergency Response 3rd Ed., November 1986: Test Methods for Evaluating Solid Waste Volume 2: Field Manual Physical/Chemical Methods Method 0010.

METHOD 0010

MODIFIED METHOD 5 SAMPLING TRAIN

1.0 SCOPE AND APPLICATION

1.1 This method is applicable to the determination of Destruction and Removal Efficiency (DRE) of semivolatile Principal Organic Hazardous Compounds (POHCs) from incineration systems (PHS, 1967). This method also may be used to determine particulate emission rates from stationary sources as per EPA Method 5 (see References at end of this method).

2.0 SUMMARY OF METHOD

2.1 Gaseous and particulate pollutants are withdrawn from an emission source at an isokinetic sampling rate and are collected in a multicomponent sampling train. Principal components of the train include a high-efficiency glass- or quartz-fiber filter and a packed bed of porous polymeric adsorbent resin. The filter is used to collect organic-laden particulate materials and the porous polymeric resin to adsorb semivolatile organic species. Semivolatile species are defined as compounds with boiling points >100°C.

2.2 Comprehensive chemical analyses of the collected sample are conducted to determine the concentration and identity of the organic materials.

3.0 INTERFERENCES

3.1 Oxides of nitrogen (NO_x) are possible interferents in the determination of certain water-soluble compounds such as dioxane, phenol, and urethane; reaction of these compounds with NO_x in the presence of moisture will reduce their concentration. Other possibilities that could result in positive or negative bias are (1) stability of the compounds in methylene chloride, (2) the formation of water-soluble organic salts on the resin in the presence of moisture, and (3) the solvent extraction efficiency of water-soluble compounds from aqueous media. Use of two or more ions per compound for qualitative and quantitative analysis can overcome interference at one mass. These concerns should be addressed on a compound-by-compound basis before using this method.

4.0 APPARATUS AND MATERIALS

4.1 Sampling train:

4.1.1 A schematic of the sampling train used in this method is shown in Figure 1. This sampling train configuration is adapted from EPA Method 5 procedures, and, as such, the majority of the required equipment

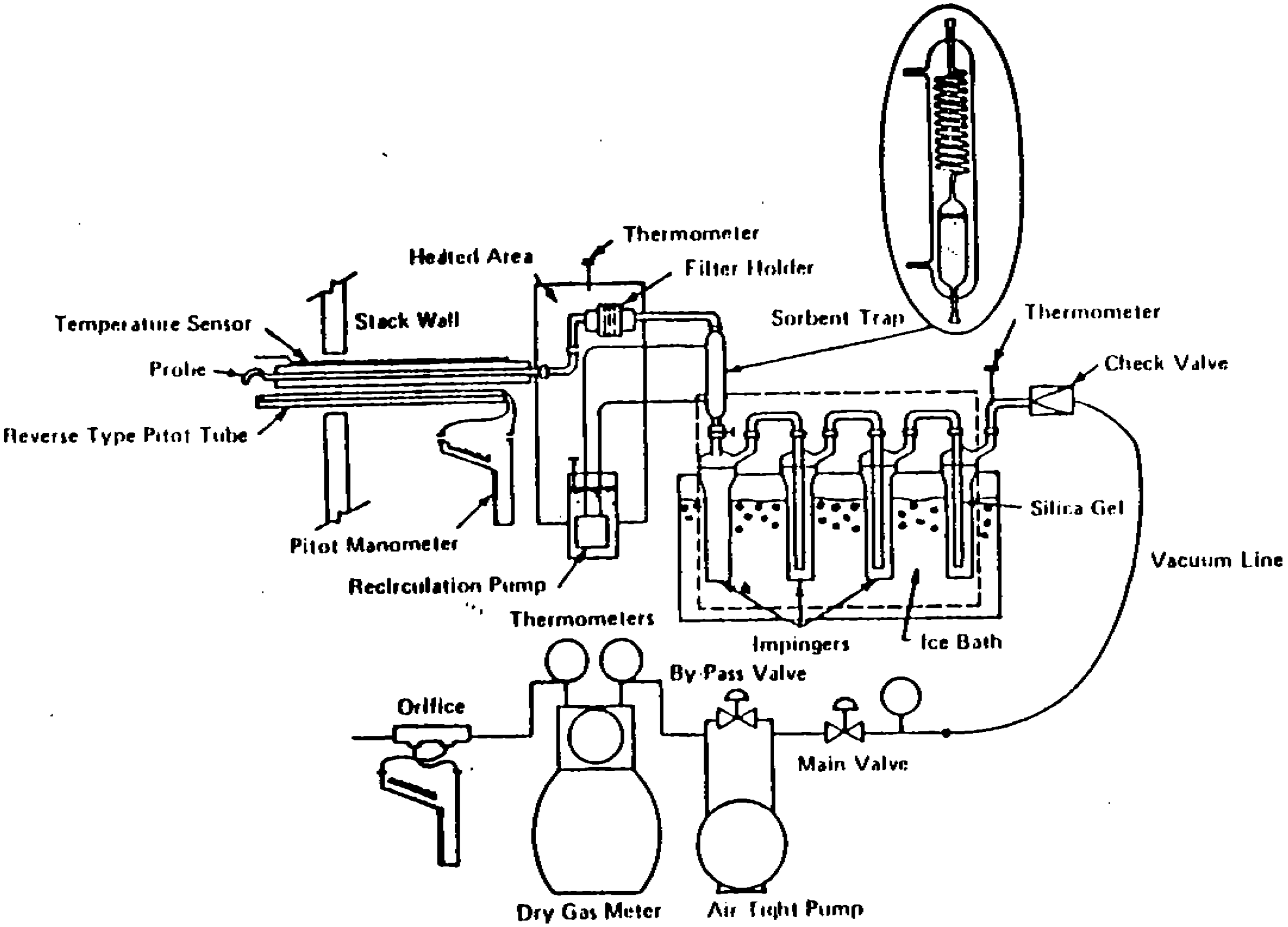

Figure 1. Modified Method 5 Sampling Train.

is identical to that used in EPA Method 5 determinations. The new components required are a condenser coil and a sorbent module, which are used to collect semivolatile organic materials that pass through the glass- or quartz-fiber filter in the gas phase.

4.1.2 Construction details for the basic train components are given in APTD-0581 (see Martin, 1971, in Section 13.0, References); commercial models of this equipment are also available. Specifications for the sorbent module are provided in the following subsections. Additionally, the following subsections list changes to APTD-0581 and identify allowable train configuration modifications.

4.1.3 Basic operating and maintenance procedures for the sampling train are described in APTD-0576 (see Rom, 1972, in Section 13.0, References). As correct usage is important in obtaining valid results, all users should refer to APTD-0576 and adopt the operating and maintenance procedures outlined therein unless otherwise specified. The sampling train consists of the components detailed below.

4.1.3.1 Probe nozzle: Stainless steel (316) or glass with sharp, tapered (30° angle) leading edge. The taper shall be on the outside to preserve a constant I.D. The nozzle shall be buttonhook or elbow design and constructed from seamless tubing (if made of stainless steel). Other construction materials may be considered for particular applications. A range of nozzle sizes suitable for isokinetic sampling should be available in increments of 0.16 cm (1/16 in.), e.g., 0.32-1.27 cm (1/8-1/2 in.), or larger if higher volume sampling trains are used. Each nozzle shall be calibrated according to the procedures outlined in Paragraph 9.1.

4.1.3.2 Probe liner: Borosilicate or quartz-glass tubing with a heating system capable of maintaining a gas temperature of 120 ± 14°C (248 ± 25°F) at the exit end during sampling. (The tester may opt to operate the equipment at a temperature lower than that specified.) Because the actual temperature at the outlet of the probe is not usually monitored during sampling, probes constructed according to APTD-0581 and utilizing the calibration curves of APTD-0576 (or calibrated according to the procedure outlined in APTD-0576) are considered acceptable. Either borosilicate or quartz-glass probe liners may be used for stack temperatures up to about 480°C (900°F). Quartz liners shall be used for temperatures between 480 and 900°C (900 and 1650°F). (The softening temperature for borosilicate is 820°C (1508°F), and for quartz 1500°C (2732°F).) Water-cooling of the stainless steel sheath will be necessary at temperatures approaching and exceeding 500°C.

4.1.3.3 Pitot tube: Type S, as described in Section 2.1 of EPA Method 2, or other appropriate devices (Vollaro, 1976). The pitot tube shall be attached to the probe to allow constant monitoring of the stack-gas velocity. The impact (high-pressure) opening plane of the pitot tube shall be even with or above the nozzle entry plane (see EPA Method 2, Figure 2-6b) during sampling. The Type S pitot tube assembly shall have a known coefficient, determined as outlined in Section 4 of EPA Method 2.

4.1.3.4 Differential pressure gauge: Inclined manometer or equivalent device as described in Section 2.2 of EPA Method 2. One manometer shall be used for velocity-head (ΔP) readings and the other for orifice differential pressure (ΔH) readings.

4.1.3.5 Filter holder: Borosilicate glass, with a glass frit filter support and a sealing gasket. The sealing gasket should be made of materials that will not introduce organic material into the gas stream at the temperature at which the filter holder will be maintained. The gasket shall be constructed of Teflon or materials of equal or better characteristics. The holder design shall provide a positive seal against leakage at any point along the filter circumference. The holder shall be attached immediately to the outlet of the cyclone or cyclone bypass.

4.1.3.6 Filter heating system: Any heating system capable of maintaining a temperature of 120 ± 14°C (248 ± 25°F) around the filter holder during sampling. Other temperatures may be appropriate for particular applications. Alternatively, the tester may opt to operate the equipment at temperatures other than that specified. A temperature gauge capable of measuring temperature to within 3°C (5.4°F) shall be installed so that the temperature around the filter holder can be regulated and monitored during sampling. Heating systems other than the one shown in APTD-0581 may be used.

4.1.3.7 Organic sampling module: This unit consists of three sections, including a gas-conditioning section, a sorbent trap, and a condensate knockout trap. The gas-conditioning system shall be capable of conditioning the gas leaving the back half of the filter holder to a temperature not exceeding 20°C (68°F). The sorbent trap shall be sized to contain approximately 20 g of porous polymeric resin (Rohm and Haas XAD-2 or equivalent) and shall be jacketed to maintain the internal gas temperature at 17 ± 3°C (62.5 ± 5.4°F). The most commonly used coolant is ice water from the impinger ice-water bath, constantly circulated through the outer jacket, using rubber or plastic tubing and a peristaltic pump. The sorbent trap should be outfitted with a glass well or depression, appropriately sized to accommodate a small thermocouple in the trap for monitoring the gas entry temperature. The condensate knockout trap shall be of sufficient size to collect the condensate following gas conditioning. The organic module components shall be oriented to direct the flow of condensate formed vertically downward from the conditioning section, through the adsorbent media, and into the condensate knockout trap. The knockout trap is usually similar in appearance to an empty impinger directly underneath the sorbent module; it may be oversized but should have a shortened center stem (at a minimum, one-half the length of the normal impinger stems) to collect a large volume of condensate without bubbling and overflowing into the impinger train. All surfaces of the organic module wetted by the gas sample shall be fabricated of borosilicate glass, Teflon, or other inert materials. Commercial versions of the complete organic module are not currently available, but may be assembled from commercially available laboratory glassware and a custom-fabricated sorbent trap. Details of two acceptable designs are shown in Figures 2 and 3 (the thermocouple well is shown in Figure 2).

4.1.3.8 Impinger train: To determine the stack-gas moisture content, four 500-mL impingers, connected in series with leak-free ground-glass joints, follow the knockout trap. The first, third, and fourth impingers shall be of the Greenburg-Smith design, modified by replacing the tip with a 1.3-cm (1/2-in.) I.D. glass tube extending about 1.3 cm (1/2 in.) from the bottom of the outer cylinder. The second impinger shall be of the Greenburg-Smith design with the standard tip. The first and second impingers shall contain known quantities of water or appropriate trapping solution. The third shall be empty or charged with a caustic solution, should the stack gas contain hydrochloric acid (HCl). The fourth shall contain a known weight of silica gel or equivalent desiccant.

4.1.3.9 Metering system: The necessary components are a vacuum gauge, leak-free pump, thermometers capable of measuring temperature to within 3°C (5.4°F), dry-gas meter capable of measuring volume to within 1%, and related equipment, as shown in Figure 1. At a minimum, the pump should be capable of 4 cfm free flow, and the dry-gas meter should have a recording capacity of 0-999.9 cu ft with a resolution of 0.005 cu ft. Other metering systems capable of maintaining sampling rates within 10% of isokineticity and of determining sample volumes to within 2% may be used. The metering system must be used in conjunction with a pitot tube to enable checks of isokinetic sampling rates. Sampling trains using metering systems designed for flow rates higher than those described in APTD-0581 and APTD-0576 may be used, provided that the specifications of this method are met.

4.1.3.10 Barometer: Mercury, aneroid, or other barometer capable of measuring atmospheric pressure to within 2.5 mm Hg (0.1 in. Hg). In many cases the barometric reading may be obtained from a nearby National Weather Service station, in which case the station value (which is the absolute barometric pressure) is requested and an adjustment for elevation differences between the weather station and sampling point is applied at a rate of minus 2.5 mm Hg (0.1 in. Hg) per 30-m (100 ft) elevation increase (vice versa for elevation decrease).

4.1.3.11 Gas density determination equipment: Temperature sensor and pressure gauge (as described in Sections 2.3 and 2.4 of EPA Method 2), and gas analyzer, if necessary (as described in EPA Method 3). The temperature sensor ideally should be permanently attached to the pitot tube or sampling probe in a fixed configuration such that the tip of the sensor extends beyond the leading edge of the probe sheath and does not touch any metal.

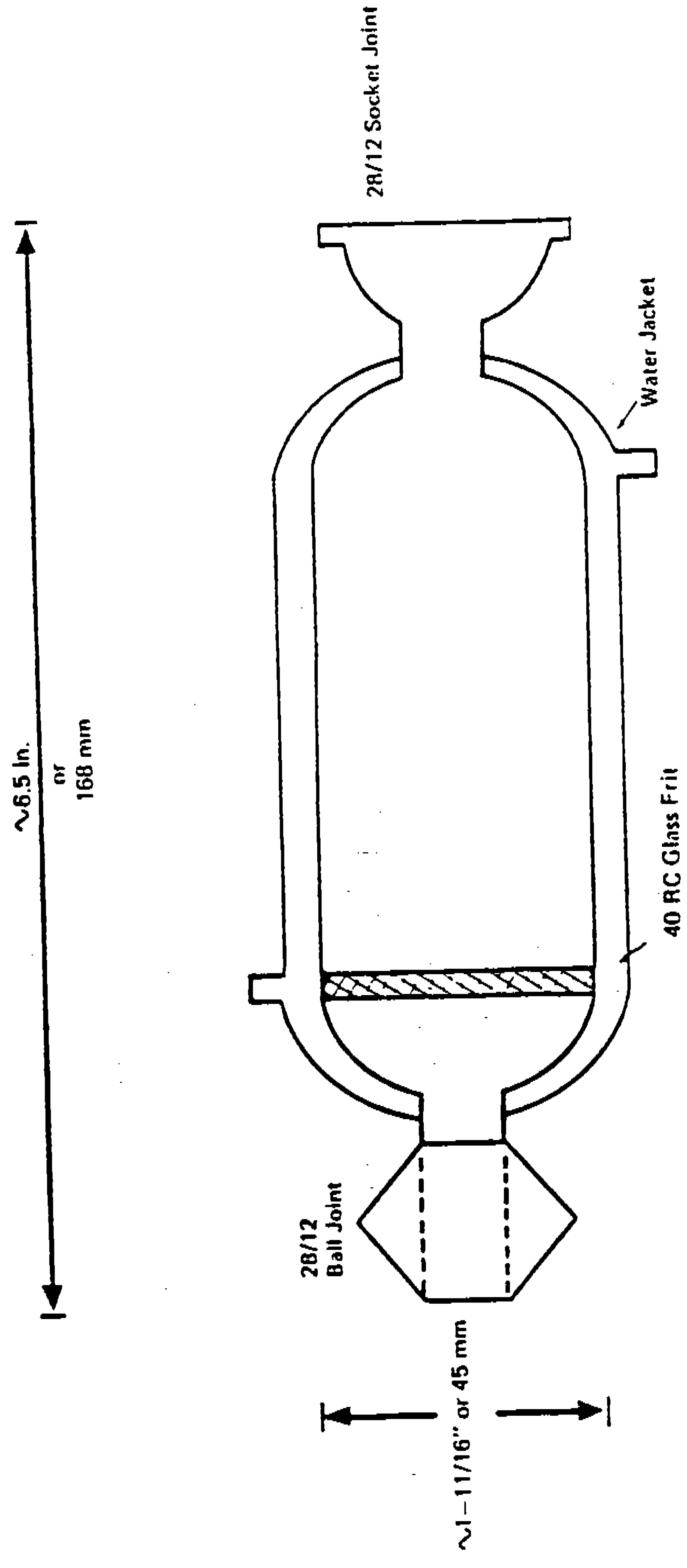

Figure 2. Adsorbent Sampling System.

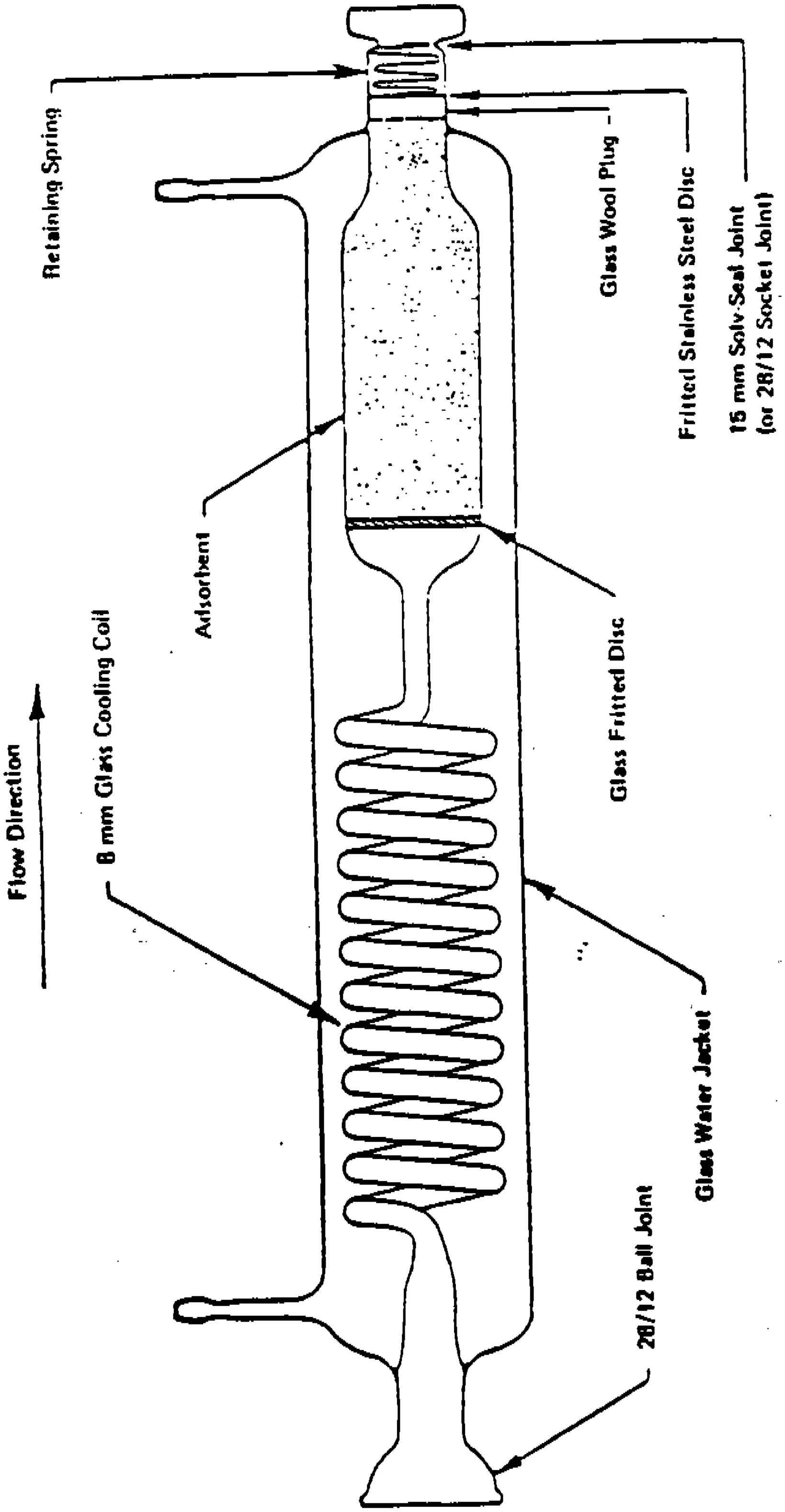

Figure 3. Adsorbent Sampling System.

Alternatively, the sensor may be attached just prior to use in the field. Note, however, that if the temperature sensor is attached in the field, the sensor must be placed in an interference-free arrangement with respect to the Type S pitot tube openings (see EPA Method 2, Figure 2-7). As a second alternative, if a difference of no more than 1% in the average velocity measurement is to be introduced, the temperature gauge need not be attached to the probe or pitot tube.

4.1.3.12 Calibration/field-preparation record: A permanently bound laboratory notebook, in which duplicate copies of data may be made as they are being recorded, is required for documenting and recording calibrations and preparation procedures (i.e., filter and silica gel tare weights, clean XAD-2, quality assurance/quality control check results, dry-gas meter, and thermocouple calibrations, etc.). The duplicate copies should be detachable and should be stored separately in the test program archives.

4.2 Sample Recovery:

4.2.1 **Probe liner:** Probe nozzle and organic module conditioning section brushes; nylon bristle brushes with stainless steel wire handles are required. The probe brush shall have extensions of stainless steel, Teflon, or inert material at least as long as the probe. The brushes shall be properly sized and shaped to brush out the probe liner, the probe nozzle, and the organic module conditioning section.

4.2.2 **Wash bottles:** Three. Teflon or glass wash bottles are recommended; polyethylene wash bottles should not be used because organic contaminants may be extracted by exposure to organic solvents used for sample recovery.

4.2.3 **Glass sample storage containers:** Chemically resistant, borosilicate amber and clear glass bottles, 500-mL or 1,000-mL. Bottles should be tinted to prevent action of light on sample. Screw-cap liners shall be either Teflon or constructed so as to be leak-free and resistant to chemical attack by organic recovery solvents. Narrow-mouth glass bottles have been found to exhibit less tendency toward leakage.

4.2.4 **Petri dishes:** Glass, sealed around the circumference with wide (1-in.) Teflon tape, for storage and transport of filter samples.

4.2.5 **Graduated cylinder and/or balances:** To measure condensed water to the nearest 1 mL or 1 g. Graduated cylinders shall have subdivisions not >2 mL. Laboratory triple-beam balances capable of weighing to ±0.5 g or better are required.

4.2.6 **Plastic storage containers:** Screw-cap polypropylene or polyethylene containers to store silica gel.

4.2.7 **Funnel and rubber policeman:** To aid in transfer of silica gel to container (not necessary if silica gel is weighed in field).

4.2.8 Funnels: Glass, to aid in sample recovery.

4.3 Filters: Glass- or quartz-fiber filters, without organic binder, exhibiting at least 99.95% efficiency (<0.05% penetration) on 0.3-um dioctyl phthalate smoke particles. The filter efficiency test shall be conducted in accordance with ASTM standard method D2986-71. Test data from the supplier's quality control program are sufficient for this purpose. In sources containing SO_2 or SO_3, the filter material must be of a type that is unreactive to SO_2 or SO_3. Reeve Angel 934 AH or Schleicher and Schwell #3 filters work well under these conditions.

4.4 Crushed ice: Quantities ranging from 10-50 lb may be necessary during a sampling run, depending on ambient air temperature.

4.5 Stopcock grease: Solvent-insoluble, heat-stable silicone grease. Use of silicone grease upstream of the module is not permitted, and amounts used on components located downstream of the organic module shall be minimized. Silicone grease usage is not necessary if screw-on connectors and Teflon sleeves or ground-glass joints are used.

4.6 Glass wool: Used to plug the unfritted end of the sorbent module. The glass-wool fiber should be solvent-extracted with methylene chloride in a Soxhlet extractor for 12 hr and air-dried prior to use.

5.0 REAGENTS

5.1 Adsorbent resin: Porous polymeric resin (XAD-2 or equivalent) is recommended. These resins shall be cleaned prior to their use for sample collection. Appendix A of this method should be consulted to determine appropriate precleaning procedure. For best results, resin used should not exhibit a blank of higher than 4 mg/kg of total chromatographable organics (TCO) (see Appendix B) prior to use. Once cleaned, resin should be stored in an airtight, wide-mouth amber glass container with a Teflon-lined cap or placed in one of the glass sorbent modules tightly sealed with Teflon film and elastic bands. The resin should be used within 4 wk of the preparation.

5.2 Silica gel: Indicating type, 6-16 mesh. If previously used, dry at 175°C (350°F) for 2 hr before using. New silica gel may be used as received. Alternatively, other types of desiccants (equivalent or better) may be used, subject to the approval of the Administrator.

5.3 Impinger solutions: Distilled organic-free water (Type II) shall be used, unless sampling is intended to quantify a particular inorganic gaseous species. If sampling is intended to quantify the concentration of additional species, the impinger solution of choice shall be subject to Administrator approval. This water should be prescreened for any compounds of interest. One hundred mL will be added to the specified impinger; the third impinger in the train may be charged with a basic solution (1 N sodium hydroxide or sodium acetate) to protect the sampling pump from acidic gases. Sodium acetate should be used when large sample volumes are anticipated because sodium hydroxide will react with carbon dioxide in aqueous media to form sodium carbonate, which may possibly plug the impinger.

5.4 Sample recovery reagents:

5.4.1 **Methylene chloride:** Distilled-in-glass grade is required for sample recovery and cleanup (see Note to 5.4.2 below).

5.4.2 **Methyl alcohol:** Distilled-in-glass grade is required for sample recovery and cleanup.
NOTE: Organic solvents from metal containers may have a high residue blank and should not be used. Sometimes suppliers transfer solvents from metal to glass bottles; thus blanks shall be run prior to field use and only solvents with low blank value (<0.001%) shall be used.

5.4.3 **Water:** Water (Type II) shall be used for rinsing the organic module and condenser component.

6.0 SAMPLE COLLECTION, PRESERVATION, AND HANDLING

6.1 Because of complexity of this method, field personnel should be trained in and experienced with the test procedures in order to obtain reliable results.

6.2 Laboratory preparation:

6.2.1 All the components shall be maintained and calibrated according to the procedure described in APTD-0576, unless otherwise specified.

6.2.2 Weigh several 200- to 300-g portions of silica gel in airtight containers to the nearest 0.5 g. Record on each container the total weight of the silica gel plus containers. As an alternative to preweighing the silica gel, it may instead be weighed directly in the impinger or sampling holder just prior to train assembly.

6.2.3 Check filters visually against light for irregularities and flaws or pinhole leaks. Label the shipping containers (glass Petri dishes) and keep the filters in these containers at all times except during sampling and weighing.

6.2.4 Desiccate the filters at 20 ± 5.6°C (68 ± 10°F) and ambient pressure for at least 24 hr, and weigh at intervals of at least 6 hr to a constant weight (i.e., <0.5-mg change from previous weighing), recording results to the nearest 0.1 mg. During each weighing the filter must not be exposed for more than a 2-min period to the laboratory atmosphere and relative humidity above 50%. Alternatively (unless otherwise specified by the Administrator), the filters may be oven-dried at 105°C (220°F) for 2-3 hr, desiccated for 2 hr, and weighed.

6.3 Preliminary field determinations:

6.3.1 Select the sampling site and the minimum number of sampling points according to EPA Method 1 or as specified by the Administrator. Determine the stack pressure, temperature, and range of velocity heads using EPA Method 2. It is recommended that a leak-check of the pitot lines (see EPA Method 2, Section 3.1) be performed. Determine the stack-gas moisture content using EPA Approximation Method 4 or its alternatives to establish estimates of isokinetic sampling-rate settings. Determine the stack-gas dry molecular weight, as described in EPA Method 2, Section 3.6. If integrated EPA Method 3 sampling is used for molecular weight determination, the integrated bag sample shall be taken simultaneously with, and for the same total length of time as, the sample run.

6.3.2 Select a nozzle size based on the range of velocity heads so that it is not necessary to change the nozzle size in order to maintain isokinetic sampling rates. During the run, do not change the nozzle. Ensure that the proper differential pressure gauge is chosen for the range of velocity heads encountered (see Section 2.2 of EPA Method 2).

6.3.3 Select a suitable probe liner and probe length so that all traverse points can be sampled. For large stacks, to reduce the length of the probe, consider sampling from opposite sides of the stack.

6.3.4 A minimum of 3 dscm (105.9 dscf) of sample volume is required for the determination of the Destruction and Removal Efficiency (DRE) of POHCs from incineration systems. Additional sample volume shall be collected as necessitated by analytical detection limit constraints. To determine the minimum sample volume required, refer to sample calculations in Section 10.0.

6.3.5 Determine the total length of sampling time needed to obtain the identified minimum volume by comparing the anticipated average sampling rate with the volume requirement. Allocate the same time to all traverse points defined by EPA Method 1. To avoid timekeeping errors, the length of time sampled at each traverse point should be an integer or an integer plus one-half min.

6.3.6 In some circumstances (e.g., batch cycles) it may be necessary to sample for shorter times at the traverse points and to obtain smaller gas-sample volumes. In these cases, the Administrator's approval must first be obtained.

6.4 Preparation of collection train:

6.4.1 During preparation and assembly of the sampling train, keep all openings where contamination can occur covered with Teflon film or aluminum foil until just prior to assembly or until sampling is about to begin.

6.4.2 Fill the sorbent trap section of the organic module with approximately 20 g of clean adsorbent resin. While filling, ensure that the trap packs uniformly, to eliminate the possibility of channeling. When freshly cleaned, many adsorbent resins carry a static charge, which will cause clinging to trap walls. This may be minimized by filling the trap in the presence of an antistatic device. Commercial antistatic devices include Model-204 and Model-210 manufactured by the 3M Company, St. Paul, Minnesota.

6.4.3 If an impinger train is used to collect moisture, place 100 mL of water in each of the first two impingers, leave the third impinger empty (or charge with caustic solution, as necessary), and transfer approximately 200-300 g of preweighed silica gel from its container to the fourth impinger. More silica gel may be used, but care should be taken to ensure that it is not entrained and carried out from the impinger during sampling. Place the container in a clean place for later use in the sample recovery. Alternatively, the weight of the silica gel plus impinger may be determined to the nearest 0.5 g and recorded.

6.4.4 Using a tweezer or clean disposable surgical gloves, place a labeled (identified) and weighed filter in the filter holder. Be sure that the filter is properly centered and the gasket properly placed to prevent the sample gas stream from circumventing the filter. Check the filter for tears after assembly is completed.

6.4.5 When glass liners are used, install the selected nozzle using a Viton-A O-ring when stack temperatures are <260°C (500°F) and a woven glass-fiber gasket when temperatures are higher. See APTD-0576 (Rom, 1972) for details. Other connecting systems utilizing either 316 stainless steel or Teflon ferrules may be used. When metal liners are used, install the nozzle as above, or by a leak-free direct mechanical connection. Mark the probe with heat-resistant tape or by some other method to denote the proper distance into the stack or duct for each sampling point.

6.4.6 Set up the train as in Figure 1. During assembly, do not use any silicone grease on ground-glass joints that are located upstream of the organic module. A very light coating of silicone grease may be used on all ground-glass joints that are located downstream of the organic module, but it should be limited to the outer portion (see APTD-0576) of the ground-glass joints to minimize silicone-grease contamination. Subject to the approval of the Administrator, a glass cyclone may be used between the probe and the filter holder when the total particulate catch is expected to exceed 100 mg or when water droplets are present in the stack. The organic module condenser must be maintained at a temperature of 17 $\pm$ 3°C. Connect all temperature sensors to an appropriate potentiometer/display unit. Check all temperature sensors at ambient temperature.

6.4.7 Place crushed ice around the impingers and the organic module condensate knockout.

6.4.8 Turn on the sorbent module and condenser coil coolant recirculating pump and begin monitoring the sorbent module gas entry temperature. Ensure proper sorbent module gas entry temperature before proceeding and again before any sampling is initiated. It is extremely important that the XAD-2 resin temperature never exceed 50°C (122°F), because thermal decomposition will occur. During testing, the XAD-2 temperature must not exceed 20°C (68°F) for efficient capture of the semivolatile species of interest.

6.4.9 Turn on and set the filter and probe heating systems at the desired operating temperatures. Allow time for the temperatures to stabilize.

6.5 Leak-check procedures

6.5.1 Pre-test leak-check:

6.5.1.1 Because the number of additional intercomponent connections in the Semi-VOST train (over the M5 Train) increases the possibility of leakage, a pre-test leak-check is required.

6.5.1.2 After the sampling train has been assembled, turn on and set the filter and probe heating systems at the desired operating temperatures. Allow time for the temperatures to stabilize. If a Viton A O-ring or other leak-free connection is used in assembling the probe nozzle to the probe liner, leak-check the train at the sampling site by plugging the nozzle and pulling a 381-mm Hg (15-in. Hg) vacuum.
(NOTE: A lower vacuum may be used, provided that it is not exceeded during the test.)

6.5.1.3 If an asbestos string is used, do not connect the probe to the train during the leak-check. Instead, leak-check the train by first attaching a carbon-filled leak-check impinger (shown in Figure 4) to the inlet of the filter holder (cyclone, if applicable) and then plugging the inlet and pulling a 381-mm Hg (15-in. Hg) vacuum. (Again, a lower vacuum may be used, provided that it is not exceeded during the test.) Then, connect the probe to the train and leak-check at about 25-mm Hg (1-in. Hg) vacuum; alternatively, leak-check the probe with the rest of the sampling train in one step at 381-mm Hg (15-in. Hg) vacuum. Leakage rates in excess of 4% of the average sampling rate or >0.00057 m^3/min (0.02 cfm), whichever is less, are unacceptable.

6.5.1.4 The following leak-check instructions for the sampling train described in APTD-0576 and APTD-0581 may be helpful. Start the pump with fine-adjust valve fully open and coarse-adjust valve completely closed. Partially open the coarse-adjust valve and slowly close the fine-adjust valve until the desired vacuum is reached. Do not reverse direction of the fine-adjust valve; this will cause water to back up into the organic module. If the desired vacuum is exceeded, either leak-check at this higher vacuum or end the leak-check, as shown below, and start over.

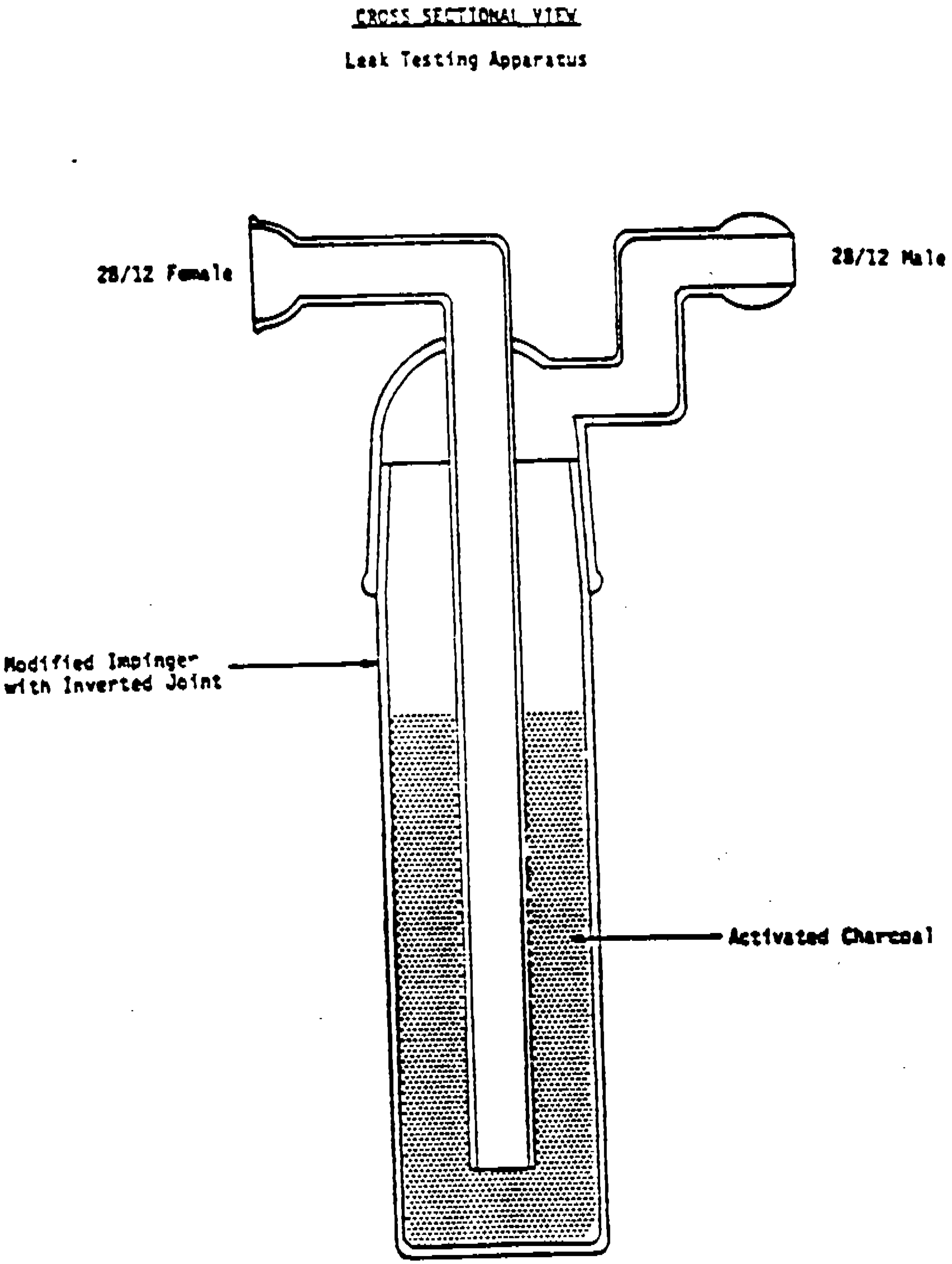

Figure 4. Leak-check impinger.

6.5.1.5 When the leak-check is completed, first slowly remove the plug from the inlet to the probe, filter holder, or cyclone (if applicable). When the vacuum drops to 127 mm (5 in.) Hg or less, immediately close the coarse-adjust valve. Switch off the pumping system and reopen the fine-adjust valve. Do not reopen the fine-adjust valve until the coarse-adjust valve has been closed. This prevents the water in the impingers from being forced backward into the organic module and silica gel from being entrained backward into the third impinger.

6.5.2 Leak-checks during sampling run:

6.5.2.1 If, during the sampling run, a component (e.g., filter assembly, impinger, or sorbent trap) change becomes necessary, a leak-check shall be conducted immediately after the interruption of sampling and before the change is made. The leak-check shall be done according to the procedure outlined in Paragraph 6.5.1, except that it shall be done at a vacuum greater than or equal to the maximum value recorded up to that point in the test. If the leakage rate is found to be no greater than 0.00057 m^3/min (0.02 cfm) or 4% of the average sampling rate (whichever is less), the results are acceptable, and no correction will need to be applied to the total volume of dry gas metered. If a higher leakage rate is obtained, the tester shall void the sampling run. (It should be noted that any "correction" of the sample volume by calculation by calculation reduces the integrity of the pollutant concentrations data generated and must be avoided.)

6.5.2.2 Immediately after a component change, and before sampling is reinitiated, a leak-check similar to a pre-test leak-check must also be conducted.

6.5.3 Post-test leak-check:

6.5.3.1 A leak-check is mandatory at the conclusion of each sampling run. The leak-check shall be done with the same procedures as those with the pre-test leak-check, except that it shall be conducted at a vacuum greater than or equal to the maximum value reached during the sampling run. If the leakage rate is found to be no greater than 0.00057 m^3/min (0.02 cfm) or 4% of the average sampling rate (whichever is less), the results are acceptable, and no correction need be applied to the total volume of dry gas metered. If, however, a higher leakage rate is obtained, the tester shall either record the leakage rate, correct the sample volume (as shown in the calculation section of this method), and consider the data obtained of questionable reliability, or void the sampling run.

6.6 <u>Sampling-train operation</u>:

6.6.1 During the sampling run, maintain an isokinetic sampling rate to within 10% of true isokinetic, unless otherwise specified by the Administrator. Maintain a temperature around the filter of 120 ± 14°C (248 ± 25°F) and a gas temperature entering the sorbent trap at a maximum of 20°C (68°F).

6.6.2 For each run, record the data required on a data sheet such as the one shown in Figure 5. Be sure to record the initial dry-gas meter reading. Record the dry-gas meter readings at the beginning and end of each sampling time increment, when changes in flow rates are made before and after each leak-check, and when sampling is halted. Take other readings required by Figure 5 at least once at each sample point during each time increment and additional readings when significant changes (20% variation in velocity-head readings) necessitate additional adjustments in flow rate. Level and zero the manometer. Because the manometer level and zero may drift due to vibrations and temperature changes, make periodic checks during the traverse.

6.6.3 Clean the stack access ports prior to the test run to eliminate the chance of sampling deposited material. To begin sampling, remove the nozzle cap, verify that the filter and probe heating systems are at the specified temperature, and verify that the pitot tube and probe are properly positioned. Position the nozzle at the first traverse point, with the tip pointing directly into the gas stream. Immediately start the pump and adjust the flow to isokinetic conditions. Nomographs, which aid in the rapid adjustment of the isokinetic sampling rate without excessive computations, are available. These nomographs are designed for use when the Type S pitot-tube coefficient is 0.84 ± 0.02 and the stack-gas equivalent density (dry molecular weight) is equal to 29 ± 4. APTD-0576 details the procedure for using the nomographs. If the stack-gas molecular weight and the pitot-tube coefficient are outside the above ranges, do not use the nomographs unless appropriate steps (Shigehara, 1974) are taken to compensate for the deviations.

6.6.4 When the stack is under significant negative pressure (equivalent to the height of the impinger stem), take care to close the coarse-adjust valve before inserting the probe into the stack, to prevent water from backing into the organic module. If necessary, the pump may be turned on with the coarse-adjust valve closed.

6.6.5 When the probe is in position, block off the openings around the probe and stack access port to prevent unrepresentative dilution of the gas stream.

6.6.6 Traverse the stack cross section, as required by EPA Method 1 or as specified by the Administrator, being careful not to bump the probe nozzle into the stack walls when sampling near the walls or when removing or inserting the probe through the access port, in order to minimize the chance of extracting deposited material.

6.6.7 During the test run, make periodic adjustments to keep the temperature around the filter holder and the organic module at the proper levels; add more ice and, if necessary, salt to maintain a temperature of <20°C (68°F) at the condenser/silica gel outlet. Also, periodically check the level and zero of the manometer.

Plant ____________________

Location ____________________

Operator ____________________

Date ____________________

Run No. ____________________

Sample Box No. ____________________

Meter Box No. ____________________

Meter H@ ____________________

C Factor ____________________

Pitot Tube Coefficient C_p ____________________

Schematic of Stack Cross Section

Ambient Temperature ____________________

Barometric Pressure ____________________

Assumed Moisture % ____________________

Probe Length, m (ft) ____________________

Nozzle Identification No. ____________________

Average Calibrated Nozzle Diameter, cm (in) ____________________

Probe Heater Setting ____________________

Leak Rate, m^3/min, (cfm) ____________________

Probe Liner Material ____________________

Static Pressure, mm Hg (in. Hg) ____________________

Filter No. ____________________

Traverse Point Number	Sampling Time (θ) min.	Vacuum mm Hg (in. Hg)	Stack Temperature (T_s) °C(°F)	Velocity Head (P_s) mm (in) H_2O	Pressure Differential Across Orifice Meter mm (H_2O) (in H_2O)	Gas Sample Volume m^3 (ft^3)	Gas Sample Temp. at Dry Gas Meter		Filter Holder Temperature °C(F°)	Temperature of Gas Entering Sorbent Trap °C(F°)	Temperature of Gas Leaving Condenser or Last Impinger
							Inlet °C(°F)	Outlet °C(F°)			
Total							Avg.	Avg.			
Average											

Figure 5. Particulate field data.

6.6.8 If the pressure drop across the filter or sorbent trap becomes too high, making isokinetic sampling difficult to maintain, the filter/sorbent trap may be replaced in the midst of a sample run. Using another complete filter holder/sorbent trap assembly is recommended, rather than attempting to change the filter and resin themselves. After a new filter/sorbent trap assembly is installed, conduct a leak-check. The total particulate weight shall include the summation of all filter assembly catches.

6.6.9 A single train shall be used for the entire sample run, except in cases where simultaneous sampling is required in two or more separate ducts or at two or more different locations within the same duct, or in cases where equipment failure necessitates a change of trains. In all other situations, the use of two or more trains will be subject to the approval of the Administrator.

6.6.10 Note that when two or more trains are used, separate analysis of the front-half (if applicable) organic-module and impinger (if applicable) catches from each train shall be performed, unless identical nozzle sizes were used on all trains. In that case, the front-half catches from the individual trains may be combined (as may the impinger catches), and one analysis of front-half catch and one analysis of impinger catch may be performed.

6.6.11 At the end of the sample run, turn off the coarse-adjust valve, remove the probe and nozzle from the stack, turn off the pump, record the final dry-gas meter reading, and conduct a post-test leak-check. Also, leak-check the pitot lines as described in EPA Method 2. The lines must pass this leak-check in order to validate the velocity-head data.

6.6.12 Calculate percent isokineticity (see Section 10.8) to determine whether the run was valid or another test run should be made.

7.0 SAMPLE RECOVERY

7.1 Preparation:

7.1.1 Proper cleanup procedure begins as soon as the probe is removed from the stack at the end of the sampling period. Allow the probe to cool. When the probe can be safely handled, wipe off all external particulate matter near the tip of the probe nozzle and place a cap over the tip to prevent losing or gaining particulate matter. Do not cap the probe tip tightly while the sampling train is cooling down because this will create a vacuum in the filter holder, drawing water from the impingers into the sorbent module.

7.1.2 Before moving the sample train to the cleanup site, remove the probe from the sample train and cap the open outlet, being careful not to lose any condensate that might be present. Cap the filter inlet.

Remove the umbilical cord from the last impinger and cap the impinger. If a flexible line is used between the organic module and the filter holder, disconnect the line at the filter holder and let any condensed water or liquid drain into the organic module.

7.1.3 Cap the filter-holder outlet and the inlet to the organic module. Separate the sorbent trap section of the organic module from the condensate knockout trap and the gas-conditioning section. Cap all organic module openings. Disconnect the organic-module knockout trap from the impinger train inlet and cap both of these openings. Ground-glass stoppers, Teflon caps, or caps of other inert materials may be used to seal all openings.

7.1.4 Transfer the probe, the filter, the organic-module components, and the impinger/condenser assembly to the cleanup area. This area should be clean and protected from the weather to minimize sample contamination or loss.

7.1.5 Save a portion of all washing solutions (methanol/methylene chloride, Type II water) used for cleanup as a blank. Transfer 200 mL of each solution directly from the wash bottle being used and place each in a separate, prelabeled glass sample container.

7.1.6 Inspect the train prior to and during disassembly and note any abnormal conditions.

7.2 Sample containers:

7.2.1 Container no. 1: Carefully remove the filter from the filter holder and place it in its identified Petri dish container. Use a pair or pairs of tweezers to handle the filter. If it is necessary to fold the filter, ensure that the particulate cake is inside the fold. Carefully transfer to the Petri dish any particulate matter or filter fibers that adhere to the filter-holder gasket, using a dry nylon bristle brush or sharp-edged blade, or both. Label the container and seal with 1-in.-wide Teflon tape around the circumference of the lid.

7.2.2 Container no. 2: Taking care that dust on the outside of the probe or other exterior surfaces does not get into the sample, quantitatively recover particulate matter or any condensate from the probe nozzle, probe fitting, probe liner, and front half of the filter holder by washing these components first with methanol/methylene chloride (1:1 v/v) into a glass container. Distilled water may also be used. Retain a water and solvent blank and analyze in the same manner as with the samples. Perform rinses as follows:

7.2.2.1 Carefully remove the probe nozzle and clean the inside surface by rinsing with the solvent mixture (1:1 v/v methanol/-methylene chloride) from a wash bottle and brushing with a nylon bristle brush. Brush until the rinse shows no visible particles; then make a final rinse of the inside surface with the solvent mix. Brush and rinse the inside parts of the Swagelok fitting with the solvent mix in a similar way until no visible particles remain.

7.2.2.2 Have two people rinse the probe liner with the solvent mix by tilting and rotating the probe while squirting solvent into its upper end so that all inside surfaces will be wetted with solvent. Let the solvent drain from the lower end into the sample container. A glass funnel may be used to aid in transferring liquid washes to the container.

7.2.2.3 Follow the solvent rinse with a probe brush. Hold the probe in an inclined position and squirt solvent into the upper end while pushing the probe brush through the probe with a twisting action; place a sample container underneath the lower end of the probe and catch any solvent and particulate matter that is brushed from the probe. Run the brush through the probe three times or more until no visible particulate matter is carried out with the solvent or until none remains in the probe liner on visual inspection. With stainless steel or other metal probes, run the brush through in the above-prescribed manner at least six times (metal probes have small crevices in which particulate matter can be entrapped). Rinse the brush with solvent and quantitatively collect these washings in the sample container. After the brushing, make a final solvent rinse of the probe as described above.

7.2.2.4 It is recommended that two people work together to clean the probe to minimize sample losses. Between sampling runs, keep brushes clean and protected from contamination.

7.2.2.5 Clean the inside of the front half of the filter holder and cyclone/cyclone flask, if used, by rubbing the surfaces with a nylon bristle brush and rinsing with methanol/methylene chloride (1:1 v/v) mixture. Rinse each surface three times or more if needed to remove visible particulate. Make a final rinse of the brush and filter holder. Carefully rinse out the glass cyclone and cyclone flask (if applicable). Brush and rinse any particulate material adhering to the inner surfaces of these components into the front-half rinse sample. After all solvent washings and particulate matter have been collected in the sample container, tighten the lid on the sample container so that solvent will not leak out when it is shipped to the laboratory. Mark the height of the fluid level to determine whether leakage occurs during transport. Label the container to identify its contents.

7.2.3 **Container no. 3:** The sorbent trap section of the organic module may be used as a sample transport container, or the spent resin may be transferred to a separate glass bottle for shipment. If the sorbent trap itself is used as the transport container, both ends should be sealed with tightly fitting caps or plugs. Ground-glass stoppers or Teflon caps may be used. The sorbent trap should then be labeled, covered with aluminum foil, and packaged on ice for transport to the laboratory. If a separate bottle is used, the spent resin should be quantitatively transferred from the trap into the clean bottle. Resin that adheres to the walls of the trap should be recovered using a rubber policeman or spatula and added to this bottle.

7.2.4 **Container no. 4:** Measure the volume of condensate collected in the condensate knockout section of the organic module to within ±1 mL by using a graduated cylinder or by weighing to within ±0.5 g using a triple-beam balance. Record the volume or weight of liquid present and note any discoloration or film in the liquid catch. Transfer this liquid to a prelabeled glass sample container. Inspect the back half of the filter housing and the gas-conditioning section of the organic module. If condensate is observed, transfer it to a graduated or weighing bottle and measure the volume, as described above. Add this material to the condensate knockout-trap catch.

7.2.5 **Container no. 5:** All sampling train components located between the high-efficiency glass- or quartz-fiber filter and the first wet impinger or the final condenser system (including the heated Teflon line connecting the filter outlet to the condenser) should be thoroughly rinsed with methanol/methylene chloride (1:1 v/v) and the rinsings combined. This rinse shall be separated from the condensate. If the spent resin is transferred from the sorbent trap to a separate sample container for transport, the sorbent trap shall be thoroughly rinsed until all sample-wetted surfaces appear clean. Visible films should be removed by brushing. Whenever train components are brushed, the brush should be subsequently rinsed with solvent mixture and the rinsings added to this container.

7.2.6 **Container no. 6:** Note the color of the indicating silica gel to determine if it has been completely spent and make a notation of its condition. Transfer the silica gel from the fourth impinger to its original container and seal. A funnel may make it easier to pour the silica gel without spilling. A rubber policeman may be used as an aid in removing the silica gel from the impinger. It is not necessary to remove the small amount of dust particles that may adhere strongly to the impinger wall. Because the gain in weight is to be used for moisture calculations, do not use any water or other liquids to transfer the silica gel. If a balance is available in the field, weigh the container and its contents to 0.5 g or better.

7.3 Impinger water:

7.3.1 Make a notation of any color or film in the liquid catch. Measure the liquid in the first three impingers to within ±1 mL by using a graduated cylinder or by weighing it to within ±0.5 g by using a balance (if one is available). Record the volume or weight of liquid present. This information is required to calculate the moisture content of the effluent gas.

7.3.2 Discard the liquid after measuring and recording the volume or weight, unless analysis of the impinger catch is required (see Paragraph 4.1.3.7). Amber glass containers should be used for storage of impinger catch, if required.

7.3.3 If a different type of condenser is used, measure the amount of moisture condensed either volumetrically or gravimetrically.

7.4 Sample preparation for shipment: Prior to shipment, recheck all sample containers to ensure that the caps are well secured. Seal the lids of all containers around the circumference with Teflon tape. Ship all liquid samples upright on ice and all particulate filters with the particulate catch facing upward. The particulate filters should be shipped unrefrigerated.

8.0 ANALYSIS

8.1 Sample preparation:

8.1.1 General: The preparation steps for all samples will result in a finite volume of concentrated solvent. The final sample volume (usually in the 1- to 10-mL range) is then subjected to analysis by GC/MS. All samples should be inspected and the appearance documented. All samples are to be spiked with surrogate standards as received from the field prior to any sample manipulations. The spike should be at a level equivalent to 10 times the MDL when the solvent is reduced in volume to the desired level (i.e., 10 mL). The spiking compounds should be the stable isotopically labeled analog of the compounds of interest or a compound that would exhibit properties similar to the compounds of interest, be easily chromatographed, and not interfere with the analysis of the compounds of interest. Suggested surrogate spiking compounds are: deuterated naphthalene, chrysene, phenol, nitrobenzene, chlorobenzene, toluene, and carbon-13-labeled pentachlorophenol.

8.1.2 Condensate: The "condensate" is the moisture collected in the first impinger following the XAD-2 module. Spike the condensate with the surrogate standards. The volume is measured and recorded and then transferred to a separatory funnel. The pH is to be adjusted to pH 2 with 6 N sulfuric acid, if necessary. The sample container and graduated cylinder are sequentially rinsed with three successive 10-mL aliquots of the extraction solvent and added to the separatory funnel. The ratio of solvent to aqueous sample should be maintained at 1:3. Extract the sample by vigorously shaking the separatory funnel for 5 min. After complete separation of the phases, remove the solvent and transfer to a Kuderna-Danish concentrator (K-D), filtering through a bed of precleaned, dry sodium sulfate. Repeat the extraction step two additional times. Adjust the pH to 11 with 6 N sodium hydroxide and reextract combining the acid and base extracts. Rinse the sodium sulfate into the K-D with fresh solvent and discard the desiccant. Add Teflon boiling chips and concentrate to 10 mL by reducing the volume to slightly less than 10 mL and then bringing to volume with fresh solvent. In order to achieve the necessary detection limit, the sample volume can be further reduced to 1 mL by using a micro column K-D or nitrogen blow-down. Should the sample start to exhibit precipitation, the concentration step should be stopped and the sample redissolved with fresh solvent taking the volume to some finite amount. After adding a standard (for the purpose of quantitation by GC/MS), the sample is ready for analysis, as discussed in Paragraph 8.2.

8.1.3 **Impinger:** Spike the sample with the surrogate standards; measure and record the volume and transfer to a separatory funnel. Proceed as described in Paragraph 8.1.2.

8.1.4 XAD-2: Spike the resin directly with the surrogate standards. Transfer the resin to the all-glass thimbles by the following procedure (care should be taken so as not to contaminate the thimble by touching it with anything other than tweezers or other solvent-rinsed mechanical holding devices). Suspend the XAD-2 module directly over the thimble. The glass frit of the module (see Figure 2) should be in the up position. The thimble is contained in a clean beaker, which will serve to catch the solvent rinses. Using a Teflon squeeze bottle, flush the XAD-2 into the thimble. Thoroughly rinse the glass module with solvent into the beaker containing the thimble. Add the XAD-2 glass-wool plug to the thimble. Cover the XAD-2 in the thimble with a precleaned glass-wool plug sufficient to prevent the resin from floating into the solvent reservoir of the extractor. If the resin is wet, effective extraction can be accomplished by loosely packing the resin in the thimble. If a question arises concerning the completeness of the extraction, a second extraction, without a spike, is advised. The thimble is placed in the extractor and the rinse solvent contained in the beaker is added to the solvent reservoir. Additional solvent is added to make the reservoir approximately two-thirds full. Add Teflon boiling chips and assemble the apparatus. Adjust the heat source to cause the extractor to cycle 5-6 times per hr. Extract the resin for 16 hr. Transfer the solvent and three 10-mL rinses of the reservoir to a K-D and concentrate as described in Paragraph 8.1.2.

8.1.5 **Particulate filter (and cyclone catch):** If particulate loading is to be determined, weigh the filter (and cyclone catch, if applicable). The particulate filter (and cyclone catch, if applicable) is transferred to the glass thimble and extracted simultaneously with the XAD-2 resin.

8.1.6 **Train solvent rinses:** All train rinses (i.e., probe, impinger, filter housing) using the extraction solvent and methanol are returned to the laboratory as a single sample. If the rinses are contained in more than one container, the intended spike is divided equally among the containers proportioned from a single syringe volume. Transfer the rinse to a separatory funnel and add a sufficient amount of organic-free water so that the methylene chloride becomes immiscible and its volume no longer increases with the addition of more water. The extraction and concentration steps are then performed as described in Paragraph 8.1.2.

8.2 Sample analysis:

8.2.1 The primary analytical tool for the measurement of emissions from hazardous waste incinerators is GC/MS using fused-silica capillary GC columns, as described in Method 8270 in Chapter Four of this manual. Because of the nature of GC/MS instrumentation and the cost associated with sample analysis, prescreening of the sample extracts by gas chromatography/flame ionization detection (GC/FID) or with electron capture (GC/ECD) is encouraged. Information regarding the complexity and concentration level of a sample prior to GC/MS analysis can be of enormous help. This information can be obtained by using either capillary columns or less expensive packed columns.. However, the FID screen should be performed with a column similar to that used with the GC/MS. Keep in mind that GC/FID has a slightly lower detection limit than GC/MS and, therefore, that the concentration of the sample can be adjusted either up or down prior to analysis by GC/MS.

8.2.2 The mass spectrometer will be operated in a full scan (40-450) mode for most of the analyses. The range for which data are acquired in a GC/MS run will be sufficiently broad to encompass the major ions, as listed in Chapter Four, Method 8270, for each of the designated POHCs in an incinerator effluent analysis.

8.2.3 For most purposes, electron ionization (EI) spectra will be collected because a majority of the POHCs give reasonable EI spectra. Also, EI spectra are compatible with the NBS Library of Mass Spectra and other mass spectral references, which aid in the identification process for other components in the incinerator process streams.

8.2.4 To clarify some identifications, chemical ionization (CI) spectra using either positive ions or negative ions will be used to elucidate molecular-weight information and simplify the fragmentation patterns of some compounds. In no case, however, should CI spectra alone be used for compound identification. Refer to Chapter Four, Method 8270, for complete descriptions of GC conditions, MS conditions, and quantitative and quantitative identification.

9.0 CALIBRATION

9.1 Probe nozzle: Probe nozzles shall be calibrated before their initial use in the field. Using a micrometer, measure the inside diameter of the nozzle to the nearest 0.025 mm (0.001 in.). Make measurements at three separate places across the diameter and obtain the average of the measurements. The difference between the high and low numbers shall not exceed 0.1 mm (0.004 in.). When nozzles become nicked, dented, or corroded, they shall be reshaped, sharpened, and recalibrated before use. Each nozzle shall be permanently and uniquely identified.

9.2 Pitot tube: The Type S pitot tube assembly shall be calibrated according to the procedure outlined in Section 4 of EPA Method 2, or assigned a nominal coefficient of 0.84 if it is not visibly nicked, dented, or corroded and if it meets design and intercomponent spacing specifications.

9.3 Metering system:

9.3.1 Before its initial use in the field, the metering system shall be calibrated according to the procedure outlined in APTD-0576. Instead of physically adjusting the dry-gas meter dial readings to correspond to the wet-test meter readings, calibration factors may be used to correct the gas meter dial readings mathematically to the proper values. Before calibrating the metering system, it is suggested that a leak-check be conducted. For metering systems having diaphragm pumps, the normal leak-check procedure will not detect leakages within the pump. For these cases the following leak-check procedure is suggested: Make a 10-min calibration run at 0.00057 m^3/min (0.02 cfm); at the end of the run, take the difference of the measured wet-test and dry-gas meter volumes and divide the difference by 10 to get the leak rate. The leak rate should not exceed 0.00057 m^3/min (0.02 cfm).

9.3.2 After each field use, the calibration of the metering system shall be checked by performing three calibration runs at a single intermediate orifice setting (based on the previous field test). The vacuum shall be set at the maximum value reached during the test series. To adjust the vacuum, insert a valve between the wet-test meter and the inlet of the metering system. Calculate the average value of the calibration factor. If the calibration has changed by more than 5%, recalibrate the meter over the full range of orifice settings, as outlined in APTD-0576.

9.3.3 Leak-check of metering system: That portion of the sampling train from the pump to the orifice meter (see Figure 1) should be leak-checked prior to initial use and after each shipment. Leakage after the pump will result in less volume being recorded than is actually sampled. The following procedure is suggested (see Figure 6): Close the main valve on the meter box. Insert a one-hole rubber stopper with rubber tubing attached into the orifice exhaust pipe. Disconnect and vent the low side of the orifice manometer. Close off the low side orifice tap. Pressurize the system to 13-18 cm (5-7 in.) water column by blowing into the rubber tubing. Pinch off the tubing and observe the manometer for 1 min. A loss of pressure on the manometer indicates a leak in the meter box. Leaks, if present, must be corrected.

NOTE: If the dry-gas-meter coefficient values obtained before and after a test series differ by >5%, either the test series shall be voided or calculations for test series shall be performed using whichever meter coefficient value (i.e., before or after) gives the lower value of total sample volume.

9.4 Probe heater: The probe-heating system shall be calibrated before its initial use in the field according to the procedure outlined in APTD-0576. Probes constructed according to APTD-0581 need not be calibrated if the calibration curves in APTD-0576 are used.

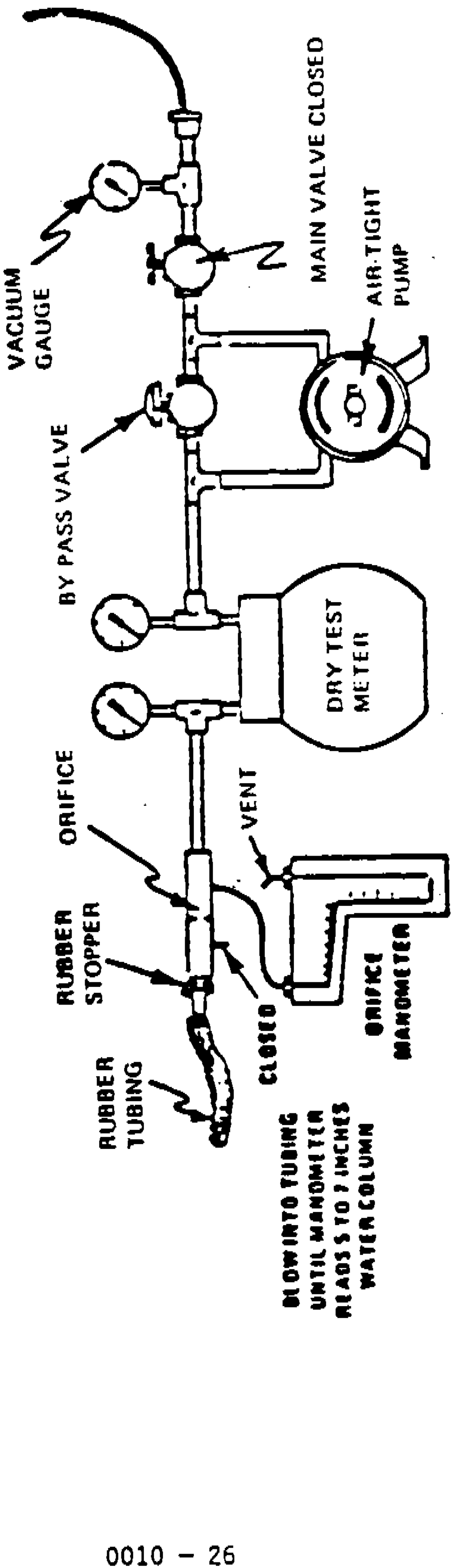

Figure 6. Leak-check of meter box.

9.5 Temperature gauges: Each thermocouple must be permanently and uniquely marked on the casting; all mercury-in-glass reference thermometers must conform to ASTM E-1 63C or 63F specifications. Thermocouples should be calibrated in the laboratory with and without the use of extension leads. If extension leads are used in the field, the thermocouple readings at ambient air temperatures, with and without the extension lead, must be noted and recorded. Correction is necessary if the use of an extension lead produces a change >1.5%.

9.5.1 **Impinger, organic module, and dry-gas meter thermocouples:** For the thermocouples used to measure the temperature of the gas leaving the impinger train and the XAD-2 resin bed, three-point calibration at ice-water, room-air, and boiling-water temperatures is necessary. Accept the thermocouples only if the readings at all three temperatures agree to ±2°C (3.6°F) with those of the absolute value of the reference thermometer.

9.5.2 **Probe and stack thermocouple:** For the thermocouples used to indicate the probe and stack temperatures, a three-point calibration at ice-water, boiling-water, and hot-oil-bath temperatures must be performed; it is recommended that room-air temperature be added, and that the thermometer and the thermocouple agree to within 1.5% at each of the calibration points. A calibration curve (equation) may be constructed (calculated) and the data extrapolated to cover the entire temperature range suggested by the manufacturer.

9.6 Barometer: Adjust the barometer initially and before each test series to agree to within ±25 mm Hg (0.1 in. Hg) of the mercury barometer or the corrected barometric pressure value reported by a nearby National Weather Service Station (same altitude above sea level).

9.7 Triple-beam balance: Calibrate the triple-beam balance before each test series, using Class-S standard weights; the weights must be within ±0.5% of the standards, or the balance must be adjusted to meet these limits.

10.0 CALCULATIONS

10.1 Carry out calculations. Round off figures after the final calculation to the correct number of significant figures.

10.2 Nomenclature:

A_n = Cross-sectional area of nozzle, m^2 (ft^2).

B_{ws} = Water vapor in the gas stream, proportion by volume.

C_d = Type S pitot tube coefficient (nominally 0.84 ± 0.02), dimensionless.

I = Percent of isokinetic sampling.

L_a = Maximum acceptable leakage rate for a leak-check, either pre-test or following a component change; equal to 0.00057 m^3/min (0.02 cfm) or 4% of the average sampling rate, whichever is less.

L_i = Individual leakage rate observed during the leak-check conducted prior to the "i^{th}" component change (i = 1, 2, 3...n) m^3/min (cfm).

L_p = Leakage rate observed during the post-test leak-check, m^3/min (cfm).

M_d = Stack-gas dry molecular weight, g/g-mole (lb/lb-mole).

M_w = Molecular weight of water, 18.0 g/g-mole (18.0 lb/lb-mole).

P_{bar} = Barometric pressure at the sampling site, mm Hg (in. Hg).

P_s = Absolute stack-gas pressure, mm Hg (in. Hg).

P_{std} = Standard absolute pressure, 760 mm Hg (29.92 in. Hg).

R = Ideal gas constant, 0.06236 mm Hg-m^3/K-g-mole (21.85 in. Hg-ft^3/°R-lb-mole).

T_m = Absolute average dry-gas meter temperature (see Figure 6), K (°R).

T_s = Absolute average stack-gas temperature (see Figure 6), K (°R).

T_{std} = Standard absolute temperature, 293K (528°R).

V_{lc} = Total volume of liquid collected in the organic module condensate knockout trap, the impingers, and silica gel, mL.

V_m = Volume of gas sample as measured by dry-gas meter, dscm (dscf).

$V_{m(std)}$ = Volume of gas sample measured by the dry-gas meter, corrected to standard conditions, dscm (dscf).

$V_{w(std)}$ = Volume of water vapor in the gas sample, corrected to standard conditions, scm (scf).

V_s = Stack-gas velocity, calculated by Method 2, Equation 2-9, using data obtained from Method 5, m/sec (ft/sec).

W_a = Weight of residue in acetone wash, mg.

γ = Dry-gas-meter calibration factor, dimensionless.

ΔH = Average pressure differential across the orifice meter (see Figure 2), mm H_2O (in. H_2O).

ρ_w = Density of water, 0.9982 g/mL (0.002201 lb/mL).

θ = Total sampling time, min.

θ_1 = Sampling time interval from the beginning of a run until the first component change, min.

θ_i = Sampling time interval between two successive component changes, beginning with the interval between the first and second changes, min.

θ_p = Sampling time interval from the final (nth) component change until the end of the sampling run, min.

13.6 = Specific gravity of mercury.

60 = sec/min.

100 = Conversion to percent.

10.3 <u>Average dry-gas-meter temperature and average orifice pressure drop</u>: See data sheet (Figure 5, above).

10.4 <u>Dry-gas volume</u>: Correct the sample measured by the dry-gas meter to standard conditions (20°C, 760 mm Hg [68°F, 29.92 in. Hg]) by using Equation 1:

$$V_{m(std)} = V_m \gamma \frac{T_{std}}{T_m} \frac{P_{bar} + \Delta H/13.6}{P_{std}} = K_1 V_m \gamma \frac{P_{bar} + \Delta H/13.6}{T_m} \qquad (1)$$

where:

K_1 = 0.3858 K/mm Hg for metric units, or
K_1 = 17.64°R/in. Hg for English units.

It should be noted that Equation 1 can be used as written, unless the leakage rate observed during any of the mandatory leak-checks (i.e., the post-test leak-check or leak-checks conducted prior to component changes) exceeds L_a. If L_p or L_i exceeds L_a, Equation 1 must be modified as follows:

a. <u>Case I</u> (no component changes made during sampling run): Replace V_m in Equation 1 with the expression:

$$V_m - (L_p - L_a)$$

b. <u>Case II</u> (one or more component changes made during the sampling run): Replace V_m in Equation 1 by the expression:

$$V_m - (L_1 - L_a)\theta_1 - \sum_{i=2}^{n} (L_i - L_a)\theta_1 - (L_p - L_a)\theta_p$$

and substitute only for those leakage rates (L_1 or L_p) that exceed L_a.

10.5 Volume of water vapor:

$$V_{w(std)} = V_{1c} \frac{P_w}{M_w} \frac{RT_{std}}{P_{std}} = K_2 V_{1c} \qquad (2)$$

where:

K_2 = 0.001333 m^3/mL for metric units, or
K_2 = 0.04707 ft^3/mL for English units.

10.6 Moisture content:

$$B_{ws} = \frac{V_{w(std)}}{V_{m(std)} + V_{w(std)}} \qquad (3)$$

NOTE: In saturated or water-droplet-laden gas streams, two calculations of the moisture content of the stack gas shall be made, one from the impinger analysis (Equation 3) and a second from the assumption of saturated conditions. The lower of the two values of B_w shall be considered correct. The procedure for determining the moisture content based upon assumption of saturated conditions is given in the Note to Section 1.2 of Method 4. For the purposes of this method, the average stack-gas temperature from Figure 6 may be used to make this determination, provided that the accuracy of the in-stack temperature sensor is ±1°C (2°F).

10.7 Conversion factors:

From	To	Multiply by
scf	m^3	0.02832
g/ft^3	gr/ft^3	15.43
g/ft^3	lb/ft^3	2.205×10^{-3}
g/ft^3	g/m^3	35.31

10.8 Isokinetic variation:

10.8.1 Calculation from raw data:

$$I = \frac{100\ T_s[K_3 F_{1c} + (V_m/T_m)\ (P_{bar} + \Delta H/13.6)]}{60\theta V_s P_s A_n} \qquad (4)$$

where:

K_3 = 0.003454 mm Hg-m^3/mL-K for metric units, or
K_3 = 0.002669 in. Hg-ft^3/mL-°R for English units.

10.8.2 Calculation for intermediate values:

$$I = \frac{T_s V_{m(std)} P_{std} 100}{T_{std} V_s \theta A_n P_s 60(1-B_{ws})} \qquad (5)$$

$$= K_4 \frac{T_s V_{m(std)}}{P_s V_s A_n \theta (1-B_{ws})}$$

where:

K_4 = 4.320 for metric units, or
K_4 = 0.09450 for English units.

10.8.3 Acceptable results: If $90\% \leq I \leq 110\%$, the results are acceptable. If the results are low in comparison with the standard and I is beyond the acceptable range, or if I is less than 90%, the Administrator may opt to accept the results.

10.9 To determine the minimum sample volume that shall be collected, the following sequence of calculations shall be used.

10.9.1 From prior analysis of the waste feed, the concentration of POHCs introduced into the combustion system can be calculated. The degree of destruction and removal efficiency that is required is used to determine the maximum amount of POHC allowed to be present in the effluent. This may be expressed as:

$$\frac{(WF)\ (POHC_i\ conc)}{100}\ \frac{(100-\%DRE)}{100} = \text{Max } POHC_i \text{ Mass} \qquad (6)$$

where:

WF = mass flow rate of waste feed per hr, g/hr (lb/hr).

$POHC_i$ = concentration of Principal Organic Hazardous Compound (wt %) introduced into the combustion process.

DRE = percent Destruction and Removal Efficiency required.

Max POHC = mass flow rate (g/hr [lb/hr]) of POHC emitted from the combustion source.

10.9.2 The average discharge concentration of the POHC in the effluent gas is determined by comparing the Max POHC with the volumetric flow rate being exhausted from the source. Volumetric flow rate data are available as a result of preliminary Method 1-4 determinations:

$$\frac{\text{Max POHC}_i\ \text{Mass}}{DV_{eff(std)}} = \text{Max POHC}_i\ \text{conc} \tag{7}$$

where:

$DV_{eff(std)}$ = volumetric flow rate of exhaust gas, dscm (dscf).

$POHC_i$ conc = anticipated concentration of the POHC in the exhaust gas stream, g/dscm (lb/dscf).

10.9.3 In making this calculation, it is recommended that a safety margin of at least ten be included:

$$\frac{LDL_{POHC} \times 10}{POHC_{i\ conc}} = V_{TBC} \tag{8}$$

where:

LDL_{POHC} = detectable amount of POHC in entire sampling train.

NOTE: The whole extract from an XAD-2 cartridge is seldom if ever, injected at once. Therefore, if aliquoting factors are involved, the LDL_{POHC} is not the same as the analytical (or column) detection limit.

V_{TBC} = minimum dry standard volume to be collected at dry-gas meter.

10.10 <u>Concentration of any given POHC in the gaseous emissions of a combustion process</u>:

1) Multiply the concentration of the POHC as determined in Method 8270 by the final concentration volume, typically 10 mL.

C_{POHC} (ug/mL) x sample volume (mL) = amount (ug) of POHC in sample (9) where:

C_{POHC} = concentration of POHC as analyzed by Method 8270.

2) Sum the amount of POHC found in all samples associated with a single train.

Total (ug) = XAD-2 (ug) + condensate (ug) + rinses (ug) + impinger (ug) (10)

3) Divide the total ug found by the volume of stack gas sampled (m^3).

(Total ug)/(train sample volume) = concentration of POHC (ug/m^3) (11)

11.0 QUALITY CONTROL

11.1 Sampling: See EPA Manual 600/4-77-027b for Method 5 quality control.

11.2 Analysis: The quality assurance program required for this study includes the analysis of field and method blanks, procedure validations, incorporation of stable labeled surrogate compounds, quantitation versus stable labeled internal standards, capillary column performance checks, and external performance tests. The surrogate spiking compounds selected for a particular analysis are used as primary indicators of the quality of the analytical data for a wide range of compounds and a variety of sample matrices. The assessment of combustion data, positive identification, and quantitation of the selected compounds are dependent on the integrity of the samples received and the precision and accuracy of the analytical methods employed. The quality assurance procedures for this method are designed to monitor the performance of the analytical method and to provide the required information to take corrective action if problems are observed in laboratory operations or in field sampling activities.

11.2.1 **Field Blanks:** Field blanks must be submitted with the samples collected at each sampling site. The field blanks include the sample bottles containing aliquots of sample recovery solvents, unused filters, and resin cartridges. At a minimum, one complete sampling train will be assembled in the field staging area, taken to the sampling area, and leak-checked at the beginning and end of the testing (or for the same total number of times as the actual test train). The filter housing and probe of the blank train will be heated during the sample test. The train will be recovered as if it were an actual test sample. No gaseous sample will be passed through the sampling train.

11.2.2 **Method blanks:** A method blank must be prepared for each set of analytical operations, to evaluate contamination and artifacts that can be derived from glassware, reagents, and sample handling in the laboratory.

11.2.3 Refer to Method 8270 for additional quality control considerations.

12.0 METHOD PERFORMANCE

12.1 Method performance evaluation: Evaluation of analytical procedures for a selected series of compounds must include the sample-preparation procedures and each associated analytical determination. The analytical procedures should be challenged by the test compounds spiked at appropriate levels and carried through the procedures.

12.2 Method detection limit: The overall method detection limits (lower and upper) must be determined on a compound-by-compound basis because different compounds may exhibit different collection, retention, and extraction efficiencies as well as instrumental minimum detection limit (MDL). The method detection limit must be quoted relative to a given sample volume. The upper limits for the method must be determined relative to compound retention volumes (breakthrough).

12.3 Method precision and bias: The overall method precision and bias must be determined on a compound-by-compound basis at a given concentration level. The method precision value would include a combined variability due to sampling, sample preparation, and instrumental analysis. The method bias would be dependent upon the collection, retention, and extraction efficiency of the train components. From evaluation studies to date using a dynamic spiking system, method biases of -13% and -16% have been determined for toluene and 1,1,2,2-tetrachloroethane, respectively. A precision of 19.9% was calculated from a field test data set representing seven degrees of freedom which resulted from a series of paired, unspiked Semivolatile Organic Sampling trains (Semi-VOST) sampling emissions from a hazardous waste incinerator.

13.0 REFERENCES

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METHOD 0010, APPENDIX A

PREPARATION OF XAD-2 SORBENT RESIN

1.0 SCOPE AND APPLICATION

1.1 XAD-2 resin as supplied by the manufacturer is impregnated with a bicarbonate solution to inhibit microbial growth during storage. Both the salt solution and any residual extractable monomer and polymer species must be removed before use. The resin is prepared by a series of water and organic extractions, followed by careful drying.

2.0 EXTRACTION

2.1 Method 1: The procedure may be carried out in a giant Soxhlet extractor. An all-glass thimble containing an extra-coarse frit is used for extraction of XAD-2. The frit is recessed 10-15 mm above a crenellated ring at the bottom of the thimble to facilitate drainage. The resin must be carefully retained in the extractor cup with a glass-wool plug and stainless steel screen because it floats on methylene chloride. This process involves sequential extraction in the following order.

Solvent	Procedure
Water	Initial rinse: Place resin in a beaker, rinse once with Type II water, and discard. Fill with water a second time, let stand overnight, and discard.
Water	Extract with H_2O for 8 hr.
Methyl alcohol	Extract for 22 hr.
Methylene chloride	Extract for 22 hr.
Methylene chloride (fresh)	Extract for 22 hr.

2.2 Method 2:

2.2.1 As an alternative to Soxhlet extraction, a continuous extractor has been fabricated for the extraction sequence. This extractor has been found to be acceptable. The particular canister used for the apparatus shown in Figure A-1 contains about 500 g of finished XAD-2. Any size may be constructed; the choice is dependent on the needs of the sampling programs. The XAD-2 is held under light spring tension between a pair of coarse and fine screens. Spacers under the bottom screen allow for even distribution of clean solvent. The three-necked flask should be of sufficient size (3-liter in this case) to hold solvent

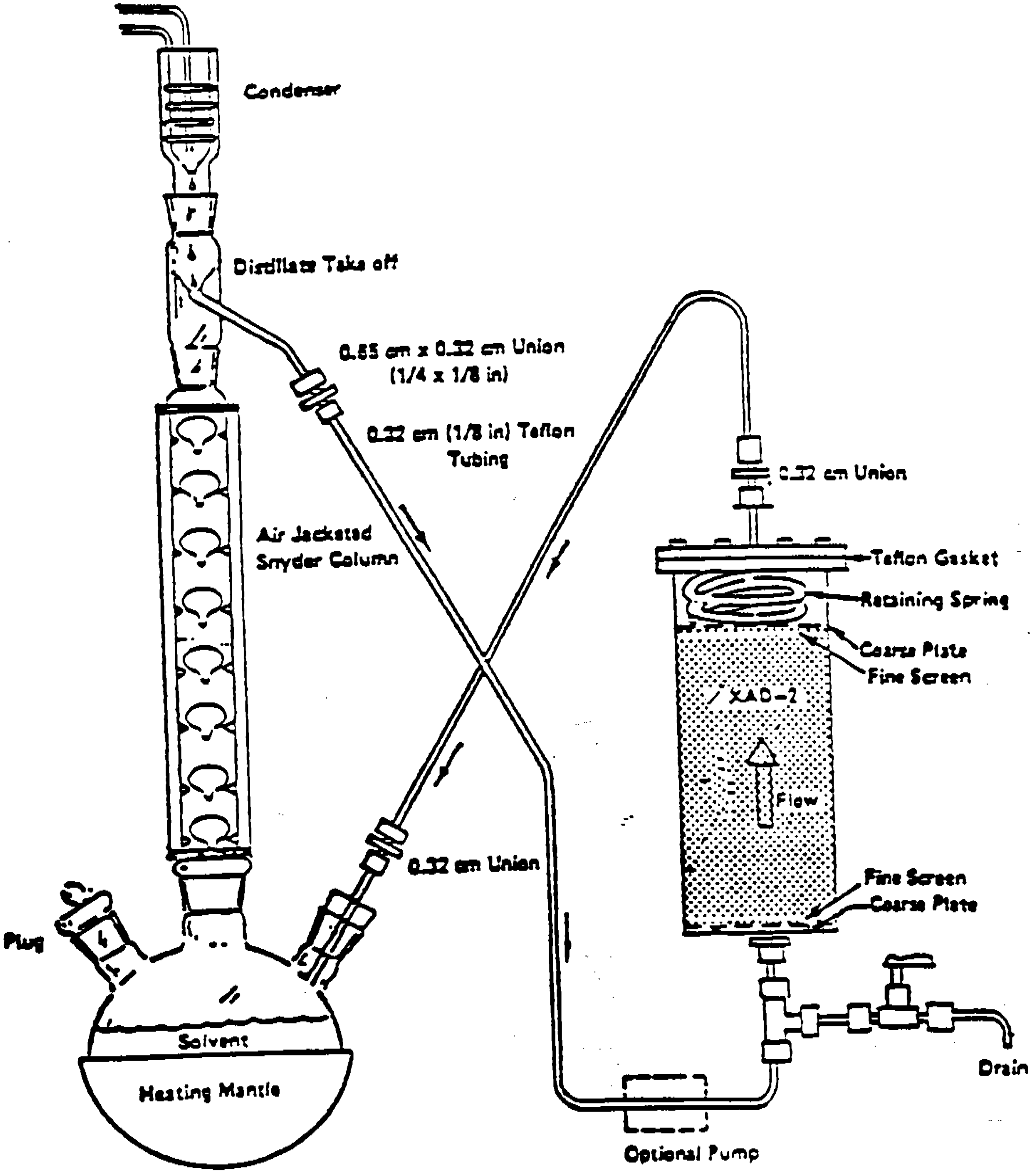

Figure A-1. XAD-2 cleanup extraction apparatus.

equal to twice the dead volume of the XAD-2 canister. Solvent is refluxed through the Snyder column, and the distillate is continuously cycled up through the XAD-2 for extraction and returned to the flask. The flow is maintained upward through the XAD-2 to allow maximum solvent contact and prevent channeling. A valve at the bottom of the canister allows removal of solvent from the canister between changes.

2.2.2 Experience has shown that it is very difficult to cycle sufficient water in this mode. Therefore the aqueous rinse is accomplished by simply flushing the canister with about 20 liters of distilled water. A small pump may be useful for pumping the water through the canister. The water extraction should be carried out at the rate of about 20-40 mL/min.

2.2.3 After draining the water, subsequent methyl alcohol and methylene chloride extractions are carried out using the refluxing apparatus. An overnight or 10- to 20-hr period is normally sufficient for each extraction.

2.2.4 All materials of construction are glass, Teflon, or stainless steel. Pumps, if used, should not contain extractable materials. Pumps are not used with methanol and methylene chloride.

3.0 DRYING

3.1 After evaluation of several methods of removing residual solvent, a fluidized-bed technique has proved to be the fastest and most reliable drying method.

3.2 A simple column with suitable retainers, as shown in Figure A-2, will serve as a satisfactory column. A 10.2-cm (4-in.) Pyrex pipe 0.6 m (2 ft) long will hold all of the XAD-2 from the extractor shown in Figure A-1 or the Soxhlet extractor, with sufficient space for fluidizing the bed while generating a minimum resin load at the exit of the column.

3.3 Method 1: The gas used to remove the solvent is the key to preserving the cleanliness of the XAD-2. Liquid nitrogen from a standard commercial liquid nitrogen cylinder has routinely proved to be a reliable source of large volumes of gas free from organic contaminants. The liquid nitrogen cylinder is connected to the column by a length of precleaned 0.95-cm (3/8-in.) copper tubing, coiled to pass through a heat source. As nitrogen is bled from the cylinder, it is vaporized in the heat source and passes through the column. A convenient heat source is a water bath heated from a steam line. The final nitrogen temperature should only be warm to the touch and not over 40°C. Experience has shown that about 500 g of XAD-2 may be dried overnight by consuming a full 160-liter cylinder of liquid nitrogen.

3.4 Method 2: As a second choice, high-purity tank nitrogen may be used to dry the XAD-2. The high-purity nitrogen must first be passed through a bed

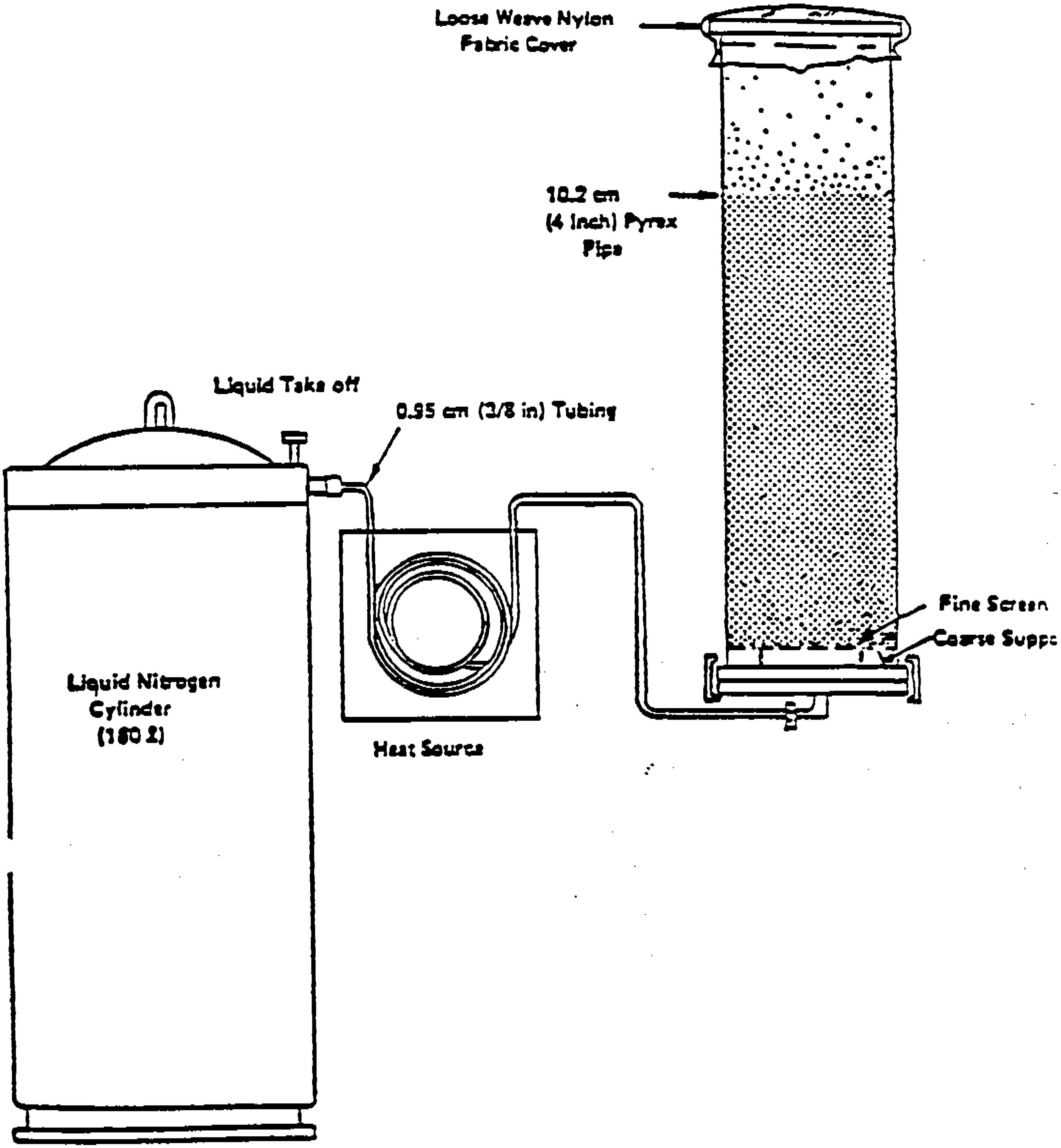

Figure A-2. XAD-2 fluidized-bed drying apparatus.

of activated charcoal approximately 150 mL in volume. With either type of drying method, the rate of flow should gently agitate the bed. Excessive fluidization may cause the particles to break up.

4.0 QUALITY CONTROL PROCEDURES

4.1 For both Methods 1 and 2, the quality control results must be reported for the batch. The batch must be reextracted if the residual extractable organics are >20 ug/mL by TCO analysis or the gravimetric residue is >0.5 mg/20 g XAD-2 extracted. (See also section 5.1, Method 0010.)

4.2 Four control procedures are used with the final XAD-2 to check for (1) residual methylene chloride, (2) extractable organics (TCO), (3) specific compounds of interest as determined by GC/MS, as described in Section 4.5 below, and (4) residue (GRAV).

4.3 Procedure for residual methylene chloride:

4.3.1 Description: A 1±0.1-g sample of dried resin is weighed into a small vial, 3 mL of toluene are added, and the vial is capped and well shaken. Five uL of toluene (now containing extracted methylene chloride) are injected into a gas chromatograph, and the resulting integrated area is compared with a reference standard. The reference solution consists of 2.5 uL of methylene chloride in 100 mL of toluene, simulating 100 ug of residual methylene chloride on the resin. The acceptable maximum content is 1,000 ug/g resin.

4.3.2 Experimental: The gas chromatograph conditions are as follows:

6-ft x 1/8-in. stainless steel column containing 10% OV-101 on 100/120 Supelcoport;

Helium carrier at 30 mL/min;

FID operated on 4×10^{-11} A/mV;

Injection port temperature: 250°C;

Detector temperature: 305°C;

Program: 30°C(4 min) 40°C/min 250°C (hold); and

Program terminated at 1,000 sec.

4.4 Procedure for residual extractable organics:

4.4.1 Description: A 20±0.1-g sample of cleaned, dried resin is weighed into a precleaned alundum or cellulose thimble which is plugged with cleaned glass wool. (Note that 20 g of resin will fill a thimble, and the

TOTAL CHROMATOGRAPHABLE ORGANIC MATERIAL ANALYSIS

1.0 SCOPE AND APPLICATION

1.1 In this procedure, gas chromatography is used to determine the quantity of lower boiling hydrocarbons (boiling points between 90° and 300°C) in the concentrates of all organic solvent rinses, XAD-2 resin and LC fractions - when Method 1 is used (see References, Method 0010) - encountered in Level 1 environmental sample analyses. Data obtained using this procedure serve a twofold purpose. First, the total quantity of the lower boiling hydrocarbons in the sample is determined. Then whenever the hydrocarbon concentrations in the original concentrates exceed 75 ug/m^3, the chromatography results are reexamined to determine the amounts of individual species.

The extent of compound identification is limited to representing all materials as normal alkanes based upon comparison of boiling points. Thus the method is not qualitative. In a similar manner, the analysis is semiquantitative; calibrations are prepared using only one hydrocarbon. They are replicated but samples routinely are not.

1.2 Application: This procedure applies solely to the Level 1 C7-C16 gas chromatographic analysis of concentrates of organic extracts, neat liquids, and of LC fractions. Throughout the procedure, it is assumed the analyst has been given a properly prepared sample.

1.3 Sensitivity: The sensitivity of this procedure, defined as the slope of a plot of response versus concentration, is dependent on the instrument and must be verified regularly. TRW experience indicates the nominal range is of the order of 77 uV·V·sec·uL/ng of n-heptane and 79 uV·sec·ul/ng of n-hexadecane. The instrument is capable of perhaps one hundredfold greater sensitivity. The level specified here is sufficient for Level 1 analysis.

1.4 Detection limit: The detection limit of this procedure as written is 1.3 ng/uL for a 1 uL injection of n-decane. This limit is arbitrarily based on defining the minimum detectable response as 100 uv·sec. This is an easier operational definition than defining the minimum detection limit to be that amount of material which yields a signal twice the noise level.

1.5 Range: The range of the procedure will be concentrations of 1.3 ng/uL and greater.

1.6 Limitations

1.6.1 Reporting limitations: It should be noted that a typical environmental sample will contain compounds which: (a) will not elute in the specified boiling ranges and thus will not be reported, and/or (b) resin will float out unless well plugged.) The thimble containing the resin is extracted for 24 hr with 200-mL of pesticide- grade methylene chloride (Burdick and Jackson pesticide-grade or equivalent purity). The 200-mL extract is reduced in volume to 10-mL using a Kuderna-Danish concentrator and/or a nitrogen evaporation stream. Five uL of that solution are analyzed by gas chromatography using the TCO analysis procedure. The concentrated solution should not contain >20 ug/mL of TCO extracted from the XAD-2. This is equivalent to 10 ug/g of TCO in the XAD-2 and would correspond to 1.3 mg of TCO in the extract of the 130-g XAD-2 module. Care should be taken to correct the TCO data for a solvent blank prepared (200 mL reduced to 10 mL) in a similar manner.

4.4.2 **Experimental:** Use the TCO analysis conditions described in the revised Level 1 manual (EPA 600/7-78-201).

4.5 GC/MS Screen: The extract, as prepared in paragraph 4.4.1, is subjected to GC/MS analysis for each of the individual compounds of interest. The GC/MS procedure is described in Chapter Four, Method 8270. The extract is screened at the MDL of each compound. The presence of any compound at a concentration >25 ug/mL in the concentrated extract will require the XAD-2 to be recleaned by repeating the methylene chloride step.

4.6 Methodology for residual gravimetric determination: After the TCO value and GC/MS data are obtained for the resin batch by the above procedures, dry the remainder of the extract in a tared vessel. There must be <0.5 mg residue registered or the batch of resin will have to be extracted with fresh methylene chloride again until it meets this criterion. This level corresponds to 25 ug/g in the XAD-2, or about 3.25 mg in a resin charge of 130 g.

will not elute from the column at all and thus will not be reported. Consequently, the organic content of the sample as reported is a lower bound and should be regarded as such.

1.6.2 **Calibration limitations:** Quantitation is based on calibration with n-decane. Data should therefore be reported as, e.g., mg C8/m^3 as n-decane. Since response varies linearly with carbon number (over a wide range the assumption may involve a 20% error), it is clear that heptane (C7) detected in a sample and quantitated as decane will be overestimated. Likewise, hexadecane (C16) quantitated as decane will be underestimated. From previous data, it is estimated the error involved is on the order of 6-7%.

1.6.3 **Detection limitations:** The sensitivity of the flame ionization detector varies from compound to compound. However, n-alkanes have a greater response than other classes. Consequently, using an n-alkane as a calibrant and assuming equal responses of all other compounds tends to give low reported values.

2.0 SUMMARY OF METHOD

2.1 A mL aliquot of all 10-mL concentrates is disbursed for GC-TCO analysis. With boiling point-retention time and response-amount calibration curves, the data (peak retention times and peak areas) are interpreted by first summing peak areas in the ranges obtained from the boiling point-retention time calibration. Then, with the response-amount calibration curve, the area sums are converted to amounts of material in the reported boiling point ranges.

2.2 After the instrument is set up, the boiling point-retention time calibration is effected by injecting a mixture of n-C7 through n-C16 hydrocarbons and operating the standard temperature program. Response-quantity calibrations are accomplished by injecting n-decane in n-pentane standards and performing the standard temperature program.

2.3 <u>Definitions</u>

<u>2.3.1 **GC:**</u> Gas chromatography or gas chromatograph.

2.3.2 **C7-C16 n-alkanes: Heptane through hexadecane.**

2.3.3 **GCA temperature program:** 4 min isothermal at 60°C, 10°C/min from 60° to 220°C.

2.3.4 **TRW temperature program:** 5 min isothermal at room temperature, then program from 30°C to 250°C at 15°C/min.

3.0 INTERFERENCES

Not applicable.

4.0 APPARATUS AND MATERIALS

4.1 Gas chromatograph: This procedure is intended for use on a Varian 1860 gas chromatograph, equipped with dual flame ionization detectors and a linear temperature programmer. Any equivalent instrument can be used provided that electrometer settings, etc., be changed appropriately.

4.2 Gases:

4.2.1 Helium: Minimum quality is reactor grade. A 4A or 13X molecular sieve drying tube is required. A filter must be placed between the trap and the instrument. The trap should be recharged after every third tank of helium.

4.2.2 Air: Zero grade is satisfactory.

4.2.3 Hydrogen: Zero grade.

4.3 Syringe: Syringes are Hamilton 701N, 10 uL, or equivalent.

4.4 Septa: Septa will be of such quality as to produce very low bleed during the temperature program. An appropriate septum is Supelco Microsep 138, which is Teflon-backed. If septum bleed cannot be reduced to a negligible level, it will be necessary to install septum swingers on the instrument.

4.5 Recorder: The recorder of this procedure must be capable of not less than 1 mV full-scale display, a 1-sec time constant and 0.5 in. per min chart rate.

4.6 Integrator: An integrator is required. Peak area measurement by hand is satisfactory but too time-consuming. If manual integration is required, the method of "height times width at half height" is used.

4.7 Columns:

4.7.1 **Preferred column:** 6 ft x 1/8 in. O.D. stainless steel column of 10% OV-101 on 100/120 mesh Supelcoport.

4.7.2 **Alternate column:** 6 ft x 1/8 in. O.D. stainless steel column of 10% OV-1 (or other silicon phase) on 100/120 mesh Supelcoport.

4.8 Syringe cleaner: Hamilton syringe cleaner or equivalent connected to a suitable vacuum source.

5.0 REAGENTS

5.1 Pentane: "Distilled-in-Glass" (reg. trademark) or "Nanograde" (reg. trademark) for standards and for syringe cleaning.

5.2 Methylene chloride: "Distilled-in-Glass" (reg. trademark) or "Nanograde" (reg. trademark) for syringe cleaning.

6.0 SAMPLING HANDLING AND PRESERVATION

6.1 The extracts are concentrated in a Kuderna-Danish evaporator to a volume less than 10 mL. The concentrate is then quantitatively transferred to a 10-mL volumetric flask and diluted to volume. A 1-mL aliquot is taken for both this analysis and possible subsequent GC/MS analysis and set aside in the sample bank. For each GC-TCO analysis, obtain the sample sufficiently in advance to allow it to warm to room temperature. For example, after one analysis is started, return that sample to the sample bank and take the next sample.

7.0 PROCEDURES

7.1 Setup and checkout: Each day, the operator will verify the following:

7.1.1 That supplies of carrier gas, air and hydrogen are sufficient, i.e., that each tank contains > 100 psig.

7.1.2 That, after replacement of any gas cylinder, all connections leading to the chromatograph have been leak-checked.

7.1.3 That the carrier gas flow rate is 30 ± 2 mL/min, the hydrogen flow rate is 30 ± 2 mL/min, and the air flow rate is 300 ± 20 mL/min.

7.1.4 That the electrometer is functioning properly.

7.1.5 That the recorder and integrator are functioning properly.

7.1.6 That the septa have been leak-checked (leak-checking is effected by placing the soap bubble flow meter inlet tube over the injection port adaptors), and that no septum will be used for more than 20 injections.

7.1.7 That the list of samples to be run is ready.

7.2 Retention time calibration:

7.2.1 To obtain the temperature ranges for reporting the results of the analyses, the chromatograph is given a normal boiling point-retention time calibration. The n-alkanes, their boiling points, and data reporting ranges are given in the table below:

	NBP,°C	Reporting Range,°C	Report As
n-heptane	98	90-110	C7
n-octane	126	110-140	C8
n-nonane	151	140-160	C9
n-decane	174	160-180	C10
n-undecane	194	180-200	C11
n-dodecane	214	200-220	C12
n-tridecane	234	220-240	C13
n-tetradecane	252	240-260	C14
n-pentadecane	270	260-280	C15
n-hexadecane	288	280-300	C16

7.2.2 **Preparation of standards:** Preparing a mixture of the C7-C16 alkanes is required. There are two approaches: (1) use of a standards kit (e.g., Polyscience Kit) containing bottles of mixtures of selected n-alkanes which may be combined to produce a C7-C16 standard; or (2) use of bottles of the individual C7-C16 alkanes from which accurately known volumes may be taken and combined to give a C7-C16 mixture.

7.2.3 **Procedure for retention time calibration:** This calibration is performed at the start of an analytical program; the mixture is chromatographed at the start of each day. To attain the required retention time precision, both the carrier gas flow rate and the temperature program specifications must be observed. Details of the procedure depend on the instrument being used. The general procedure is as follows:

7.2.3.1 Set the programmer upper limit at 250°C. If this setting does not produce a column temperature of 250°C, find the correct setting.

7.2.3.2 Set the programmer lower limit at 30°C.

7.2.3.3 Verify that the instrument and samples are at room temperature.

7.2.3.4 Inject 1 uL of the n-alkane mixture.

7.2.3.5 Start the integrator and recorder.

7.2.3.6 Allow the instrument to run isothermally at room temperature for five min.

7.2.3.7 Shut the oven door.

7.2.3.8 Change the mode to Automatic and start the temperature program.

7.2.3.9 Repeat Steps 1-9 a sufficient number of times so that the relative standard deviation of the retention times for each peak is <5%.

7.3 Response calibration:

7.3.1 For the purposes of a Level 1 analysis, response-quantity calibration with n-decane is adequate. A 10-uL volume of n-decane is injected into a tared 10 mL volumetric flask. The weight injected is obtained and the flask is diluted to the mark with n-pentane. This standard contains about 730 ng n-decane per uL n-pentane. The exact concentration depends on temperature, so that a weight is required. Two serial tenfold dilutions are made from this standard, giving standards at about 730, 73, and 7.3 ng n-decane per uL n-pentane, respectively.

7.3.2 Procedure for response calibration: This calibration is performed at the start of an analytical program and monthly thereafter. The most concentrated standard is injected once each day. Any change in calibration necessitates a full calibration with new standards. Standards are stored in the refrigerator locker and are made up monthly.

7.3.2.1 Verify that the instrument is set up properly.

7.3.2.2 Set electrometer at 1 x 10^{-10} A/mV.

7.3.2.3 Inject 1 uL of the highest concentration standard.

7.3.2.4 Run standard temperature program as specified above.

7.3.2.5 Clean syringe.

7.3.2.6 Make repeated injections of all three standards until the relative standard deviations of the areas of each standard are $\leq$5%.

7.4 Sample analysis procedure:

7.4.1 The following apparatus is required:

7.4.1.1 Gas chromatograph set up and working.

7.4.1.2 Recorder, integrator working.

7.4.1.3 Syringe and syringe cleaning apparatus.

7.4.1.4 Parameters: Electrometer setting is 1 x 10^{-10} A/mV; recorder is set at 0.5 in./min and 1 mV full-scale.

7.4.2 Steps in the procedure are:

7.4.2.1 Label chromatogram with the data, sample number, etc.

7.4.2.2 Inject sample.

7.4.2.3 Start integrator and recorder.

7.4.2.4 After isothermal operation for 5 min, begin temperature program.

7.4.2.5 Clean syringe.

7.4.2.6 Return sample; obtain new sample.

7.4.2.7 When analysis is finished, allow instrument to cool. Turn chromatogram and integrator output and data sheet over to data analyst.

7.5 Syringe cleaning procedure:

7.5.1 Remove plunger from syringe.

7.5.2 Insert syringe into cleaner; turn on aspirator.

7.5.3 Fill pipet with pentane; run pentane through syringe.

7.5.4 Repeat with methylene chloride from a separate pipet.

7.5.5 Flush plunger with pentane followed by methylene chloride.

7.5.6 Repeat with methylene chloride.

7.6 Sample analysis decision criterion: The data from the TCO analyses of organic extract and rinse concentrates are first used to calculate the total concentration of C7-C16 hydrocarbon-equivalents (Paragraph 7.7.3) in the sample with respect to the volume of air actually sampled, i.e., ug/m^3. On this basis, a decision is made both on whether to calculate the quantity of each n-alkane equivalent present and on which analytical procedural pathway will be followed. If the total organic content is great enough to warrant continuing the analysis -- >500 ug/m^3 -- a TCO of less than 75 ug/m^3 will require only LC fractionation and gravimetric determinations and IR spectra to be obtained on each fraction. If the TCO is greater than 75 ug/m^3, then the first seven LC fractions of each sample will be reanalyzed using this same gas chromatographic technique.

7.7 Calculations:

7.7.1 **Boiling Point - Retention Time Calibration:** The required data for this calibration are on the chromatogram and on the data sheet. The data reduction is performed as follows:

7.7.1.1 Average the retention times and calculate relative standard deviations for each n-hydrocarbon.

7.7.1.2 Plot average retention times as abscissae versus normal boiling points as ordinates.

7.7.1.3 Draw in calibration curve.

7.7.1.4 Locate and record retention times corresonding to boiling ranges 90-100, 110-140, 140-160, 160-180, 180-200, 200-220, 220-240, 240-260, 260-280, 280-300°C.

7.7.2 **Response-amount calibration:** The required data for this calibration are on the chromatogram and on the data sheet. The data reduction is performed as follows:

7.7.2.1 Average the area responses of each standard and calculate relative standard deviations.

7.7.2.2 Plot response (uv·sec) as ordinate versus ng/uL as abscissa.

7.7.2.3 Draw in the curve. Perform least squares regression and obtain slope (uV·sec·uL/ng).

7.7.3 **Total C7-C16 hydrocarbons analysis:** The required data for this calculation are on the chromatogram and on the data sheet. The data reduction is performed as follows:

7.7.3.1 Sum the areas of all peaks within the retention time range of interest.

7.7.3.2 Convert this area (uV·sec) to ng/uL by dividing by the weight response for n-decane (uV·sec.uL/ng).

7.7.3.3 Multiply this weight by the total concentrate volume (10 mL) to get the weight of the C7-C16 hydrocarbons in the sample.

7.7.3.4 Using the volume of gas sampled or the total weight of sample acquired, convert the result of Step 7.7.3.3 above to ug/m^3.

7.7.3.5 If the value of total C7-C16 hydrocarbons from Step 7.7.3.4 above exceeds 75 ug/m^3, calculate individual hydrocarbon concentrations in accordance with the instructions in Paragraph 7.7.5.5 below.

7.7.4 **Individual C7-C16 n-Alkane Equivalent Analysis:** The required data from the analyses are on the chromatogram and on the data sheet. The data reduction is performed as follows:

7.7.4.1 Sum the areas of peaks in the proper retention time ranges.

7.7.4.2 Convert areas (uV·sec) to ng/uL by dividing by the proper weight response (uV·sec·uL/ng).

7.7.4.3 Multiply each weight by total concentrate volume (10 mL) to get weight of species in each range of the sample.

7.7.4.4 Using the volume of gas sampled on the total weight of sample acquired, convert the result of Step 7.7.4.3 above to ug/m^3.

8.0 QUALITY CONTROL

8.1 Appropriate QC is found in the pertinent procedures throughout the method.

9.0 METHOD PERFORMANCE

9.1 Even relatively comprehensive error propagation analysis is beyond the scope of this procedure. With reasonable care, peak area reproducibility of a standard should be of the order of 1% RSD. The relative standard deviation of the sum of all peaks in a fairly complex waste might be of the order of 5-10%. Accuracy is more difficult to assess. With good analytical technique, accuracy and precision should be of the order of 10-20%.

10.0 REFERENCES

1. Emissions Assessment of Conventional Stationary Combustion Systems: Methods and Procedure Manual for Sampling and Analysis, Interagency Energy/Environmental R&D Program, Industrial Environmental Research Laboratory, Research Triangle Park, NC 27711, EPA-600/7-79-029a, January 1979.

APPENDIX L

CALCULATION EQUATIONS

METHOD 2
CALCULATION EQUATIONS

$$\overline{V_s} = 85.49\ C_p\ (\sqrt{\Delta p})_{avg}\ \sqrt{\frac{T_{s(avg)}}{P_s\ M_s}}$$

$$Q_{s,\ d} = 60\ (1\ - B_{ws})\ \overline{V_s}\ A\ (\frac{528}{T_{s\ (avg)}})\ (\frac{P_s}{29.92})$$

$$Q_a = 60\ \overline{V_s}\ A$$

$$\dot{m}_g = \frac{4.995\ Q_{s,\ d}\ G_d}{1\ -\ B_{ws}}$$

$$RH^* = 100\ (vp_{twb}\ -\ 0.0003641\ P_s\ (T_{db}\ -\ T_{wb}))/vp_{tdb}$$

$$B_{ws}^* = RH(vp_{tdb})/P_s$$

$$\rho = \frac{4.585\ x\ 10^{-2}\ P_s M_s}{T_s\ (avg)}$$

*Alternate equations for calculating moisture content from wet bulb and dry bulb data.

SYMBOLS

A = Cross Sectional area of stack, SQ. FT.

A_n = Cross sectional area of nozzle, SQ. FT.

B_{ws} = Water vapor in gas stream, proportion by volume

C_p = Pitot tube coefficient, dimensionless

C_a = Concentration of particulate matter in stack gas, wet basis, GR/ACF

C_s = Concentration of particulate matter in stack gas, dry basis, corrected to standard conditions, GR/DSCF

EA = Excess air, percent by volume

γ = Dry test meter correction factor, dimensionless

G_d = Specific gravity (relative to air), dimensionless

I = Isokinetic variation, percent by volume

M_d = Molecular weight of stack gas, dry basis, g/g - mole.

$\dot{m}_g$ = Mass flow of wet flue gas, LB/HR

$\dot{m}_p$ = Particulate mass flow, LB/HR

M_s = Molecular weight of stack gas, wet basis, g/g mole.

M_p = Total amount of particulate matter collected, g

P_{bar} = Atmospheric pressure, IN. HG. (uncompensated)

P_g = Stack static gas pressure, IN. WC.

P_s = Absolute pressure of stack gas, IN. HG.

P_{std} = Standard absolute pressure, 29.92 IN. HG.

A_a = Actual volumetric stack gas flow rate, ACFM

$Q_{s,d}$ = Dry volumetric stack gas flow rate corrected to standard conditions, DSCFM

RH = Relative humidity, %

T_{db} = Dry bulb temperature of stack gas, °F

T_{wb} = Wet bulb temperature of stack gas, °F

$T_{m(avg)}$ = Absolute average dry gas meter temperature, °R

$T_{s(avg)}$ = Absolute average stack temperature, °R

T_{std} = Standard absolute temperature, 528 °R (68 °F)

θ = Total sampling time, min.

V_{lc} = Total volume of liquid collected in impingers and silica gel, ml

V_m = Volume of gas sample as measured by dry gas meter, CF

$V_{m(std)}$ = Volume of gas sample measured by the dry gas meter corrected to standard conditions, DSCF

$V_{w(std)}$ = Volume of water vapor in the gas sample corrected to standard conditions, SCF

$\bar{V}_s$ = Average actual stack gas velocity, FT/SEC

vp_{tdb} = Vapor pressure at T_{db}, IN. HG.

vp_{twb} = Vapor pressure at T_{wb}, IN. HG.

$\overline{\Delta H}$ = Average pressure differential across the orifice meter, IN. WC.

ΔP = Velocity pressure of stack gas, IN. WC.

γ = Dry test meter correction coefficient, dimensionless

ρ = Actual gas density, LB/ACF

METHOD 3
CALCULATION EQUATIONS

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

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

$$M_s = M_d\ (I - B_{ws}) + 0.18\ B_{ws}$$

$$B_{ws} = \frac{V_{w(std)}}{V_{w(std)} + V_{m(std)}}$$

METHOD 5
CALCULATION EQUATIONS

$$V_{m(std)} = 17.65\ V_m\ \gamma\ (\frac{P_{bar} + \overline{\Delta H}/13.6}{T_{m(avg)}})$$

$$V_{w(std)} = 0.0472\ V_{Ls}$$

$$B_{ws} = \frac{V_{w(std)}}{V_{w(std)} + V_{m(std)}}$$

$$I = 0.0944\ (\frac{T_{s(avg)}\ V_{m(std)}}{P_s\ V_s\ A_n\ \theta\ (I - B_{ws})})$$

$$C_s = \frac{15.43\ M_p}{V_{m(std)}}$$

$$C_a = \frac{272.3\ M_p\ P_s}{T_{s(avg)}\ (V_{w(std)} + V_{m(std)})}$$

$$(\dot{m}_p)_1 = 8.5714\ x\ 10^{-3}\ C_s\ Q_{s,\ d}$$

$$(\dot{m}_p)_2 = \frac{1.3228 \ x \ 10^{-1} \ M_p \ A}{\theta \ A_n}$$

$$\dot{m}_p = \frac{(\dot{m}_p)_1 + (\dot{m}_p)_2}{2}$$

CALCULATION EQUATIONS

METHOD 7

$$V_{m(std)} = 17.64\ (V_f - 25)\ [\frac{P_f}{T_f} - \frac{P_i}{T_i}]$$

$$C_s = 6.243\ x\ 10^{-5}\ \frac{M}{V_{m(std)}}$$

$$E = \frac{2090\ C_s F}{20.9 - \overline{B}'_{O_2}}$$

$$C_s\ (GR/DSCF) = 7000\ C_s$$

$$C_s\ (MG/DSCM) = 1.60186\ x\ 10^7\ C_s$$

$$C_s\ (ppm\text{-}dry) = 8.37552\ x\ 10^6\ C_s$$

$$C_s\ (ppm\text{-}3\%\ O_2) = 8.37552\ x\ 10^6\ C_s\ \{1 + [\frac{\overline{B}'_{O_2} - 3}{20.9 - B'_{O_2}}]\}$$

$$C_s\ (ppm\text{-}wet) = 8.37552\ x\ 10^6\ C_s\ (1 - \frac{MC}{100})$$

G:\STACK\WP\METHODS\EQ.M7

SYMBOLS

$\bar{B}\ O_2$ = Average oxygen content in flue gas, % v/v

C_s = Concentration of nitrogen oxides in flue gas, dry basis, corrected to standard conditions, LB/DSCF

C_s (GR/DSCF) = Concentration of nitrogen oxides in flue gas, dry basis, corrected to standard conditions, GR/DSCF

C_s (MG/DSCM)= Concentration of nitrogen oxides in flue gas, dry basis, corrected to standard conditions, MG/DSCM

E = Emission factor, LB/10^6BTU

F = F-Factor for given fuel type, DSCF/10^4BTU

M = Mass of nitrogen oxides as nitrogen dioxide in gas sample, ug

MC = Moisture content of flue gas, %

P_f = Final absolute pressure in flask, IN. HG

P_i = Initial absolute pressure in flask, IN. HG

C_s (ppm-dry) = Concentration of nitrogen oxides in flue gas, dry basis, (v/v), ppm

C_s (ppm-3% O_2) = Concentration of nitrogen oxides in flue gas, dry basis, corrected to 3% O_2, (v/v) ppm

C_s (ppm-wet) = Concentration of nitrogen oxides in flue gas, wet basis, (v/v), ppm

T_f = Final absolute temperature in flask, °R

T_i = Initial absolute temperature in flask, °R

V_f = Volume of flask and valve, cc

$V_{m(std)}$ = Sample volume at standard conditions, dry basis, cc

CALCULATION EQUATIONS

METHOD 10

$$CO\cdot PPM\cdot DRY = CO_{CO_2} - free, dry, avg\ (1 - CO_2, d/100)$$

$$CO\cdot PPM\cdot WET = CO\cdot PPM\cdot DRY\ (1 - MC/100)$$

$$GR/DSCF = 5.0885\ X\ 10^{-4}\ (CO\cdot PPM\cdot DRY)$$

$$mg/dscm = 1.165\ (CO\cdot PPM\cdot DRY)$$

$$\dot{m} = 8.5714\ x\ 10^{-3}\ (GR/DSCF)\ (Q_{s,d})$$

$$E = \frac{2.9857\ x\ 10^{-3}\ F_d\ (GR/DSCF)}{20.9 - O_{2,\,d}}$$

where:

CO_{CO_2} - *free, dry, avg*

= average of two determinations of carbon monoxide on a dry, CO_2 - free integrated flue gas sample reported in ppm by volume

$CO_{2,\,d}$ = carbon dioxide concentration of flue gas on a dry percent by volume basis

$O_{2,\,d}$ = oxygen concentration of flue gas on a dry percent by volume basis

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MC = moisture content of flue gas on a percent by volume basis

CO·PPM·DRY = carbon monoxide concentration in ppm by volume on a dry basis

CO·PPM·WET = carbon monoxide concentration in ppm by volume on a wet or actual basis

GR/DSCF = concentration of carbon monoxide in flue gas on a grains per dry standard cubic foot basis (68 °F, 29.92 IN. HG.)

mg/dscm = concentration of carbon monoxide in flue gas on a milligrams per dry standard cubic meter basis (60 °F, 29.92 IN. HG.)

$\dot{m}$ = emissions or mass rate of carbon monoxide on a LB/HR basis

$Q_{s,d}$ = volumetric flow rate of flue gas in dry standard cubic feet per minute

E = emission factor of carbon monoxide in pounds of carbon monoxide emitted per million BTU heat input (LB/MMBTU)

F_d = F-Factor of respective fuel in dry standard cubic feet of exhaust gas at 0% oxygen per million BTU of heat input (DSCF/MMBTU)

CALCULATION EQUATIONS

Chromotropic Acid Method for Formaldehyde

$$m_t = \frac{m_a \ V_{soln}}{V_{aliq}}$$

where:

m_t = mass of formaldehyde in total sample in ug

m_a = mass of formaldehyde in aliquot in ug

V_{soln} = volume of total sample in cc (500 cc normally)

V_{aliq} = volume of aliquot taken for analysis in cc

$$\text{PPM·DRY} = \frac{0.0283 \ m_t}{V_{std}}$$

PPM·WET = PPM.DRY (1-MC/100)

GR/DSCF = 5.45×10^{-4} (PPM·DRY)

mg/dscm = 1.249 (PPM·DRY)

$\dot{m}$ = 8.5714×10^{-3} (GR/DSCF) ($Q_{s,\ d}$)

where:

PPM·DRY = concentration of formaldehyde in parts per million by volume on a dry basis

PPM·WET = concentration of formaldehyde in parts per million by volume on an actual or wet basis

MC = moisture content of gas on a percent by volume basis

GR/DSCF = concentration of formaldehyde in gas on a grains per dry standard cubic foot basis (68 °F, 29.92 IN. HG.)

$\dot{m}$ = emission or mass rate of formaldehyde in pounds per hour (LB/HR)

V_{std} = dry gas volume as measured by the dry gas meter, corrected to standard conditions (at 68 °F and 1 atmosphere) DSCF

CALCULATION EQUATIONS

Gas Chromatographic Method for Phenol in Air

$$\text{PPM·DRY} = \frac{9.03 \text{ x } 10^{-3}\ m_t}{V_{std}}$$

$$\text{PP·WET} = \text{PPM·DRY (1-MC/100)}$$

$$\text{GR/DSCF} = 1.709 \text{ x } 10^{-3}\ \text{(PPM·DRY)}$$

$$\text{mg/dscm} = 3.913\ \text{(PPM·DRY)}$$

$$\dot{m} = 8.5714 \text{ x } 10^{-3}\ \text{(GR/DSCF)}\ (Q_{s,\,d})$$

where:

PPM·DRY = concentration of phenol in gas in parts per million by volume on a dry basis

PPM·WET = concentration of phenol in gas in parts per million by volume on an actual or wet basis

MC = moisture content of gas on a percent by volume basis

GR/DSCF = concentration of phenol in gas on a grains per dry standard cubic foot basis (68 °F, 29.92 IN. HG.)

$\dot{m}$ = emission or mass rate of phenol in pounds per hour (LB/HR)

$Q_{s,\,d}$ = volumetric flow rate of stack gas in dry standard cubic feet per minute (DSCFM)

CALCULATION OF PAH EMISSION RATES

in g/sec and 10^{-6}g/sec

$\dot{m}$ (g/sec)

$$= \quad 4.716 \times 10^{-10}\ C_s\ (\mathrm{ug/m^3})\ \ Q_{s,d}\ (\mathrm{DSCFM})$$

$\dot{m}$ (10^{-3}g/sec)

$$= \quad 4.716 \times 10^{-7}\ \mathrm{Ca}\ (\mathrm{ug/m^3})\ \ Q_{s,d}\ (\mathrm{DSCFM})$$

$\dot{m}$ (10^{-6}g/sec)

$$= \quad 4.716 \times 10^{-4}\ \mathrm{Cs}\ (\mathrm{ug/m^3})\ \ Q_{s,d}\ (\mathrm{DSCFM})$$

where:

Q_s = ug/dsm^3

$Q_{s,d}$ = DSCF/MIN

LP-HAYWARD

Oxides of Nitrogen

Report No. 4-3366

LB/HR Calculations

Line 1 Surface Dryer RTO Inlet

RUN	NOx ppm	Flow	LB/DSCF	LB/HR
1	48	26310	5.73E-06	9.046965
2	34	27727	4.06E-06	6.753403
3	39	25659	4.66E-06	7.168779
AVG	**40**	26565		**7.656382**

Line 1 Dryer RTO Outlet

RUN	NOx ppm	Flow	LB/DSCF	LB/HR
1	29	58322	3.46E-06	12.11633
2	29	57883	3.46E-06	12.02513
3	28	59575	3.34E-06	11.94986
AVG	**29**	58593		**12.03044**

Line 2 Core Dryer RTO Inlet

RUN	NOx ppm	Flow	LB/DSCF	LB/HR
1	24	26211	2.87E-06	4.506462
2	24	23955	2.87E-06	4.118587
3	19	25392	2.27E-06	3.45614
AVG	**22**	25186		**4.027063**

Line 1 Core Dryer RTO Inlet

RUN	NOx ppm	Flow	LB/DSCF	LB/HR
1	23	23320	2.75E-06	3.842353
2	28	23138	3.34E-06	4.64114
3	22	24468	2.63E-06	3.856222
AVG	**24**	23642		**4.113238**

Line 2 Surface Dryer RTO Inlet

RUN	NOx ppm	Flow	LB/DSCF	LB/HR
1	17	32179	2.03E-06	3.918883
2	25	32898	2.98E-06	5.891832
3	16	33198	1.91E-06	3.805158
AVG	**19**	32758		**4.538625**

Line 2 Dryer RTO Outlet

RUN	NOx ppm	Flow	LB/DSCF	LB/HR
1	24	64004	2.87E-06	11.00422
2	24	63029	2.87E-06	10.83659
3	23	63455	2.75E-06	10.45525
AVG	**24**	63496		**10.76535**

LP - HAYWARD

BENZENE CALCULATIONS

Line 2 Dryer RTO Outlet

Test/Run	Mass (ug)	Vstd (DSCF)	Concentration (ppm,d)	Concentration LB/DSCF	Flow DSCFM	Mass Rate (LB/HR)
9/1	2.2	2.149	0.011149	2.26E-09	66300	0.008978
9/2	4.8	2.114	0.024728	5.01E-09	65990	0.01982
9/3	3.4	2.112	0.017533	3.55E-09	65990	0.014052

Line 1 Dryer RTO Outlet

Test/Run	Mass (ug)	Vstd (DSCF)	Concentration (ppm,d)	Concentration LB/DSCF	Flow DSCFM	Mass Rate (LB/HR)
12/1	14	2.029	0.075146	1.52E-08	59060	0.053905
12/2	12	1.718	0.076071	1.54E-08	57020	0.052683
12/3	8.4	1.791	0.051079	1.03E-08	57020	0.035375

Report No. 4-3366

LOUISIANA-PACIFIC - Hayward

Line 2 Dryer Outlet

TEST #	RUN	MC%	CONC (ppmC,w)	GASFLOW (DSCFM)	MASSRATE (LB/HR)	AVERAGE (ppmC,w)	AVERAGE (LB/HR)		(GR/DSCF)
4	1	20.87	22.1	65964	3.44				0.0060885
	2	22.16	19.6	64723	3.05				0.0054892
	3	21.44	21.7	67196	3.47				0.0060216
				65961		21.133333	3.318639		

Line 2 Surface Dryer RTO Inlet

TEST #	RUN	MC%	CONC (ppmC,w)	GASFLOW (DSCFM)	MASSRATE (LB/HR)	AVERAGE (ppmC,w)	AVERAGE (LB/HR)		(GR/DSCF)
5	1	21.36	111.8	30194	8.02				0.0309924
	2	22.63	174.6	30077	12.68				0.0491958
	3	20	217.9	30767	15.66				0.0593778
				30346		168.1	12.12088		

Line 2 Core Dryer RTO Inlet

TEST #	RUN	MC%	CONC (ppmC,w)	GASFLOW (DSCFM)	MASSRATE (LB/HR)	AVERAGE (ppmC,w)	AVERAGE (LB/HR)		(GR/DSCF)
6	1	24.72	408.3	26463	26.82				0.1182378
	2	20.29	496	24829	28.87				0.1356517
	3	24.92	371.1	25486	23.54				0.1077515
				25592		425.13333	26.40899		

Line 1 Surface Dryer RTO Inlet

TEST #	RUN	MC%	CONC (ppmC,w)	GASFLOW (DSCFM)	MASSRATE (LB/HR)	AVERAGE (ppmC,w)	AVERAGE (LB/HR)		(GR/DSCF)
16	1	26.34	609.3	25252	39.03				0.180325
	2	31.96	651.3	24160	43.21				0.2086764
	3	25.2	207.9	24718	12.84				0.0605912
						489.5	31.69384		

Line 1 Dryer RTO Outlet

TEST #	RUN	MC%	CONC (ppmC,w)	GASFLOW (DSCFM)	MASSRATE (LB/HR)	AVERAGE (ppmC,w)	AVERAGE (LB/HR)		(GR/DSCF)
17	1	24.7	63.7	59055	9.33				0.0184417
	2	26.1	49.9	57018	7.19				0.0147202
	3	25.1	34	56588	4.80				0.0098959
						49.2	7.109621		

Line 1 Core Dryer RTO Inlet

TEST #	RUN	MC%	CONC (ppmC,w)	GASFLOW (DSCFM)	MASSRATE (LB/HR)	AVERAGE (ppmC,w)	AVERAGE (LB/HR)		(GR/DSCF)
18	1	21.02	432.6	25437	26.03				0.1194059
	2	18.51	282	26512	17.14				0.0754399
	3	18.91	302.4	29134	20.30				0.0812963
						339	21.15959		

APPENDIX M

SAMPLING TRAIN CALIBRATION DATA

INTERPOLL LABORATORIES

EPA Method 5 Gas Metering System

Quality Control Check Data Sheet

Job LP/Hayward

Date 7-13-94

Operator DM

Module No. 2

Instructions: Operate the control module at a flow rate equal to ^H@ for 10 minutes before attaching the umbilical. Record the following data:

Bar press 28.94 in. Hg. T = .9974 ^H@ 1.77 in. W.C.

Time (min)	Volume (CF)	Meter Temp. (°F)	
		Inlet	Outlet
[redacted]	185.60	[redacted]	[redacted]
2.5	187.52	65	63
5.0	189.45	74	63
7.5	191.39	77	64
10	193.30	79	64
[redacted]	V_m= 7.7	Avg(t_m)=68.6 °F	

Calculate Y_{cn} as follows:

$$Y_{cn} = \frac{1.786}{T\ V_m}\left[\frac{(t_m + 460)}{P_b}\right]^{0.5}$$

$$Y_{cn} = \frac{1.786}{(.9974)(7.7)}\left[\frac{(68.6) + 460}{(28.94)}\right]^{0.5}$$

Y_{cn} = .994

If Y_{cn} is not within the range of 0.97 to 1.03, "the volume metering system should be investigated before beginning."

CFR Title 40, Part 60, Appendix A, Method 5, Section 4.4.1

S-432

INTERPOLL LABORATORIES

EPA Method 5 Gas Metering System
Quality Control Check Data Sheet

Job CP / HAYWARD

Date 7-14-94

Operator Bob

Module No. 2

Instructions: Operate the control module at a flow rate equal to ^H@ for 10 minutes before attaching the umbilical. Record the following data:

Bar press 2885 in. Hg. T = .9974 ^H@ 1.77 in. W.C.

Time (min)	Volume (CF)	Meter Temp. (°F)	
		Inlet	Outlet
[redacted]	(338.70	[redacted]	
2.5	340.64	71	64
5.0	342.55	77	64
7.5	344.52	79	64
10	346.42	80	64
[redacted]	V_m = 7.72	Avg(t_m) = 70.4 °F	

Calculate Y_{cn} as follows:

$$Y_{cn} = \frac{1.786}{T\ V_m}\left[\frac{(t_m + 460)}{P_b}\right]^{0.5}$$

$$Y_{cn} = \frac{1.786}{(.9974)(7.72)}\left[\frac{(70.4) + 460}{(28.85)}\right]^{0.5}$$

Y_{cn} = .995

If Y_{cn} is not within the range of 0.97 to 1.03, "the volume metering system should be investigated before beginning."

CFR Title 40, Part 60, Appendix A, Method 5, Section 4.4.1

S-432

INTERPOLL LABORATORIES
EPA Method 5 Gas Metering System Quality Control Check Data Sheet

Job LP / Hayward

Date 7-15-94

Operator D/M

Module No. 2

Instructions: Operate the control module at a flow rate equal to ^H@ for 10 minutes before attaching the umbilical. Record the following data:

Bar press 28.86 in. Hg. $_T$ = .9974 ^H@ 1.77 in. W.C.

Time (min)	Volume (CF)	Meter Temp. (°F)	
		Inlet	Outlet
[redacted]	(542.90)	[redacted]	[redacted]
2.5	544.55	72	65
5.0	546.74	74	65
7.5	548.69	77	65
10	550.64	80	65
[redacted]	V_m= 7.74	Avg(t_m)= 70.4 °F	

Calculate Y_{cn} as follows:

$$Y_{cn} = \frac{1.786}{_T\ V_m}\left[\frac{(t_m + 460)}{P_b}\right]^{0.5}$$

$$Y_{cn} = \frac{1.786}{(.9974)(7.74)}\left[\frac{(70.4) + 460}{(28.86)}\right]^{0.5}$$

Y_{cn} = .992

If Y_{cn} is not within the range of 0.97 to 1.03, "the volume metering system should be investigated before beginning."

CFR Title 40, Part 60, Appendix A, Method 5, Section 4.4.1

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INTERPOLL LABORATORIES
EPA Method 5 Gas Metering System Quality Control Check Data Sheet

Job LP / Hayward

Date 7-12-94

Operator DM

Module No. 4

Instructions: Operate the control module at a flow rate equal to ^H@ for 10 minutes before attaching the umbilical. Record the following data:

Bar press 28.71 in. Hg. T = .9962 ^H@ 1.89 in. W.C.

Time (min)	Volume (CF)	Meter Temp. (°F)	
		Inlet	Outlet
	(74.50		
2.5	76.40	72	68
5.0	78.29	74	69
7.5	80.17	76	70
10	82.08	77	71
	V_m = 7.58	Avg(t_m) = 72 °F	

Calculate Y_{cn} as follows:

$$Y_{cn} = \frac{1.786}{T\ V_m}\left[\frac{(t_m + 460)}{P_b}\right]^{0.5}$$

$$Y_{cn} = \frac{1.786}{(.9962)(7.58)}\left[\frac{(72) + 460}{(28.71)}\right]^{0.5}$$

Y_{cn} = 1.02

If Y_{cn} is not within the range of 0.97 to 1.03, "the volume metering system should be investigated before beginning."

CFR Title 40, Part 60, Appendix A, Method 5, Section 4.4.1

S-432

INTERPOLL LABORATORIES

EPA Method 5 Gas Metering System
Quality Control Check Data Sheet

Job LP/HAYWARD　　Date 7-13-94

Operator　　Module No. 4

Instructions: Operate the control module at a flow rate equal to ^H@ for 10 minutes before attaching the umbilical. Record the following data:

Bar press 28.94 in. Hg. τ = .9962 ^H@ 1.89 in. W.C.

Time (min)	Volume (CF)	Meter Temp. (°F)	
		Inlet	Outlet
[redacted]	(190.00)	[redacted]	
2.5	191.90	68	63
5.0	193.80	70	64
7.5	195.77	72	65
10	197.76	73	66
[redacted]	V_m= 7.76	Avg(t_m)= 67.6 °F	

Calculate Y_{cn} as follows:

$$Y_{cn} = \frac{1.786}{\tau\ V_m}\left[\frac{(t_m + 460)}{P_b}\right]^{0.5}$$

$$Y_{cn} = \frac{1.786}{(\quad)(\quad)}\left[\frac{(67.6) + 460}{(28.94)}\right]^{0.5} \quad 4.269$$

Y_{cn} = .9562

If Y_{cn} is not within the range of 0.97 to 1.03, "the volume metering system should be investigated before beginning."

CFR Title 40, Part 60, Appendix A, Method 5, Section 4.4.1

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INTERPOLL LABORATORIES
EPA Method 5 Gas Metering System
Quality Control Check Data Sheet

Job L.P. / Hayward, Wi

Date 7-14-94

Operator M. Kaehler

Module No. 4

Instructions: Operate the control module at a flow rate equal to ^H@ for 10 minutes before attaching the umbilical. Record the following data:

Bar press 28.85 in. Hg. Υ = .9962 ^H@ 1.89 in. W.C.

Time (min)	Volume (CF)	Meter Temp. (°F)	
		Inlet	Outlet
[redacted]	(369.70)	[redacted]	
2.5	371.63	62	62
5.0	373.54	63	62
7.5	375.45	67	63
10	377.37	69	63
[redacted]	V_m= 7.67	Avg(t_m)= 63.975 °F	

Calculate Y_{cn} as follows:

$$Y_{cn} = \frac{1.786}{\Upsilon\, V_m}\left[\frac{(t_m + 460)}{P_b}\right]^{0.5}$$

$$Y_{cn} = \frac{1.786}{(.9962)(7.67)}\left[\frac{(63.975) + 460}{(28.85)}\right]^{0.5}$$

Y_{cn} = .996

If Y_{cn} is not within the range of 0.97 to 1.03, "the volume metering system should be investigated before beginning."

CFR Title 40, Part 60, Appendix A, Method 5, Section 4.4.1

S-432

Interpoll Laboratories, Inc.
(612) 786-6060

EPA Method 5 Gas Metering System
Quality Control Check Data Sheet

Job LP/Hayward Date 7-15-94

Operator DM Module No. 4

Instructions: Operate the control module at a flow rate equal to ΔH@ for 10 minutes before attaching the umbilical. Record the following data:

Bar press 28.87 in. Hg. γ = .9963 ΔH@ 1.54 in. W.C.

Time (min)	Volume (CF)	Meter Temp. (°F)	
		Inlet	Outlet
	(525.30)		
2.5	527.23	70	66
5.0	528.18	71	67
7.5	531.06	72	67
10	533.00	73	68
	V_m = 7.7	Avg (t_m) = 69.3 °F	

Calculate Y_{cn} as follows:

$$Y_{cn} = \frac{1.786}{\gamma\ V_m}\left[\frac{(t_m + 460)}{P_b}\right]^{0.5}$$

$$Y_{cn} = \frac{1.786}{(.9963)(7.7)}\left[\frac{(69.3) + 460}{(28.87)}\right]^{0.5}$$

Y_{cn} = .997

If Y_{cn} is not within the range of 0.97 to 1.03, "the volume metering system should be investigated before beginning."

CFR Title 40, Part 60, Appendix A, Method 5, Section 4.4.1

INTERPOLL LABORATORIES
EPA Method 5 Gas Metering System
Quality Control Check Data Sheet

Job CP / HAYWARD
Date 7-12-94

Operator Bob
Module No. 2

Instructions: Operate the control module at a flow rate equal to ^H@ for 10 minutes before attaching the umbilical. Record the following data:

Bar press 28.71 in. Hg. T = .9947 ^H@ 1.95 in. W.C.

Time (min)	Volume (CF)	Meter Temp. (°F)	
		Inlet	Outlet
[redacted]	(846.00)	[redacted]	
2.5	847.93	72	68
5.0	849.87	74	68
7.5	851.80	76	71
10	853.73	77	72
[redacted]	V_m= 7.73	Avg(t_m)=72.25 °F	

Calculate Y_{cn} as follows:

$$Y_{cn} = \frac{1.786}{T\ V_m}\left[\frac{(t_m + 460)}{P_b}\right]^{0.5}$$

$$Y_{cn} = \frac{1.786}{(.9947)(\quad)}\left[\frac{(72.25) + 460}{(28.71)}\right]^{0.5}$$

Y_{cn} = .9999

If Y_{cn} is not within the range of 0.97 to 1.03, "the volume metering system should be investigated before beginning."

CFR Title 40, Part 60, Appendix A, Method 5, Section 4.4.1

S-432

Interpoll Laboratories, Inc.
(612) 786-6060

EPA Method 5 Gas Metering System
Quality Control Check Data Sheet

Job L.P. / Hayward, WI

Date 7-12-94

Operator M. Koehler

Module No. 10

Instructions: Operate the control module at a flow rate equal to ^H@ for 10 minutes before attaching the umbilical. Record the following data:

Bar press 29.71 in. Hg. γ = .9930 ^H@ 1.77 in. W.C.

Time (min)	Volume (CF)	Meter Temp. (°F)	
		Inlet	Outlet
[redacted]	(506.60)	[redacted]	
2.5	508.57	77	70
5.0	510.54	78	70
7.5	512.50	78	71
10	514.36	78	72
[redacted]	V_m= 7.26	Avg(t_m)= 74.25 °F	

Calculate Y_{cn} as follows:

$$Y_{cn} = \frac{1.786}{\gamma \; V_m}\left[\frac{(t_m + 460)}{P_b}\right]^{0.5}$$

$$Y_{cn} = \frac{1.786}{(.9930)(7.26)}\left[\frac{(74.25) + 460}{(28.71)}\right]^{0.5}$$

Y_{cn} = 1.000

If Y_{cn} is not within the range of 0.97 to 1.03, "the volume metering system should be investigated before beginning."

CFR Title 40, Part 60, Appendix A, Method 5, Section 4.4.1

S-432R

INTERPOLL LABORATORIES
EPA Method 5 Gas Metering System
Quality Control Check Data Sheet

Job LP / Hayward

Date 7-13

Operator DM

Module No. 10

Instructions: Operate the control module at a flow rate equal to ^H@ for 10 minutes before attaching the umbilical. Record the following data:

Bar press 28.94 in. Hg. γ = .9930 ^H@ 1.77 in. W.C.

Time (min)	Volume (CF)	Meter Temp. (°F)	
		Inlet	Outlet
[redacted]	830.60	[redacted]	[redacted]
2.5	832.58	69	62
5.0	834.52	72	62
7.5	836.49	74	63
10	838.41	75	63
[redacted]	V_m=7.81	Avg(t_m)=67.5 °F	

Calculate Y_{cn} as follows:

$$Y_{cn} = \frac{1.786}{\gamma \; V_m}\left[\frac{(t_m + 460)}{P_b}\right]^{0.5}$$

$$Y_{cn} = \frac{1.786}{(.9930)(7.81)}\left[\frac{(67.5) + 460}{(28.94)}\right]^{0.5}$$

Y_{cn} = .983

If Y_{cn} is not within the range of 0.97 to 1.03, "the volume metering system should be investigated before beginning."

CFR Title 40, Part 60, Appendix A, Method 5, Section 4.4.1

S-432

INTERPOLL LABORATORIES
EPA Method 5 Gas Metering System
Quality Control Check Data Sheet

Job LP / Hayward

Date 7-14-94

Operator DM

Module No. 10

Instructions: Operate the control module at a flow rate equal to ^H@ for 10 minutes before attaching the umbilical. Record the following data:

Bar press 28.85 in. Hg. T = .9930 ^H@ 1.77 in. W.C.

Time (min)	Volume (CF)	Meter Temp. (°F)	
		Inlet	Outlet
	(69.20)		
2.5	71.12	70	64
5.0	73.03	71	64
7.5	74.95	71	64
10	76.92	73	64
	V_m= 7.72	Avg(t_m)= 67.6 °F	

Calculate Y_{cn} as follows:

$$Y_{cn} = \frac{1.786}{T\ V_m}\left[\frac{(t_m + 460)}{P_b}\right]^{0.5}$$

$$Y_{cn} = \frac{1.786}{(.9930)(7.72)}\left[\frac{(67.6) + 460}{(28.85)}\right]^{0.5}$$

Y_{cn} = .996

If Y_{cn} is not within the range of 0.97 to 1.03, "the volume metering system should be investigated before beginning."

CFR Title 40, Part 60, Appendix A, Method 5, Section 4.4.1

S-432

Interpoll Laboratories, Inc.
(612) 786-6020

Meter Box Calibration and Usage Status

Date of Report: July 20, 1994

Meter Box No. : 2 (Rockwell Dry Test Meter Serial No. 964551)

Date of Last Calibration: March 24, 1994
Calibration Technician: E. Trowbridge
Wet Test Meter No.: American Meter AL-20

Date of Use	Report No.	Initial Meter Reading	Final Meter Reading	Volume/Job (cu. ft.)	Total Volume* (cu. ft.)
March 30, 1994	4-2559	994.50	1149.99	155.49	155.49
April 6, 1994	4-2598	1160.80	1592.09	431.29	586.78
June 8, 1994	4-3097	1781.90	2184.95	403.05	989.83
July 13, 1994	4-3366	2193.50	2691.66	498.16	1487.99

* Total volume through meter since last calibration.

Interpoll Laboratories, Inc.
(612) 786-6020

Meter Box Calibration and Usage Status

Date of Report: July 20, 1994

Meter Box No. : 4 (Rockwell Dry Test Meter Serial No. 964552)

Date of Last Calibration: July 07, 1994
Calibration Technician: S. Bainville
Wet Test Meter No.: American Meter AL-20

Date of Use	Report No.	Initial Meter Reading	Final Meter Reading	Volume/Job (cu. ft.)	Total Volume* (cu. ft.)
July 12, 1994	4-3366	84.10	703.50	619.40	619.40

* Total volume through meter since last calibration.

Interpoll Laboratories, Inc.
(612) 786-6020

Meter Box Calibration and Usage Status

Date of Report: July 20, 1994

Meter Box No. : 7 (Rockwell Dry Test Meter Serial No. 965550)

Date of Last Calibration: April 26, 1994
Calibration Technician: E. Trowbridge
Wet Test Meter No.: American Meter AL-20

Date of Use	Report No.	Initial Meter Reading	Final Meter Reading	Volume/Job (cu. ft.)	Total Volume* (cu. ft.)
July 06, 1994	4-3289	737.70	843.74	106.04	106.04
July 12, 1994	4-3366	853.90	991.80	137.90	243.94

* Total volume through meter since last calibration.

Interpoll Laboratories, Inc.
(612) 786-6020

Meter Box Calibration and Usage Status

Date of Report: July 20, 1994

Meter Box No. : 10 (Rockwell Dry Test Meter Serial No. 1334112)

Date of Last Calibration: May 31, 1994
Calibration Technician: E. Trowbridge
Wet Test Meter No.: American Meter AL-20

Date of Use	Report No.	Initial Meter Reading	Final Meter Reading	Volume/Job (cu. ft.)	Total Volume* (cu. ft.)
June 01, 1994	4-3020	104.50	570.30	465.80	465.80
June 09, 1994	4-3097	578.60	717.65	139.05	604.85
June 14, 1994	4-3117	726.90	1578.75	851.85	1456.70
June 21, 1994	4-3188	1580.20	1846.88	266.68	1723.38
June 22, 1994	4-3189	1847.30	1947.16	99.86	1823.24
June 28, 1994	4-3255	1957.30	2068.23	110.93	1934.17
June 29, 1994	4-3256	2076.63	2196.50	119.87	2054.04
June 30, 1994	4-3257	2198.20	2310.51	112.31	2166.35
July 06, 1994	4-3287	2319.50	2423.53	104.03	2270.38
July 07, 1994	4-3288	2424.00	2498.60	74.6	2344.98
July 12, 1994	4-3366	2514.40	3243.87	729.47	3074.45

* Total volume through meter since last calibration.

Interpoll Laboratories, Inc.
(612) 786-6020

Meter Box Calibration and Usage Status

Date of Report: July 20, 1994

Meter Box No. : 2-S (Rockwell Dry Test Meter Serial No. 69185)

Date of Last Calibration: January 13, 1994
Calibration Technician: S. Bainville
Wet Test Meter No.: American Meter AL-17 (0.05 CF/REV)

Date of Use	Report No.	Initial Meter Reading	Final Meter Reading	Volume/Job (cu. ft.)	Total Volume* (cu. ft.)
January 20, 1994	4-2118	396.000	398.532	2.532	2.532
March 04, 1994	4-2384	406.300	433.333	27.033	29.565
May 11, 1994	4-2839	434.450	436.850	2.400	31.965
June 09, 1994	4-3097	436.910	443.688	6.778	38.743
June 23, 1994	4-3193	443.705	447.205	3.500	42.243
June 29, 1994	4-3250	448.375	473.392	25.017	67.260
July 13, 1994	4-3366	478.310	489.477	11.167	78.427

* Total volume through meter since last calibration.

Date 3-24-94

Bar. Press. 29.00 in. Hg

INTERPOLL LABORATORIES, INC.
METER CALIBRATION SHEET
EPA METHOD 5

Control Module No. 2
Serial No. DTM 964551
Wet Test Meter No. AL-20
Technician

ΔH (in. WC)		Gas Volume Wet Test Meter (ft³)	* Cal. Index φ (%)	* Diff. Wet Test Meter ΔP_w (in.WC)	Gas Volume Dry test meter (ft³)		Gas temperatures			Time θ (min/sec)	Meter Coeff. Y	Orifice Const. ΔH@	C_f
nominal	actual				V_{di}	V_{df}	Wet Test t_w (°F)	Dry Test t_{di} (°F)	Dry Test t_{do} (°F)				
0.5	.5	2	99.85	0.01	965.500	967.525	66	83	68	4/58	1.0026	1.75	
1.2	1.2	3	99.91	0.025	962.000	965.050	66	80	67	4/46	.9936	1.72	
2.0	2.0	3	99.93	0.055	968.000	971.061	66	90	70	3/46	1.0002	1.77	
3.3	3.3	5	100.00	0.09	971.500	976.642	66	96	72	4/56	.9970	1.79	
4.7	4.7	5	100.02	0.12	977.000	982.161	66	99	73	4/10	.9937	1.81	
	2	3	4	5	6	7	8	9	10	11/12	.9974	1.77	

Positive leak check performed by

Meter was in tolerance ☒

Meter was not in tolerance ☐; readjusted linkage

Meter was not in tolerance ☐; changed dry test meters

Approved by Daniel Deep Date 4/4/94

* Based on AL-20 wet test meter calibration in Nov. 1991 against Bell Prover (NBS Traceable) - Carl Poe Co.

S0102RR 11/91

Date 7-7-94

Bar. Press. 28.82 in. Hg

INTERPOLL LABORATORIES, INC.
METER CALIBRATION SHEET
EPA METHOD 6

Control Module No. 4
Serial No. DTM 964552
Wet Test Meter No. AL-20
Technician S. BAINVICK

ΔH (in. WC)		Gas Volume Wet Test Meter (ft³)	* Cal. Index ϕ (%)	* Diff. Wet Test Meter $ΔP_w$ (in.WC)	Gas Volume Dry test meter (ft³)		Gas temperatures			Time θ (min/sec)	Meter Coeff. Y	Orifice Const. ΔH@	C_f
nominal	actual				V_{di}	V_{df}	Wet Test t_w (°F)	Dry Test t_{di} (°F)	Dry Test t_{do} (°F)				
0.5	0.5	2	99.85	0.01	29.500	31.540	73	83	79	5/07	.9923	1.89	
1.2	1.2	3	99.91	0.025	44.500	47.575	73	90	83	4/55	.9963	1.84	
2.0	2.0	3	99.93	0.055	26.000	29.041	73	83	79	3/50	.9954	1.89	
3.3	3.3	5	100.00	0.09	39.000	44.092	73	93	83	5/02	1.0009	1.90	
4.7	4.7	6	100.02	0.12	33.000	38.072	73	89	81	4/15	.9959	1.94	
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	7	[illegible]	[illegible]	10	11/12	.9962	1.89	

Positive leak check performed by SLB

Meter was in tolerance ☒

Meter was not in tolerance ☐; readjusted linkage

Meter was not in tolerance ☐; changed dry test meters

Approved by Daniel J. Dey Date 7/18/94

* Based on AL-20 wet test meter calibration in Nov. 1991 against Bell Prover (NBS Traceable) - Carl Poe Co.

S0102RR ./91

Date 4-26-94

Bar. Press. 28.36 in. Hg

INTERPOLL LABORATORIES, INC.
METER CALIBRATION SHEET
EPA METHOD 5

Control Module No. 7

Serial No. DTM 964550

Wet Test Meter No. AL-20

Technician

ΔH (in. WC)		Gas Volume Wet Test Meter (ft³)	* Cal. Index θ (%)	* Diff. Wet Test Meter ΔP_w (in. WC)	Gas Volume Dry test meter (ft³)		Gas temperatures			Time θ (min/sec)	Meter Coeff. Y	Orifice Const. ΔH@	C_f
							Wet Test t_w (°F)	Dry Test					
nominal	actual				V_{di}	V_{df}		t_{di} (°F)	t_{do} (°F)				
0.6	.5	2	99.85	0.01	693.700	695.728	69	80	75	5/02	.9992	1.85	
1.2	1.2	3	99.91	0.025	690.500	693.555	69	79	75	4/58	.9928	1.92	
2.0	2.0	3	99.93	0.055	696.000	699.060	69	84	77	3/54	.9957	1.96	
3.3	3.3	5	100.00	0.09	700.000	705.124	69	89	78	5/06	.9938	1.98	
4.7	4.7	5	100.02	0.12	705.500	710.625	69	90	79	4/20	.9919	2.02	
	2	3	4	5	6	7	8	9	10	11/12	.9947	1.95	

Positive leak check performed by

Meter was in tolerance ☒

Meter was not in tolerance ☐; readjusted linkage

Meter was not in tolerance ☐; changed dry test meters

Approved by Date 5/2/94

* Based on AL-20 wet test meter calibration in Nov. 1991 against Bell Prover (NBS Traceable) - Carl Poe Co.

SO102RR 11/91

Date 5-31-94

Bar. Press. 29.12 in. Hg

INTERPOLL LABORATORIES, INC.
METER CALIBRATION SHEET
EPA METHOD 5

Control Module No. 10

Serial No. DTM 1334112

Wet Test Meter No. AL-20

Technician G. Traudt

ΔH (in. WC)		Gas Volume Wet Test Meter (ft³)	* Cal. Index δ (%)	* Diff. Wet Test Meter ΔP_w (in.WC)	Gas Volume Dry test meter (ft³)		Gas temperatures			Time θ (min/sec)	Meter Coeff. Y	Orifice Const. ΔH@	C_f
							Wet Test	Dry Test					
nominal	actual				V_{di}	V_{df}	t_w (°F)	t_{di} (°F)	t_{do} (°F)				
0.5	.5	2	99.85	0.01	91.000	93.059	69	89	73	4/56	.9906	1.72	
1.2	1.2	3	99.91	0.025	84.000	87.073	69	68	7[illegible]	4/52	.9916	1.79	
2.0	2.0	3	99.93	0.055	87.500	90.556	69	92	72	3/46	.9999	1.77	
3.3	3.3	5	100.00	0.09	93.500	98.640	69	95	74	4/55	.9927	1.79	
4.7	4.7	5	100.02	0.12	99.000	104.164	69	99	76	4/09	.9902	1.80	
											.9930	1.77	

Positive leak check performed by GT

Meter was in tolerance ☒

Meter was not in tolerance ☐; readjusted linkage

Meter was not in tolerance ☐; changed dry test meters

Approved by Daniel [illegible] Date 6/6/94

* Based on AL-20 wet test meter calibration in Nov. 1991 against Bell Prover (NBS Traceable) - Carl Poe Co.

Date 1-13-94

Bar. Press. 29.14 in. Hg

INTERPOLL LABORATORIES
MINIMODULE CALIBRATION SHEET
Flow Rate Range 0-0.13 CFM
(0-4 LPM)

Meter Box No. 2 5

Serial No. DTM 69185

Wet Test Meter No. AL-17 (.05 CF/REV)

Technician S. BAINVILLE

Rotameter Reading (cc/min)	ΔP$_d$ (IN/WC)	Gas Volume Wet Test Meter (ft³)	** Cal. Index φ (%)	Diff. Wet Test Meter ΔP$_w$ (in.WC)	Gas Volume Dry test meter (ft³) V$_{di}$	V$_{df}$	Gas temperatures Wet Test t$_w$ (°F)	Dry Test t$_{di}$ (°F)		Time θ (min/sec)	Meter Coeff. Y	Rotameter Coeff. Z
1000	.001	.3	99.55	0.04	394.800	395.108	67	84			1.0081	
1000	.001	.3	99.55	0.04	395.200	395.510	67	90			1.0089	
1000	.001	.3	99.55	0.04	395.600	395.913	67	94			1.0065	
1	2	3	4	5	6	7	8	9		10/11 Average:	1.0078	

Meter was in tolerance ☒

Meter was not in tolerance ☐; readjusted linkage

Meter was not in tolerance ☐; changed dry test meters

Gas Meter Bimetallic Therm. Calibration/Verification*

☐ ≥ ± 5°F (Out of control) ☐ Recalibrated / /

☒ ≤ ± 5°F (In control) ☒ No action required

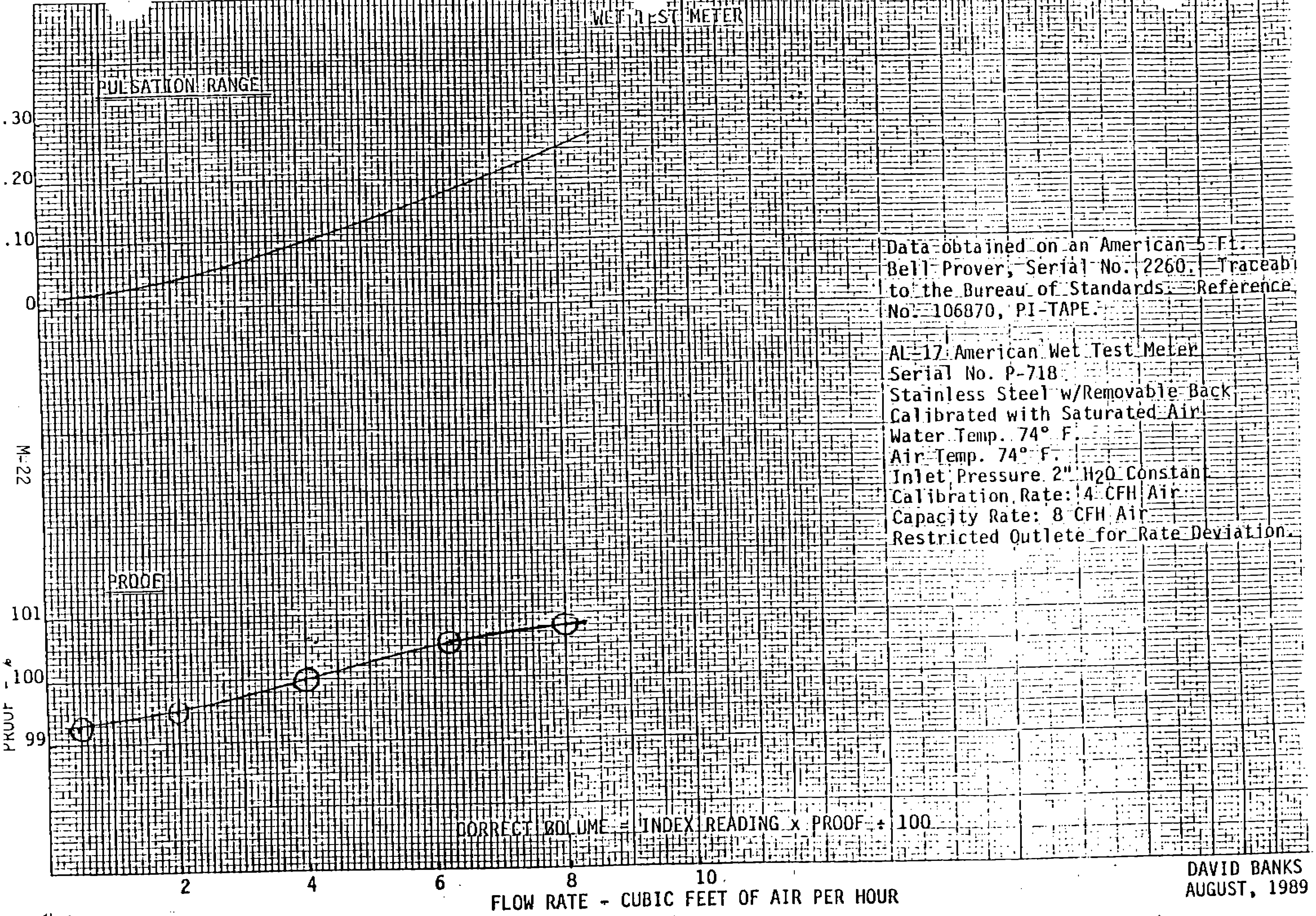
Approved by ______ Date 1/14/94

* Verified against mercury in glass thermometer or calibrated platinum resistance thermometer.

** Based on AL-17 wet test meter calibration in August 1989 against Bell Prover (NBS Traceable) - Carl Poe Co.

S0102R 8/89

DIFFERENTIAL PRESSUR - PROOF CALIBRATION CURVE
WET TEST METER



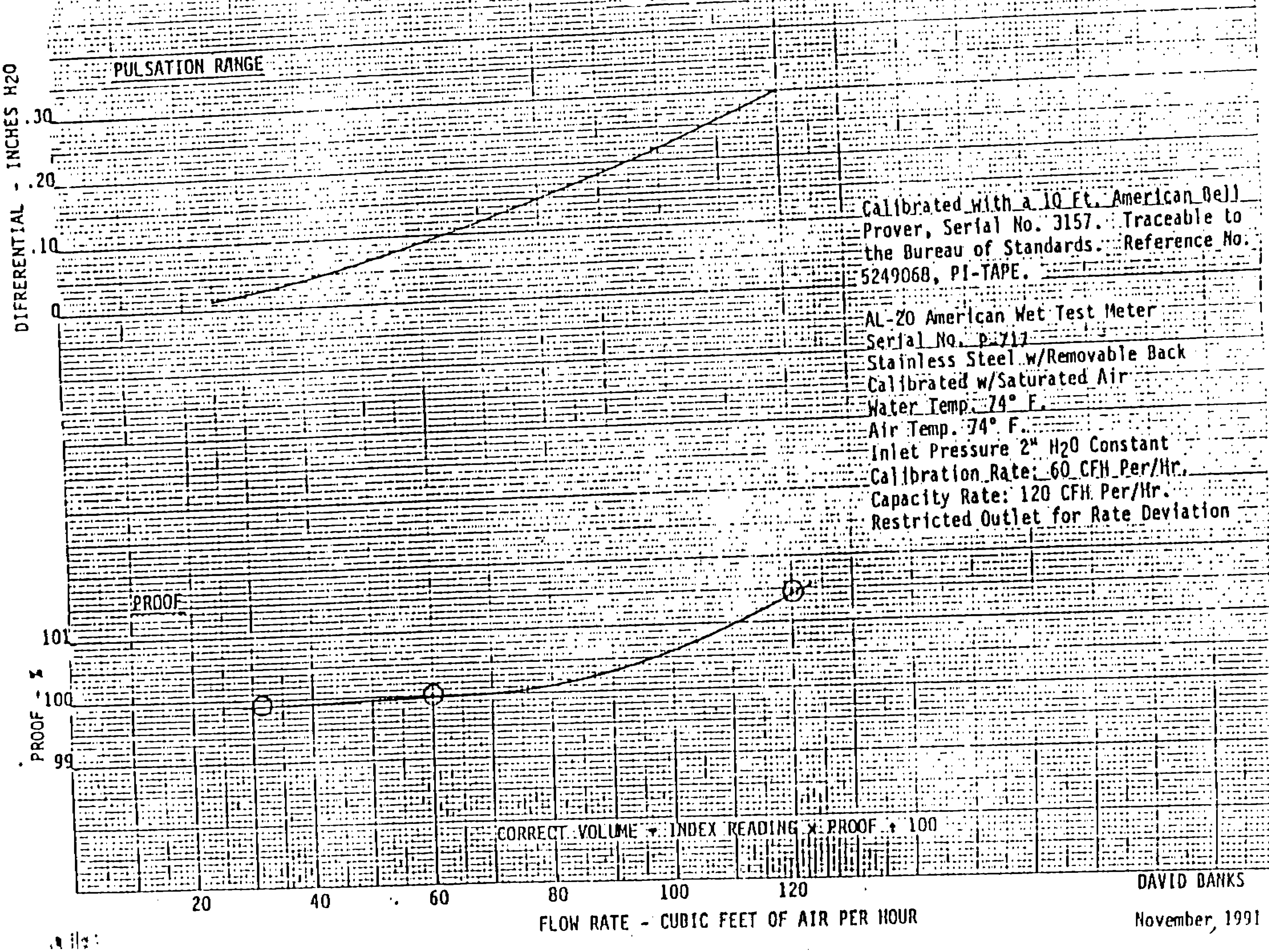
Data obtained on an American 5 Ft.
Bell Prover, Serial No. 2260. Traceab
to the Bureau of Standards. Reference
No. 106870, PI-TAPE.

AL-17 American Wet Test Meter
Serial No. P-718
Stainless Steel w/Removable Back
Calibrated with Saturated Air
Water Temp. 74° F.
Air Temp. 74° F.
Inlet Pressure 2" H_2O Constan
Calibration Rate: 4 CFH Air
Capacity Rate: 8 CFH Air
Restricted Outlete for Rate Deviation.

CORRECT VOLUME = INDEX READING x PROOF ÷ 100

DAVID BANKS
AUGUST, 1989

DIFFERENTIAL PRESSURE AND PROOF CALIBRATION CURVES
WET TEST METER



Calibrated With a 10 Ft. American Bell Prover, Serial No. 3157. Traceable to the Bureau of Standards. Reference No. 5249068, PI-TAPE.

AL-20 American Wet Test Meter
Serial No. P-717
Stainless Steel w/Removable Back
Calibrated w/Saturated Air
Water Temp. 74° F.
Air Temp. 74° F.
Inlet Pressure 2" H_2O Constant
Calibration Rate: 60 CFH Per/Hr.
Capacity Rate: 120 CFH Per/Hr.
Restricted Outlet for Rate Deviation

DAVID DANKS

November, 1991

Interpoll Laboratories, Inc.
(612) 786-6020

Nozzle Calibration
Data Sheet

Date of Calibration: 07-12-94 Nozzle Number 3-4

Technician: Mark Kaehler

The nozzle is rotated in 60 degree increments and the diameter at each point is measured to the nearest 0.001 inch. The observed readings and average are shown below.

Position	Diameter (inches)
1	.246
2	.246
3	.244
Average:	.245

Interpoll Laboratories, Inc.
(612) 786-6020

Nozzle Calibration
Data Sheet

Date of Calibration: 07-12-94

Technician: Bob Aschenbach

Nozzle Number 5-3

The nozzle is rotated in 60 degree increments and the diameter at each point is measured to the nearest 0.001 inch. The observed readings and average are shown below.

Position	Diameter (inches)
1	.195
2	.195
3	.197
Average:	.195

Interpoll Laboratories, Inc.
(612) 786-6020

Nozzle Calibration
Data Sheet

Date of Calibration: 07-12-94

Technician: Dennis Marso

Nozzle Number 7-3

The nozzle is rotated in 60 degree increments and the diameter at each point is measured to the nearest 0.001 inch. The observed readings and average are shown below.

Position	Diameter (inches)
1	.185
2	.184
3	.186
Average:	.185

Interpoll Laboratories, Inc.
(612) 786-6020

Nozzle Calibration
Data Sheet

Date of Calibration: 07-12-94
Technician: Mark Kaehler

Nozzle Number Glass

The nozzle is rotated in 60 degree increments and the diameter at each point is measured to the nearest 0.001 inch. The observed readings and average are shown below.

Position	Diameter (inches)
1	.303
2	.302
3	.303
Average:	.303

Interpoll Laboratories, Inc.
(612) 786-6020

Nozzle Calibration
Data Sheet

Date of Calibration: 07-13-94

Technician: Mark Kaehler

Nozzle Number 8D-4

The nozzle is rotated in 60 degree increments and the diameter at each point is measured to the nearest 0.001 inch. The observed readings and average are shown below.

Position	Diameter (inches)
1	.237
2	.237
3	.237
Average:	.237

Interpoll Laboratories, Inc.
(612) 786-6020

Nozzle Calibration
Data Sheet

Date of Calibration: 07-13-94

Technician: Ed Trowbridge

Nozzle Number Glass

The nozzle is rotated in 60 degree increments and the diameter at each point is measured to the nearest 0.001 inch. The observed readings and average are shown below.

Position	Diameter (inches)
1	.303
2	.303
3	.302
Average:	.303

Interpoll Laboratories, Inc.
(612) 786-6020

Nozzle Calibration
Data Sheet

Date of Calibration: 07-14-94

Technician: Mark Kaehler

Nozzle Number 3-4

The nozzle is rotated in 60 degree increments and the diameter at each point is measured to the nearest 0.001 inch. The observed readings and average are shown below.

Position	Diameter (inches)
1	.246
2	.246
3	.244
Average:	.245

Interpoll Laboratories, Inc.
(612) 786-6020

Nozzle Calibration
Data Sheet

Date of Calibration: 07-14-94 Nozzle Number 5-3

Technician: Bob Aschenbach

The nozzle is rotated in 60 degree increments and the diameter at each point is measured to the nearest 0.001 inch. The observed readings and average are shown below.

Position	Diameter (inches)
1	.195
2	.195
3	.197
Average:	.195

Interpoll Laboratories, Inc.
(612) 786-6020

Nozzle Calibration
Data Sheet

Date of Calibration: 07-14-94 Nozzle Number 8-4
Technician: Dennis Marso

The nozzle is rotated in 60 degree increments and the diameter at each point is measured to the nearest 0.001 inch. The observed readings and average are shown below.

Position	Diameter (inches)
1	.243
2	.243
3	.243
Average:	.243

Interpoll Laboratories, Inc.
(612) 786-6020

Nozzle Calibration
Data Sheet

Date of Calibration: 07-15-94
Technician: Mark Kaehler

Nozzle Number 8D-4

The nozzle is rotated in 60 degree increments and the diameter at each point is measured to the nearest 0.001 inch. The observed readings and average are shown below.

Position	Diameter (inches)
1	.237
2	.237
3	.237
Average:	.237

Interpoll Laboratories, Inc.

Temperature Measurement Device Calibration Sheet

Unit under test:
Vendor Omega
Model HH81
Range 0 - 2000 °F
Date of Calibration 7-8-94
Serial Number 735X1495 PDT-3
Thermocouple Type K
Technician Mark Kaeklen

Method of Calibration:

☐ Comparison against ASTM mercury in glass thermometer using a thermostatted and insulated aluminum block designed to provide uniform temperature. The temperature is adjusted by adjusting the voltage on the block heater cartridge.

☑ Omega Model CL-300 Type K Thermocouple Simulator which provides 22 precise temperature equivalent millivolt signals. The CL-300 is cold junction compensated. Calibration accuracy is ± 0.1% of span (2100 °F) ± 1 degree (for negative temperatures add ± 2 degrees. The CL-300 simulates exactly the millivoltage of a Type K thermocouple at the indicated temperature.

Desired Temp (°F) Nominal	Temperature of Standard or Simulated Temp (°F)	Response of Unit Under Test (°F)	Deviation	
			Δt (°F)	(%)
0	0	0	0	0
100	100	100	0	0
200	200	202	2	.30
300	300	300	0	0
400	400	399	1	.12
500	500	500	0	0
600	600	601	1	.09
700	700	700	0	0
800	800	802	2	.16
900	900	901	1	.07
1000	1000	1001	1	.07
1100	1100	1100	0	0
1200	1200	1201	1	.06
1300	1300	1299	1	.06
1400	1400	1402	2	.11
1500	1500	1500	0	0
1600	1600	1602	2	.10
1700	1700	1701	1	.05
1800	1800	1802	2	.09
1900	1900	1901	1	.04
2000	2000	2001	1	.04
2100	~~2100~~ 2100	2099	1	.04
		Averages:	.909	.06

OF = off scale response by unit under test (°F)
% dev = 100 Δt / (460 + t)

☐ Unit in tolerance
☐ Unit was not in tolerance: recalibrated - See new calibration sheet.

S-43

Interpoll Laboratories, Inc.

Temperature Measurement Device Calibration Sheet

Unit under test:

Vendor OMEGA

Model HH81 — Serial Number 74JX0223 #33

Range -160 - 1372 C °F — Thermocouple Type K

Date of Calibration 4-18-94 — Technician BOB

Method of Calibration:

☐ Comparison against ASTM mercury in glass thermometer using a thermostatted and insulated aluminum block designed to provide uniform temperature. The temperature is adjusted by adjusting the voltage on the block heater cartridge.

☒ Omega Model CL-300 Type K Thermocouple Simulator which provides 22 precise temperature equivalent millivolt signals. The CL-300 is cold junction compensated. Calibration accuracy is ± 0.1% of span (2100 °F) ± 1 degree (for negative temperatures add ± 2 degrees. The CL-300 simulates exactly the millivoltage of a Type K thermocouple at the indicated temperature.

Desired Temp (°F) Nominal	Temperature of Standard or Simulated Temp (°F)	Response of Unit Under Test (°F)	Deviation	
			Δt (°F)	(%)
0	0	-1.0	-1.0	-.21
100	100	98.5	1.5	.26
200	200	200.3	.3	.04
300	300	298.6	1.4	.18
400	400	398	2	.23
500	500	499	1	.10
600	600	600	0	0
700	700	699	1	.08
800	800	801	1	.07
900	900	900	0	0
1000	1000	1001	1	.06
1100	1100	1099	1	.06
1200	1200	1201	1	.06
1300	1300	1299	1	.65
1400	1400	1402	2	.01
1500	1500	1500	0	0
1600	1600	1603	3	.14
1700	1700	1701	1	.04
1800	1800	1803	3	.13
1900	1900	1901	1	.04
2000	2000	2001	1	.04
2100	2100	2099	1	.03
		Averages:	1.05	.064

OF = off scale response by unit under test (°F)
% dev = 100 Δt / (460 + t)

☒ Unit in tolerance
☐ Unit was not in tolerance; recalibrated - See new calibration sheet.

S-433

E.T.'s

Interpoll Laboratories, Inc.

Temperature Measurement Device Calibration Sheet

#34

Unit under test:
Vendor omega
Model HH81
Range 0-2000 °F
Date of Calibration 4-21-94
Serial Number 74TXC343
Thermocouple Type K
Technician E TROWBRIDGE

Method of Calibration:

☐ Comparison against ASTM mercury in glass thermometer using a thermostatted and insulated aluminum block designed to provide uniform temperature. The temperature is adjusted by adjusting the voltage on the block heater cartridge.

☒ Omega Model CL-300 Type K Thermocouple Simulator which provides 22 precise temperature equivalent millivolt signals. The CL-300 is cold junction compensated. Calibration accuracy is ± 0.1% of span (2100 °F) ± 1 degree (for negative temperatures add ± 2 degrees. The CL-300 simulates exactly the millivoltage of a Type K thermocouple at the indicated temperature.

Desired Temp (°F) Nominal	Temperature of Standard or Simulated Temp (°F)	Response of Unit Under Test (°F)	Deviation Δt (°F)	Deviation (%)
0	0	-1.9	-1.9	.41
100	100	-97.5	-2.5	.45
200	200	199.7	-.3	.05
300	300	297.5	-2.5	.33
400	400	397	-3	.35
500	500	498	-2	.20
600	600	600	—	0
700	700	699	-1	.08
800	800	801	+1	.08
900	900	900	—	0
1000	1000	1001	+1	.07
1100	1100	1098	-2	.13
1200	1200	1201	+1	.06
1300	1300	1299	-1	.05
1400	1400	1402	+2	.11
1500	1500	1500	—	0
1600	1600	1603	+3	.14
1700	1700	1701	+1	.05
1800	1800	1804	+4	.18
1900	1500	1901	+1	.04
2000	2000	2001	+1	.04
2100	2100	2099	-1	
		Averages:	1.46	.128

OF = off scale response by unit under test (°F)
% dev = 100 Δt / (460 + t)

☒ Unit in tolerance
☐ Unit was not in tolerance; recalibrated - See new calibration sheet.

7

Interpoll Laboratories, Inc.

Temperature Measurement Device
Calibration Sheet

#58

Unit under test:
Vendor Omega
Model HH 81
Range 0 – °F
Date of Calibration 5-5-94
Serial Number 74TX0474
Thermocouple Type K
Technician E TROWBRIDGE

Method of Calibration:

☐ Comparison against ASTM mercury in glass thermometer using a thermostatted and insulated aluminum block designed to provide uniform temperature. The temperature is adjusted by adjusting the voltage on the block heater cartridge.

☒ Omega Model CL-300 Type K Thermocouple Simulator which provides 22 precise temperature equivalent millivolt signals. The CL-300 is cold junction compensated. Calibration accuracy is ± 0.1% of span (2100 °F) ± 1 degree (for negative temperatures add ± 2 degrees. The CL-300 simulates exactly the millivoltage of a Type K thermocouple at the indicated temperature.

Desired Temp (°F) Nominal	Temperature of Standard or Simulated Temp (°F)	Response of Unit Under Test (°F)	Deviation	
			Δt (°F)	(%)
0	0	-2	-2.0	.43
100	100	99.0	-1	.18
200	200	200	0	0
300	300	298	-2	.26
400	400	398	-2	.23
500	500	499	-1	.10
600	600	600	0	0
700	700	699	-1	.08
800	800	802	+2	.16
900	900	900	0	0
1000	1000	1001	+1	.07
1100	1100	1100	0	0
1200	1200	1201	+1	.06
1300	1300	1299	-1	.05
1400	1400	1402	+2	.10
1500	1500	1500	0	0
1600	1600	1603	+3	.14
1700	1700	1701	+1	.05
1800	1800	1802	+2	.09
1900	1900	1901	+1	.04
2000	2000	2001	+1	.04
2100	2100	2099	-1	.04
		Averages:	1.14	.09

OF = off scale response by unit under test (°F)
% dev = 100 Δt / (460 + t)

☒ Unit in tolerance
☐ Unit was not in tolerance; recalibrated - See new calibration sheet.

Interpoll Laboratories, Inc.
(612) 786-6020

S-Type Pitot Tube Inspection Sheet

Pitot Tube No. 22-8

Pitot tube dimensions:

1. External tubing diameter (D_t) .316 IN.
2. Base to Side A opening plane (P_A) .460 IN.
3. Base to Side B opening plane (P_B) .460 IN.

Alignment:

4. α_1 < 10° 0
5. α_2 < 10° 0

6. B_1 < 5° 0
7. B_2 < 5° 0

8. Z <.125" .0
9. W <.0625" .01

Distance from Pitot to Probe Components:

10. Pitot to 0.500 IN. nozzle .760 IN.
11. Pitot to probe sheath 3.0 IN.
12. Pitot to thermocouple (parallel to probe) 3.0 IN.
13. Pitot to thermocouple (perpendicular to probe) .760 IN.

☒ Meets all EPA design criteria thus C_p = 0.84
☐ Does not meet EPA design criteria - thus calibrate in wind tunnel.
C_p = ______

Date of Inspection: 11-8-94

Inspected by:

CFR Title 40 Part 60 Appenidix A Method 2

S-348

Interpoll Laboratories, Inc.
(612) 786-6020

S-Type Pitot Tube Inspection Sheet

Pitot Tube No. 23-6

Pitot tube dimensions:

1. External tubing diameter (D_t) .316 IN.
2. Base to Side A opening plane (P_A) .460 IN.
3. Base to Side B opening plane (P_B) .460 IN.

Alignment:

4. α_1 < 10° 0
5. α_2 < 10° 0

6. B_1 < 5° 0
7. B_2 < 5° 0

8. Z <.125" .02
9. W <.0625" .025

Distance from Pitot to Probe Components:

10. Pitot to 0.500 IN. nozzle .750 IN.
11. Pitot to probe sheath 3.0 IN.
12. Pitot to thermocouple (parallel to probe) 3.0 IN.
13. Pitot to thermocouple (perpendicular to probe) .760 IN.

☒ Meets all EPA design criteria thus C_p = 0.84
☐ Does not meet EPA design criteria - thus calibrate in wind tunnel.
C_p = ______

Date of Inspection: 1-8-94

Inspected by:

CFR Title 40 Part 60 Appenidix A Method 2

Interpoll Laboratories, Inc.
(612) 786-6020

S-Type Pitot Tube Inspection Sheet

Pitot Tube No. 23-8

Pitot tube dimensions:

1. External tubing diameter (D_t) .316 IN.
2. Base to Side A opening plane (P_A) .460 IN.
3. Base to Side B opening plane (P_B) .460 IN.

Alignment:

4. α_1 < 10° 0
5. α_2 < 10° 0

6. B_1 < 5° 0
7. B_2 < 5° 0

8. Z <.125" .03
9. W <.0625" .02

Distance from Pitot to Probe Components:

10. Pitot to 0.500 IN. nozzle .760 IN.
11. Pitot to probe sheath 3.0 IN.
12. Pitot to thermocouple (parallel to probe) 3.0 IN.
13. Pitot to thermocouple (perpendicular to probe) .760 IN.

☒ Meets all EPA design criteria thus C_p = 0.84
☐ Does not meet EPA design criteria - thus calibrate in wind tunnel.
C_p = ______

Date of Inspection: 1-8-94

Inspected by:

CFR Title 40 Part 60 Appenidix A Method 2

S-348

Interpoll Laboratories, Inc.
(612) 786-6020

S-Type Pitot Tube Inspection Sheet

Pitot Tube No 27-4

Pitot tube dimensions:

1. External tubing diameter (D_t) .316 IN.
2. Base to Side A opening plane (P_A) .460 IN.
3. Base to Side B opening plane (P_B) .460 IN.

Alignment:

4. α_1 < 10° 0
5. α_2 < 10° 0

6. B_1 < 5° 0
7. B_2 < 5° 0

8. Z <.125" .02
9. W <.0625" .01

Distance from Pitot to Probe Components:

10. Pitot to 0.500 IN. nozzle .750 IN.
11. Pitot to probe sheath 3.0 IN.
12. Pitot to thermocouple (parallel to probe) 3.0 IN.
13. Pitot to thermocouple (perpendicular to probe) .760 IN.

☒ Meets all EPA design criteria thus C_p = 0.84
☐ Does not meet EPA design criteria - thus calibrate in wind tunnel.
C_p = ______

Date of Inspection: 4-7-94

Inspected by:

CFR Title 40 Part 60 Appenidix A Method 2

S-348

Interpoll Laboratories, Inc.
(612) 786-6020

S-Type Pitot Tube Inspection Sheet

Pitot Tube No. 27-6

Pitot tube dimensions:

1. External tubing diameter (D_t) .316 IN.
2. Base to Side A opening plane (P_A) .460 IN.
3. Base to Side B opening plane (P_B) .460 IN.

Alignment:

4. α_1 < 10° 0
5. α_2 < 10° 0

6. B_1 < 5° 0
7. B_2 < 5° 0

8. Z <.125" .01
9. W <.0625" .02

Distance from Pitot to Probe Components:

10. Pitot to 0.500 IN. nozzle .750 IN.
11. Pitot to probe sheath 3.0 IN.
12. Pitot to thermocouple (parallel to probe) 3.0 IN.
13. Pitot to thermocouple (perpendicular to probe) .760 IN.

☒ Meets all EPA design criteria thus C_p = 0.84
☐ Does not meet EPA design criteria - thus calibrate in wind tunnel.
C_p = ______

Date of Inspection: 4-7-94

Inspected by:

CFR Title 40 Part 60 Appenidix A Method 2

S-348

Interpoll Laboratories, Inc.
(612) 786-6020

S-Type Pitot Tube Inspection Sheet

Pitot Tube No. 79-4

Pitot tube dimensions:

1. External tubing diameter (D_t) .316 IN.
2. Base to Side A opening plane (P_A) .460 IN.
3. Base to Side B opening plane (P_B) .460 IN.

Alignment:

4. α_1 < 10° 0
5. α_2 < 10° 0

6. B_1 < 5° 0
7. B_2 < 5° 0

8. Z <.125" .02
9. W <.0625" .02

Distance from Pitot to Probe Components:

10. Pitot to 0.500 IN. nozzle .750 IN.
11. Pitot to probe sheath 3.0 IN.
12. Pitot to thermocouple (parallel to probe) 3.0 IN.
13. Pitot to thermocouple (perpendicular to probe) .760 IN.

☒ Meets all EPA design criteria thus C_p = 0.84
☐ Does not meet EPA design criteria - thus calibrate in wind tunnel.
C_p = ______

Date of Inspection: 4-7-94

Inspected by:

CFR Title 40 Part 60 Appenidix A Method 2

Interpoll Laboratories, Inc.
(612) 786-6020

S-Type Pitot Tube Inspection Sheet

Pitot Tube No. 29-5

Pitot tube dimensions:

1. External tubing diameter (D_t) .316 IN.
2. Base to Side A opening plane (P_A) .460 IN.
3. Base to Side B opening plane (P_B) .460 IN.

Alignment:

4. α_1 < 10° 0
5. α_2 < 10° 0

6. B_1 < 5° 0
7. B_2 < 5° 0

8. Z <.125" .02
9. W <.0625" .01

Distance from Pitot to Probe Components:

10. Pitot to 0.500 IN. nozzle .750 IN.
11. Pitot to probe sheath 3.0 IN.
12. Pitot to thermocouple (parallel to probe) 3.0 IN.
13. Pitot to thermocouple (perpendicular to probe) .760 IN.

☒ Meets all EPA design criteria thus C_p = 0.84
☐ Does not meet EPA design criteria - thus calibrate in wind tunnel.
C_p = ______

Date of Inspection: 1-7-94

Inspected by:

CFR Title 40 Part 60 Appenidix A Method 2

S-348

Interpoll Laboratories, Inc.
(612) 786-6020

S-Type Pitot Tube Inspection Sheet

Pitot Tube No. 29-8

Pitot tube dimensions:

1. External tubing diameter (D_t) .316 IN.
2. Base to Side A opening plane (P_A) .460 IN.
3. Base to Side B opening plane (P_B) .460 IN.

Alignment:

4. α_1 < 10° 0
5. α_2 < 10° 0

6. B_1 < 5° 0
7. B_2 < 5° 0

8. Z <.125" .01
9. W <.0625" .02

Distance from Pitot to Probe Components:

10. Pitot to 0.500 IN. nozzle .750 IN.
11. Pitot to probe sheath 3.0 IN.
12. Pitot to thermocouple (parallel to probe) 3.0 IN.
13. Pitot to thermocouple (perpendicular to probe) .760 IN.

☐ Meets all EPA design criteria thus C_p = 0.84
☐ Does not meet EPA design criteria - thus calibrate in wind tunnel.
C_p = ________

Date of Inspection: 4-7-94

Inspected by:

CFR Title 40 Part 60 Appenidix A Method 2

Interpoll Laboratories, Inc.
(612) 786-6020

S-Type Pitot Tube Inspection Sheet

Pitot Tube No. 4M5-8

Pitot tube dimensions:

1. External tubing diameter (D_t) .316 IN.
2. Base to Side A opening plane (P_A) .460 IN.
3. Base to Side B opening plane (P_B) .460 IN.

Alignment:

4. α_1 < 10° 0
5. α_2 < 10° 0

6. B_1 < 5° 0
7. B_2 < 5° 0

8. Z <.125" 0
9. W <.0625" .02

Distance from Pitot to Probe Components:

10. Pitot to 0.500 IN. nozzle .750 IN.
11. Pitot to probe sheath 3.0 IN.
12. Pitot to thermocouple (parallel to probe) 3.0 IN.
13. Pitot to thermocouple (perpendicular to probe) .760 IN.

☒ Meets all EPA design criteria thus C_p = 0.84
☐ Does not meet EPA design criteria - thus calibrate in wind tunnel.
C_p = ______

Date of Inspection:

4-7-93

Inspected by:

CFR Title 40 Part 60 Appenidix A Method 2

S-348

INTERPOLL LABORATORIES
(612)786-6020

Stack Sampling Department - QA
Aneroid Barometer Calibration Sheet

Date 7-7-94
Technician Bob
Mercury Column Barometer No. LAB
Aneroid Barometer No. 107 23629

Actual Mercury Barometer Read	Ambient Temp.	Temperature Correction Factor	Adjsted Mercury Barometer Read	Initial Aneriod Barometer Read	Difference ($P_{ba}-P_{bm}$)
28.98	78	.129	28.85	28.84	.01

Has this barometer shown any consistent problems with calibration? Yes/No. If yes, explain. NO

Has problem been alleviated? Yes/No. How?

*Note

Aneroid barometers will be calibrated periodically against a mercury column barometer. The aneroid barometer to be calibrated should be placed in close proximity to the mercury barometer and left to equilibrate for 20-30 minutes before calibrating. Aneriod barometer will be calibrated to the adjusted mercury barometer readings.

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INTERPOLL LABORATORIES
(612)786-6020

Stack Sampling Department - QA
Aneroid Barometer Calibration Sheet

Date 7-8-94

Technician Mark Koehler

Mercury Column Barometer No. Lab 1

Aneroid Barometer No. ~~560 ETS~~ 21029004 MK

Actual Mercury Barometer Read	Ambient Temp.	Temperature Correction Factor	Adjsted Mercury Barometer Read	Initial Aneriod Barometer Read	Difference (P_{ba}-P_{bm})
28.910	74	.119	28.791	28.78	.01

Has this barometer shown any consistent problems with calibration? Yes/No. If yes, explain.

Has problem been alleviated? Yes/No. How?

*Note

Aneroid barometers will be calibrated periodically against a mercury column barometer. The aneroid barometer to be calibrated should be placed in close proximity to the mercury barometer and left to equilibrate for 20-30 minutes before calibrating. Aneriod barometer will be calibrated to the adjusted mercury barometer readings.

INTERPOLL LABORATORIES
(612)786-6020

Stack Sampling Department - QA
Aneroid Barometer Calibration Sheet

Date 11-15-93
Technician R. Rosenthal
Mercury Column Barometer No. NOVA-1
Aneroid Barometer No.

Actual Mercury Barometer Read	Ambient Temp.	Temperature Correction Factor	Adjsted Mercury Barometer Read	Initial Aneriod Barometer Read	Difference (P_{ba}-P_{bm})
29.36	72	.116	29.244	29.24	0

Has this barometer shown any consistent problems with calibration? Yes/[✓ No.] If yes, explain.

Has problem been alleviated? Yes/No. How?

*Note

Aneroid barometers will be calibrated periodically against a mercury column barometer. The aneroid barometer to be calibrated should be placed in close proximity to the mercury barometer and left to equilibrate for 20-30 minutes before calibrating. Aneriod barometer will be calibrated to the adjusted mercury barometer readings.

S-312

INTERPOLL LABORATORIES
(612)786-6020

Stack Sampling Department - QA
Aneroid Barometer Calibration Sheet

ET'S

Date 5-31-94
Technician
Mercury Column Barometer No. LPB 1
Aneroid Barometer No. ultimeter model 12 SN-01002.084

Actual Mercury Barometer Read	Ambient Temp.	Temperature Correction Factor	Adjsted Mercury Barometer Read	Initial Aneriod Barometer Read	Difference (P_{ba}-P_{bm})
29.230	72	.115	29.115	29.12	.005

Has this barometer shown any consistent problems with calibration? Yes/No. If yes, explain. no

Has problem been alleviated? Yes/No. How?

*Note

Aneroid barometers will be calibrated periodically against a mercury column barometer. The aneroid barometer to be calibrated should be placed in close proximity to the mercury barometer and left to equilibrate for 20-30 minutes before calibrating. Aneriod barometer will be calibrated to the adjusted mercury barometer readings.

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